Participation in a blood and body fluid exposure programme in a multinational healthcare facility in an emerging country

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Abstract

Background: Blood and body fluid exposures (BBFE) are an important occupational hazard to which healthcare providers are exposed, with more than 5,000 daily exposures worldwide. While the majority of programmes for the management of BBFE were written for developed countries, most BBFE transmissible infections in healthcare providers occur in the developing countries, where reporting of exposures is low. It is therefore a high priority to establish effective BBFE programmes in developing countries, and to identify and reduce barriers to participation in these programmes.

Aim: To examine participation in a newly established BBFE programme, responsive to the needs of a multinational workforce, in a hospital in United Arab Emirates (UAE).

Methodology: Mixed methods.

Methods: Three systematic reviews and one structured review of the literature were performed on topics central to management of BBFE. Two quantitative and two qualitative studies were conducted to assess the participation in and impact of implementing a new BBFE programme. The first quantitative study assessed the knowledge, attitudes, and practices of the healthcare providers prior to implementation of the programme. The second quantitative study constituted pre- and post-intervention clinical audits to assess the impact of the programme on healthcare providers' behaviour. The first qualitative study examined the lived experience of healthcare providers after occupational exposure to HIV-infected body fluid. The second qualitative study involved a cross-cultural comparison of healthcare providers' beliefs and attitudes toward BBFE in UAE and New Zealand.

Results: Healthcare providers in the hospital were found to have detailed knowledge of potential treatment options. The results reflected a preference for personal discretion in decisions on reporting and risk assessment before post-exposure management. The second quantitative study demonstrated that the programme successfully improved the reporting rates of occupational exposures from 19.5/100 beds annually in 2006-7 to 27.7/100 beds annually in 2008-9. The study identified several features which the programme used to improve reporting and post-exposure management: corporate policy, development of a BBFE protocol, introduction of immunisation campaigns, use of safe devices, and post-exposure counselling.
The qualitative studies explored post-exposure stress and the effect of non-organisational factors. These studies demonstrated that healthcare providers were more concerned about the social implications (particularly stigma, and legal or financial penalties) rather than the biological consequences of the disease. It was evident from the case studies that concern regarding stigma played a significant role in post-exposure stress, with healthcare providers in UAE having far more concerns in this regard compared to New Zealand-based healthcare providers. The findings suggested that in UAE occupational reporting is not just an organisational issue; it needs to be addressed at a societal level as well.

Conclusions: This thesis characterised the organisational and non-organisational factors which influenced participation of healthcare providers in a BBFE programme. The hospital’s programme was successful in addressing organisational factors, but interventions to address non-organisational factors are also required. All hospitals in the Middle East should develop BBFE programmes that optimise their effectiveness in the cultural context in which they operate.

Key words: Blood and body fluid exposure (BBFE), Protocol, prevention and post-exposure prophylaxis, Non-organisational factors, Stigma, Culture, Law.
Publications arising from this thesis


Conference presentations arising from this thesis


Preface

This thesis would not have been completed without the grace of God and the support that was provided by a number of people.

I would firstly like to thank my supervisors for their encouragement and support through the last 5 years: Dr. Robin Griffiths, Dr. William Levack, Dr. Mark Newson-Smith, Dr. Peter Larsen, and Dr. Salem Beshyah. They contributed to the development of my work at different stages of the research, publications, and writing the thesis.

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The research would not have been possible if the management of Sheikh Khalifa Medical City had not allowed me to conduct the research at their hospital; I thank them and all my colleagues in the hospital and especially my department for their support of the research.

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I dedicate this thesis to my family: my parents Dr. Matloob Zaidi and Qamar Zaidi who were always there when I needed them for help and guidance. They have always encouraged me to study and excel. I also dedicate it to my wife Fariha Zaidi and daughters Ayesha, Asma, Maryam, and Sarah for their love and patience, not only in the hours dedicated to the research but also migrating to New Zealand for completing the PhD, especially my wife for her support throughout the 14 years of our marriage, but more so in the last 2 years of writing the thesis.
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<th>Description</th>
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<td>ACC</td>
<td>Accident Compensation Corporation</td>
</tr>
<tr>
<td>AIDS</td>
<td>Acquired Immunodeficiency Syndrome</td>
</tr>
<tr>
<td>BBFE</td>
<td>Blood and Body Fluid Exposure</td>
</tr>
<tr>
<td>CCOHS</td>
<td>Canadian Council for Occupational Health and Safety</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control</td>
</tr>
<tr>
<td>DNA</td>
<td>Deoxyribonucleic acid</td>
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<tr>
<td>HAART</td>
<td>Highly Active Antiretroviral Therapy</td>
</tr>
<tr>
<td>HBeAg</td>
<td>Hepatitis B e Antigen</td>
</tr>
<tr>
<td>HBsAg</td>
<td>Hepatitis B surface antigen</td>
</tr>
<tr>
<td>HBV</td>
<td>Hepatitis B Virus</td>
</tr>
<tr>
<td>HCPs</td>
<td>Healthcare providers</td>
</tr>
<tr>
<td>HCV</td>
<td>Hepatitis C Virus</td>
</tr>
<tr>
<td>HIV</td>
<td>Human immunodeficiency virus</td>
</tr>
<tr>
<td>HSE</td>
<td>Health and Safety Executive</td>
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<tr>
<td>ILO</td>
<td>International Labour Organisation</td>
</tr>
<tr>
<td>JCI</td>
<td>Joint Commission International</td>
</tr>
<tr>
<td>KAP</td>
<td>Knowledge, attitudes, and practices</td>
</tr>
<tr>
<td>LCDC</td>
<td>Laboratory Centre for Disease Control</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute of Occupational Safety &amp; Health</td>
</tr>
<tr>
<td>NSI</td>
<td>Needlestick injuries</td>
</tr>
<tr>
<td>NZ</td>
<td>New Zealand</td>
</tr>
<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
</tr>
<tr>
<td>SKMC</td>
<td>Sheikh Khalifa Medical City</td>
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<tr>
<td>UAE</td>
<td>United Arab Emirates</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>UK</td>
<td>United Kingdom</td>
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<tr>
<td>UNAIDS</td>
<td>United Nations Programme on HIV/AIDS</td>
</tr>
<tr>
<td>US PHS</td>
<td>United States Public Health Services</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
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<tr>
<td>WHO EMRO</td>
<td>WHO Eastern Mediterranean Regional Office</td>
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</table>
Glossary

Blood
Human blood, human blood components, and products made from human blood.

Blood-borne pathogens
Pathogenic micro-organisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus, hepatitis C virus and human immunodeficiency virus.

Blood and body fluid exposure
Blood or body fluid exposure is defined as an incident when an infected body fluid comes in contact with healthcare providers’ tissues (LCDC, 1987).

In this thesis I have limited the use of the abbreviation (BBFE) to when it was repeated in the same sentence or paragraph, tables, graphs, and figures.

Clinical laboratory
A workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious materials.

Constant comparative method
A method of analysis which generates successively more abstract theories and concepts through the inductive process of comparing data with data, data with categories, categories with categories, and categories with concepts, comparing them at each analytic stage (Charmaz, 2006, p.187).

Constructivism
An epistemology in which “truth, or meaning, comes into existence in and out of our engagement with realities in our world” (Crotty, 1998, p.8).

Contaminated
The presence or the reasonably anticipated presence of blood or other potentially infectious materials on or in an item or surface. For example, contaminated laundry refers to laundry which has been soiled with blood or other potentially infectious materials or may contain sharps. Contaminated sharps refers to any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.
Engineered sharps injury protection
A non-needle sharp or a needle device used for withdrawing body fluids, accessing a vein or artery, or administering medications or other fluids, with a built-in safety feature or mechanism that effectively reduces the risk of an exposure incident.

Engineering controls
Controls (e.g. sharps disposal containers, self-sheathing needles, safer medical devices, such as sharps with engineered sharps injury protection and needleless systems) that have been designed to safely isolate or remove the hazard of blood-borne pathogens from the workplace.

Epistemology
The study of knowledge. Epistemology relates to one’s belief regarding the nature of knowledge and how it is possible to know what we know (Crotty, 1998).

Exposure
An incident in which there is a specific body part (eye, mouth, other mucous membrane), non-intact skin, or parenteral contact with blood or other potentially infectious materials.

Healthcare provider
Any individual including employees, students, contractors, attending clinicians, public safety workers and volunteers who is involved in activities which require contact with patients or with blood or any other body fluid of patients in a healthcare, laboratory or public safety setting.

Needleless system
A device that does not use needles for: (1) The collection of bodily fluids or withdrawal of body fluids after initial venous or arterial access is established; (2) The administration of medication or fluids; or (3) Any other procedure involving the potential for occupational exposure to blood-borne pathogens due to percutaneous injuries from contaminated sharps.

Needlestick injury
Needlestick injuries (NSIs) are defined as an accidental skin-penetrating stab wound caused by a needle.

In this thesis I have limited the use of the abbreviation (NSI) to tables, graphs and figures.
Occupational exposure

Non-intact skin, eye, mucous membrane, or parenteral contact with blood or body fluid exposure to any infectious materials that may result from any activity performed at work.

Originality

A criterion on which grounded theory studies can be critically evaluated. Originality refers to how novel the work resulting from a grounded theory study is; it can be judged on the basis of whether it produces new perspectives, as opposed to being a re-packaging of established concepts (Charmaz, 2006).

Parenteral

A specific route of transmission by which a drug, fluid, poison, or other substance is taken into the body. Parenteral transmission involves direct transfer into the body via piercing mucous membranes or the skin barrier through such events as needlesticks, human bites, cuts, and abrasions.

Personal protective equipment

Specialised clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, trousers, shirts or blouses) that are not intended to function as protection against a hazard are not considered to be personal protective equipment.

Purposeful sampling

An approach to selection of participants or sources of data on the basis of their characteristics (Charmaz, 2006).

Sharps

Any sharp instrument or device which could cut the skin is colloquially referred to in the medical literature as a “sharp”. It includes both needles and scalpels.

Source individual

Any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure for healthcare providers. Examples include, but are not limited to: hospital and clinic patients; clients in institutions for the developmentally disabled; trauma victims, clients of drug and alcohol treatment facilities; residents of hospices and nursing homes; human remains; and individuals who donate or sell blood or blood components.
<table>
<thead>
<tr>
<th><strong>Sterilising</strong></th>
<th>The use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.</th>
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<tbody>
<tr>
<td><strong>Universal precautions</strong></td>
<td>An approach to infection control, in which all human blood and certain human body fluids are assumed to be equally at risk of being infectious for HIV, HBV, and other blood-borne pathogens, and are treated and managed as such.</td>
</tr>
<tr>
<td><strong>Work practice controls</strong></td>
<td>Controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g. prohibiting recapping of needles by a two-handed technique).</td>
</tr>
</tbody>
</table>
Chapter 1: Introduction and background

1.1 Introduction

According to the World Health Organisation (WHO) model, 200-5,000 HIV occupational infections occur each year in healthcare providers (with an expected consequence of 1000 new HIV/AIDS infections annually) (Prüss-Üstün et al., 2003). According to the WHO (2003) data, the annual proportions of healthcare providers exposed to blood-borne pathogens were 2.6% for hepatitis C virus (HCV), 5.9% for hepatitis B virus (HBV) and 0.5% for human immunodeficiency virus (HIV), corresponding globally to approximately 16,000 HCV and 66,000 HBV actual exposures and potential infections in healthcare providers worldwide (Prüss-Üstün et al., 2003).

The management of blood and body fluid exposures in the hospitals of developing countries is of particular concern. There is an asymmetry in blood and body fluid exposures reporting and prevention in that, while 90% of all exposures among healthcare providers are attributed to occupational incidents in the developing world, 90% of the reports of occupational exposure are recorded in the developed world (Wilburn, 2004). The majority of the studies which have assessed blood and body fluid exposures reporting have demonstrated that significant overall under-reporting occurs worldwide (McGeer et al., 1990; Osborn et al., 1999). A regional assessment conducted by the WHO Eastern Mediterranean Regional Office (EMRO) reported an average of four needlestick injuries (NSI) per year per healthcare provider in the East Mediterranean region (WHO, 2010b). There are limited published research data on occupational exposures to body fluids in the Middle East and United Arab Emirates (UAE) (Jacob et al., 2010; Zaidi et al., 2010).

The most serious consequence of failure to report an exposure is that it precludes access to post-exposure prophylaxis, the benefits of which are well established (CDC, 2001b). Prompt and appropriate post-exposure management can reduce the risk of occupational HIV infection following exposure by 86%, and hepatitis B by 95% (Grady & Lee, 1975; McLeod & Montaner, 2009; Department of Health AIDS Institute, 2008; Weinbaum et al., 2003).

One of the major barriers to seeking post-exposure prophylaxis in the Middle East region is a lack of clear policies, procedures, protocols for reporting, and post-exposure management. Guidelines for management of blood and body fluid exposures have been available since 1991; most of these were implemented in developed countries (Go et al.,
1991). In the developed countries, national standards cover all elements of a comprehensive blood and body fluid exposures programme including vaccination, education, reporting, and post-exposure management. In contrast, in emerging countries, such national standards, infrastructure and reporting systems are not available.

At the commencement of this study, most of the hospitals in UAE did not have established blood and body fluid protection programmes and there were no national guidelines on standards and practices. In the UAE, hospitals employ healthcare providers from many different countries, adding another dimension.

This thesis endeavours to establish a better understanding of the issues related to participation in a blood and body fluid exposure programme in Middle Eastern health services. It first reports a systematic review of international blood and body fluid exposures programmes which demonstrated that they all had similar content in terms of their context and recommendations. Secondly, it examines the effects of the establishment of a new blood and body fluid exposure programme in one hospital in UAE, and the experiences of healthcare providers working in that environment. Thirdly, barriers to participation in a blood and body fluid exposure programme are examined.

The implementation of the new blood and body fluid exposures programme itself was not a part of the work contributing to this PhD. Instead, the research examined the impact of the programme by benchmarking the key performance indices before its implementation (pre-intervention clinical audit) and comparing these with the post-intervention findings (post-intervention clinical audit), in order to examine whether the introduction of a blood and body fluid exposures programme was able to increase participation.

A Knowledge, Attitudes, and Practices (KAP) study was conducted. One of the objectives of the KAP study was to estimate the proportion of actual exposures versus reported exposures. This study not only provided information about the knowledge and practices of the healthcare providers, but also identified non-systemic barriers to practice and participation in the blood and body fluid exposures programme.

To further comprehensively explore factors influencing participation, a qualitative study was designed to drill down into these non-systemic factors. The results demonstrated the significant impact of non-organisational factors such as culture, stigma and legal contexts on healthcare providers’ response to blood and body fluid exposure incidents. The perceived impacts of non-organisational factors were then explored in a cross-cultural comparison of
healthcare providers from the UAE and New Zealand (NZ), to establish whether the findings were specific to the Middle East context.

1.1.1 Research aim

The overall aim of the research was:

"To examine the participation in and experience of a new blood and body fluid exposure programme, designed to be responsive to the specific workforce context of a multinational hospital in an emerging country".

To achieve the research aim, four objectives were developed; these were attained through a series of quantitative and qualitative studies:

- To evaluate the effectiveness of the blood and body fluid exposure programme at the study hospital after 2 years; and
- To assess the knowledge, attitudes, and practices of healthcare providers in the UAE related to blood and body fluid exposures; and
- To explore the lived experience of the healthcare providers in the UAE exposed to body fluid infected with HIV through the course of their work; and
- To undertake a cross-cultural comparison of healthcare providers' perception of management of blood and body fluid exposure in two different countries' health settings.

Quantitative research methods were used to benchmark the pre-intervention hospital practices, assess the knowledge and practices of healthcare providers, and evaluate the post-intervention impact of the blood and body fluid exposure programme after 2 years. During this work it became apparent that quantitative methods would not be sufficient to fully explore the non-organisational determinants of participation influencing this programme and its outcomes. Therefore, qualitative research methods were also used to document the lived experience of healthcare providers who were exposed to body fluids infected with HIV. The principles of grounded theory research were applied to explore their experiences. Finally, an international cross-cultural study was conducted to compare the perceptions of healthcare providers related to blood and body fluid exposure in UAE to those in a country with a different cultural, religious, and legal working context.
1.1.2 Thesis structure

The thesis consists of nine chapters. Chapter 1 gives an introduction explaining why the research was performed, and presents background information to the research topic from historical, legal and regional perspectives. Chapter 2 provides a review of the literature for areas related to the barriers to participation and evaluation of hospital-based blood and body fluid exposures programmes. Chapter 3 discusses culture and stigma in the context of HIV to build the basis of stigma being discussed in the latter part of the thesis. Chapter 4 provides a description of the methodologies employed in this thesis and debates the benefits of the mixed methods research paradigm used in this research. Chapter 5 provides the findings of the knowledge, attitudes and practices study. It discusses blood and body fluid exposures reporting rates and the influence of knowing the patient’s infectious state on post-exposure practices of healthcare providers. Chapter 6 documents and compares the pre-intervention clinical audit findings with the post-intervention clinical audit results to assess the impact of the intervention after 2 years. Chapters 7 and 8 discuss the qualitative research conducted as part of this thesis, which explored the lived experience of healthcare providers exposed to body fluids infected with HIV, and a comparative study exploring the beliefs and perspectives of healthcare providers from two different countries (UAE and NZ) regarding occupational exposure to HIV, in order to explore the impact of culture, stigma and law on compliance with blood and body fluid exposure management programmes. Finally, chapter 9 discusses the results of the studies as a whole body of research, and provides an overview of how these studies reinforced each other, contributing to the existing body of knowledge of participation in and management of blood and body fluid exposures in hospitals with a multinational workforce in emerging countries. The chapter concludes the thesis by presenting future research opportunities and recommendations.

1.2 Diseases transmitted by blood and body fluid exposure

1.2.1 Blood-borne pathogens

Hepatitis B, hepatitis C and HIV are the three most common infections transmitted after an occupational blood and body fluid exposure (Weber et al., 2010). A review of the literature revealed that there are however at least 45 diseases which are transmissible after exposure to blood or body fluids (see Table 1.1).
Table 1.1: Diseases transmissible through blood or body fluid exposure

<table>
<thead>
<tr>
<th>Disease</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td>LCDC (1987)</td>
</tr>
<tr>
<td>Blastomycosis</td>
<td>CCOHS (2005)</td>
</tr>
<tr>
<td>Bolivian viral haemorrhagic fever</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Brucellosis</td>
<td>CCOHS (2005)</td>
</tr>
<tr>
<td>Corynebacterium striatum</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Crimean-Congo viral haemorrhagic fever</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Cryptococcus neoformans</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Cytomegalovirus</td>
<td>LCDC (1987)</td>
</tr>
<tr>
<td>Dengue fever</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Ebola fever</td>
<td>LCDC (1987)</td>
</tr>
<tr>
<td>Gonorrhoea</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>LCDC (1987)</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>LCDC (1987)</td>
</tr>
<tr>
<td>Hepatitis D</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Hepatitis G</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Herpes simplex 1</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Human T-cell lymphotrophic virus I, II</td>
<td>LCDC (1987)</td>
</tr>
<tr>
<td>Lassa fever</td>
<td>LCDC (1987)</td>
</tr>
<tr>
<td>Leishmania species</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Malaria</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Marburg viral haemorrhagic fever</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Mycobacteriosis</td>
<td>CCOHS (2005)</td>
</tr>
<tr>
<td>Mycobacterium leprae</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Mycobacterium marinum</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Mycoplasma caviae</td>
<td>CCOHS (2005)</td>
</tr>
<tr>
<td>Parovirus</td>
<td>WGO (n.d.)</td>
</tr>
<tr>
<td>Plasmodium falciparum</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Plasmodium malariae</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Plasmodium vivax</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Rocky Mountain spotted fever</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Sporotrichosis</td>
<td>CCOHS (2005)</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>CCOHS (2005)</td>
</tr>
<tr>
<td>Streptococcus pyogenes</td>
<td>CCOHS (2005)</td>
</tr>
<tr>
<td>Toxoplasmosis</td>
<td>CCOHS (2005)</td>
</tr>
<tr>
<td>Treponema pallidum (syphilis)</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Typhus</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Varicella zoster virus</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Yellow fever</td>
<td>Weber et al. (2010)</td>
</tr>
<tr>
<td>Yersinia</td>
<td>WGO (n.d.)</td>
</tr>
</tbody>
</table>

1.2.2 Hepatitis B

In 1963 Blumberg and colleagues discovered a protein which they identified as the Australia antigen; this antigen was subsequently shown to be a marker of active infection with the HBV (Blumberg & Alter, 1965). HBV is a hepatotropic double-stranded deoxyribonucleic acid virus belonging to the Hepadnaviridae family, 42 nm in diameter (Lüsebrink et al., 2010).
HBV infects only humans and a few non-human primates. Viral replication takes place mainly in the cells of the liver and to a lesser degree in the kidneys, pancreas, bone marrow, and spleen (Carey, 2010; Seeger & Mason, 2000). Occupational transmission of HBV in healthcare providers is well recognised (Alter, 2005). Blood contains the highest titre of HBV among the various body fluids (Bond et al., 1977). The blood test for HBV provides a quantitative measure of concentration of the virus in the blood, to measure the infectivity. Hepatitis B “e” antigen (HBeAg) is a good marker of infectivity and is usually present in samples with high concentration of HBV (active disease status) and usually absent when the HBV is present in low concentration (but this may be misleading in some case). The infection risk after an exposure to HBV-infected blood with demonstrable hepatitis B “e” antigen (HBeAg) is higher than if when exposed to blood infected by HBV but without hepatitis B “e” antigen (HBeAg). The routes of exposure and infectivity documented by different studies are presented in Table 1.2.

The HBV has been demonstrated to survive in dried blood at room temperature on environmental surfaces for at least 1 week (Bond et al., 1981). The efficiency of various modes of hepatitis transmission is dependent on the amount of HBV present in the body fluid, which reduces rapidly on exposure to ambient environments, and therefore reduces the infectivity of the dried blood on environmental surfaces. The contribution to disease transmission via environmental dried blood is unknown (“Hepatitis B,” 2012).

Since 1982 there have been effective vaccines to prevent hepatitis B infection, which provide up to 90% protection against the infection. The WHO has promoted population immunisation worldwide since 1997 (AIDS Institute, 2008). Due to the high risk of hepatitis B infection among healthcare providers, routine pre-exposure vaccination for healthcare providers against hepatitis B, and universal precautions (to treat all body fluids as infected) to reduce the risk of transmission have been recommended since the 1980s (CDC, 1982). Jagger reported that in 1983 the incidence of hepatitis B infection was three times higher in healthcare providers compared to the general public in the US, but that ratio fell to five times lower by 1995. The annual incidence of healthcare providers being infected due to occupational exposure fell from 386 to 9 infected healthcare providers per 100,000 in the same period (Jagger, 2007). This reduction in incidence of hepatitis B among healthcare providers was 1.5-fold greater than the reduction in incidence in the general population (Mahoney et al., 1997). This reduction in hepatitis B infection rates amongst healthcare providers was largely attributed to their high rates of occupation-related immunisation.
Table 1.2: Transmission of hepatitis B virus following blood and body fluid exposures

<table>
<thead>
<tr>
<th>Antigen</th>
<th>Exposure</th>
<th>Infectivity</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBsAg +ve &amp; HBeAg +ve</td>
<td>Percutaneous</td>
<td>37-62%</td>
<td>Werner &amp; Grady (1982)</td>
</tr>
<tr>
<td>HBsAg +ve &amp; HBeAg -ve</td>
<td>Percutaneous</td>
<td>23-37%</td>
<td>Werner &amp; Grady (1982)</td>
</tr>
<tr>
<td>HBsAg +ve &amp; HBeAg -ve</td>
<td>Percutaneous</td>
<td>1-6%</td>
<td>Sepkowitz (1996)</td>
</tr>
<tr>
<td>HBV viral load &gt; 10^9 genome equivalents/ml.</td>
<td>Percutaneous</td>
<td>5-13%</td>
<td>Harpaz et al, 1996; Eijk, 2004</td>
</tr>
<tr>
<td>HBV viral load &lt; 10^7 genome equivalents/ml.</td>
<td>Percutaneous</td>
<td>Unlikely</td>
<td>Buster et al., 2003</td>
</tr>
<tr>
<td>HBV</td>
<td>Mucous membrane</td>
<td>&gt;0%</td>
<td>Collins &amp; Kennedy (1997)</td>
</tr>
</tbody>
</table>

Generally accepted practices for the prevention of occupational infection are that if a non-immunised healthcare provider is exposed to body fluid contaminated with hepatitis B, he/she should be given either hepatitis B immune globulin and/or hepatitis B vaccine; both treatment regimens have been found effective (Seeff et al., 1978; CDC, 1991). In the case of previously demonstrated immune non-response to hepatitis B vaccination, provision of passive immunity by injection of anti-hepatitis B immune globulin is advised. A single dose of this has been shown to be 70% to 90% effective in preventing hepatitis B infection when administered within 7 days of exposure (Beasley et al., 1983). If the second dose of hepatitis B immune globulin is given after 4 weeks, the effectiveness is documented to be 75% to 95% (Grady & Lee, 1975; AIDS Institute, 2008; Weinbaum et al., 2003).
1.2.3 Hepatitis C

The HCV was discovered in 1989 by Michael Houghton and co-workers (Pawlotsky, 2011). It was found to be a ribonucleic acid virus classified in the flaviviridae family and genus Hepacivirus (Choo et al., 1989). Hepatitis C is a double-shelled, enveloped, single-stranded virus, 50 to 60 nm in diameter (Carey, 2010).

Non-occupational transmission of the HCV has been primarily through blood transfusions, intravenous drug use, and unsafe medical or surgical procedures (Pawlotsky, 2011). Hepatitis C is not frequently transferred through sexual contact or from mother to neonates (Koop, 2011). The infectivity of HCV is low but its prevalence is high. Hepatitis C is highly prevalent in the Middle East (PharmARC, 2010). The WHO estimates that there are at least 21.3 million HCV carriers in the Middle East (Fallahian & Najafi, 2011). The HCV virus does not live long in blood or other fluids outside the body. The concentration of viable HCV decreases significantly with time, which reduces the infectivity of the dried blood on environmental surfaces. The virus can survive on surfaces for up to 16 hours (Kamili et al., 2007).

HCV is not efficiently transmitted via typical mechanisms of occupational exposure to blood and body fluids. Puro et al. (1995) reported that transmission of the virus occurred only from hollow-bore needles and not via other sharp instruments. The routes of exposure and infectivity documented by different studies are summarised in Table 1.3.

Table 1.3: Transmission of hepatitis C virus following blood and body fluid exposures

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Infectivity</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percutaneous</td>
<td>1-10%</td>
<td>Collins &amp; Kennedy (1997)</td>
</tr>
<tr>
<td>Percutaneous</td>
<td>3-10%</td>
<td>Puro et al. (1995)</td>
</tr>
<tr>
<td>Percutaneous</td>
<td>10%</td>
<td>Mitsui et al. (1992)</td>
</tr>
<tr>
<td>Percutaneous</td>
<td>1.8% (0-7%)</td>
<td>CDC (1997c)</td>
</tr>
<tr>
<td>Percutaneous</td>
<td>2%</td>
<td>Boyer (2002)</td>
</tr>
<tr>
<td>Percutaneous</td>
<td>6%</td>
<td>Lanphear et al. (1994)</td>
</tr>
<tr>
<td>Mucous membrane</td>
<td>&gt;0%</td>
<td>Collins &amp; Kennedy (1997)</td>
</tr>
<tr>
<td>Mucous membrane</td>
<td>&gt;0%</td>
<td>Sartori et al. (1993)</td>
</tr>
</tbody>
</table>
The HCV antibody test indicates the presence of antibodies to the HCV; a positive result indicates prior exposure to HCV. The test is unable to differentiate someone with an active infection from someone previously infected with HCV (but who is currently not actively infected). To diagnose current infection with HCV, a Ribonucleic Acid Qualitative test is performed; a positive result identifies a current infection. HCV Viral Load (HCV Ribonucleic Acid test, Quantitative) quantifies the number of hepatitis C viral ribonucleic acid particles in the blood. The quantitative test is usually performed before and during treatment (American Association for Clinical Chemistry, 2013).

Neither immunoglobulin nor antiviral agents are recommended for HCV post-exposure prophylaxis (AIDS Institute, 2008). In the absence of an effective post-exposure prophylactic treatment for occupational exposure to hepatitis C, the recommendations for post-exposure management focus on early identification of active HCV infection in the exposed healthcare provider, and appropriate treatment once identified. The available scientific evidence suggests that if interferon-based therapy is provided early in the phase of acute infection it can decrease the risk of progression to chronic infection (Alter et al., 1998; CDC, 2001b; Jaeckel et al., 2001). The Advisory Committee on Immunization Practices is a group of medical and public health experts that develop recommendations on how to use vaccines to control diseases in the United States. In 1994 the Committee concluded that they would not support hepatitis C immune immunoglobulin as an intervention for post-exposure prophylaxis for hepatitis C, because animal studies have failed to demonstrate prevention of infection (Alter, 1994; CDC, 2001b; Henderson, 2003).

1.2.4 Human immunodeficiency virus

HIV can be transmitted from an infected individual to an uninfected person by the following routes: sexual activity, sharing used needles, blood and body fluid exposure, mother-to-child transmission during pregnancy in uterus, during childbirth, and through breastfeeding, and receiving transfusions of infected blood or blood products (Bond et al., 2005).

Occupational transmission of HIV after an exposure to blood is well documented. The risks of HIV transmission after exposure to other body fluids and tissues have been quantified, but are much lower than that for blood (CDC, 1987; Fahey et al., 1991; Henderson et al., 1990). The routes of exposure and infectivity documented by different studies are summarised in Table 1.4.
Table 1.4: Transmission of HIV infection following blood and body fluid exposures

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Infectivity</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percutaneous</td>
<td>0.3%</td>
<td>Collins &amp; Kennedy (1997); Gerberding (1996); LCDC (1987); Johnson et al. (1995), Tokars et al. (1993); Henderson et al. (1995)</td>
</tr>
<tr>
<td>Mucous membrane</td>
<td>0.1%</td>
<td>Collins &amp; Kennedy (1997)</td>
</tr>
<tr>
<td>Mucous membrane</td>
<td>0.09%</td>
<td>Roy (1994); Ippolito et al. (1993)</td>
</tr>
</tbody>
</table>

All international protocols recommend that healthcare providers exposed to blood or body fluid infected with HIV should be assessed as soon as possible, as early assessment and intervention improves long term outcomes (Böttiger et al., 1997; Martin et al., 1993; McClure et al., 1990). The evidence suggests that antiretroviral therapy can reduce the risk of HIV transmission by 86% (McLeod & Montaner, 2009). Animal studies have suggested that post-exposure prophylaxis is less effective if started after 36 hours (Böttiger et al., 1997; Cardo et al., 1997; CDC, 2005; Shih et al., 1991; Tsai et al., 1995). Once started, prophylactic treatment should continue for at least 4 weeks if the side effects (such as depression, mood changes, tachycardia, fever, chills, sore throat, inflammation of the pancreas, joint pain, muscle pain, nausea, and vomiting) can be tolerated (CDC, 2001b). The New York State Department of Health AIDS Institute (AIDS Institute, 2010) reviewed the available post-exposure prophylaxis studies, and thus recommended the use of two nucleoside agents and a protease inhibitor or non-nucleoside reverse transcriptase inhibitor regimen in the case of a significant occupational exposure. CDC Atlanta recommends examining the severity of exposure to determine whether a basic or expanded regimen should be started (CDC, 2005). The basic regimen was composed of two drugs, Zidovudine 300 mg and Lamivudine 150 mg, in a combination called Combivir (CDC, 2005). The expanded regimen consisted of three drugs: the basic regimen with an addition of a protease inhibitor, either Lopinavir or Ritonavir (CDC, 2005).
CDC updated the post-exposure guidelines in September 2013. The recommended regimens for all occupational exposure to HIV consist of three (or more) antiretroviral drugs: Raltegravir (Isentress; RAL 400 mg) PO twice daily in addition to Truvada, 1 PO once daily (Tenofovir DF [Viread; TDF] 300 mg, and Emtricitabine [Emtriva; FTC] 200 mg) (Kuhar et al., 2013).

1.3 Characteristics of blood and body fluid exposure

This section will provide some context to the later discussion on how biological fluid can transmit blood-borne pathogens, outline the epidemiology of blood and body fluid exposure and then will examine the global burden of occupational exposure to body fluids, the historical perspective, and legislation related to blood and body fluid exposure.

1.3.1 Occupational health hazards from blood and body fluid exposure

The Laboratory Centre for Disease Control (LCDC) of Canada has defined a blood or body fluid exposure as an incident when an infected body fluid comes in contact with healthcare providers' tissues. This could be as a result of a percutaneous injury such as a needlestick injury, a cut by a sharp instrument, or a bite that penetrates the skin. Alternatively this could result from contact between one person's infected blood or body fluid and another person's non-intact skin (e.g. abraded skin, a chapped area or cut on the skin surface) or mucous membrane (e.g. mouth, eyes, nose, or genitalia). Blood-borne pathogens have not been documented to have infected healthcare providers via airborne transmission (Gerberding, 1995; Laboratory Centre for Disease Control (LCDC), 1987).

The relative risk of infection after an exposure to blood and body fluid depends on the viral load in the body fluid to which the healthcare provider had been exposed. Blood has the highest viral load compared to other body fluids. Most of the studies demonstrated that viral load (HIV, HBV, HCV) in other body fluids were positive only if it was present in the blood (Kidd-Ljunggren et al., 2006). Absolute viral loads will be affected by the health of the source; symptomatic patients will have more of the virus, irrespective of how it is partitioned across the various body fluids.
In addition to blood (i.e. serum, plasma, and any biological fluid contaminated with blood) the following body fluids can transmit “blood-borne pathogens” (Boon et al., 2006):

- Body organs: All body organs, tissues, specimens, and cultures;
- Body fluids: Amniotic, peritoneal, pleural, pericardial, synovial and cerebrospinal fluids;
- Body secretions: Vaginal, uterine, and semen (which can transmit HIV and HBV, but are unlikely to transmit HCV);
- Saliva: HBV can be transmitted by a bite not contaminated with blood; HIV and HCV transmission occurs only if contaminated with blood (Larc, 1978). Fan et al. (2004) reported the presence of HIV in a very low quantity in saliva. Similarly Liou et al. (1992) reported detecting HCV in saliva. These reports were different from the finding of the Laboratory Centre for Disease Control referred to earlier in the paragraph.

<table>
<thead>
<tr>
<th>HIV</th>
<th>High</th>
<th>Blood (plasma), semen, vaginal secretion, and breast milk</th>
<th>Fan et al., 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Moderate</td>
<td>Anal secretion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very low</td>
<td>Saliva and tears</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hepatitis B</th>
<th>High</th>
<th>Blood</th>
<th>Parker et al., 1976</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Moderate</td>
<td>Semen and vaginal secretion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>very low</td>
<td>Saliva</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hepatitis C</th>
<th>High</th>
<th>Blood</th>
<th>Liou et al., 1992; Numata et al., 1993; Young et al., 1993</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Moderate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very low</td>
<td>Semen, vaginal secretion, ascites, saliva, breast milk, urine and faeces</td>
<td></td>
</tr>
</tbody>
</table>

It is important to know the depth of injury in penetrating exposures to blood-borne pathogens to assess the severity of exposure, especially when deciding on post-exposure prophylaxis for HIV-infected body fluids. The CDC advises the basic regimen for a less
severe exposure (solid needle or superficial injury) and an expanded regimen for a more severe injury (large-bore hollow needle, deep puncture, visible blood on device, or needle used in patient's artery or vein), as discussed in the section above (CDC, 2005). The International Healthcare Worker Safety Center at the University of Virginia, in their surveillance programme “EPINet” (Perry et al., 2009), has provided three categories to classify the depth of injury as follows:

- Superficial: little or no bleeding, solid needle;
- Moderate: skin punctured, some bleeding;
- Severe: deep stick/cut, profuse bleeding.

1.3.2 Epidemiology of blood and body fluid exposure

Studies on the epidemiology of blood and body fluid exposures show that the majority of needlestick injuries occur while disposing of needles, administering injections, undertaking venepuncture, recapping needles, or handling trash and dirty linens that contain “needles or scalpels” (Sharma et al., 2009; Tadesse & Tadesse, 2010; Zafar et al., 2008). Syringes, needles, and glass items were reported to be the most common devices which caused blood and body fluid exposure (Lee et al., 1999; Shiao et al., 1999; Smith & Leggat, 2005b; Tadesse & Tadesse, 2010).

The University of Virginia International Healthcare Worker Safety Center maintains a voluntary surveillance programme to collect data related to blood and body fluid exposures, in which 29 healthcare facilities voluntarily participate (Perry et al., 2009). EPINet collects information with respect to the type of exposure and the activity during which it occurred; the following activities were identified: during use of device, between steps of a multi-step procedure, disassembling device, recapping device, before disposal, and after disposal (Perry et al., 2009). Due to the voluntary nature of this surveillance programme, and limited participation by healthcare facilities, the data does not represent the blood and body fluid exposure pattern throughout the United States.

Articles which discuss blood and body fluid exposure epidemiology have relied on voluntary databases, clinical audits of the hospital or hospital networks, cross-sectional studies, and knowledge, attitude, and practices studies. The results of the studies varied depending on the selection of participants and type of study; if the study focused on medical students or surgeons specifically their findings were different from those which had data from
all groups of healthcare providers. A detailed discussion on reporting of blood and body fluid exposure is provided in chapter 2.

1.3.3 Global burden of blood and body fluid exposure

Blood-borne pathogens such as HIV and hepatitis infections are significant occupational health hazards for healthcare providers (WHO, 1997). Nonetheless, the hazard to health and safety needs to be put into context. According to the CDC, healthcare providers frequently face a great number and range of hazards while at work, including needlestick injuries, back injuries, latex allergy, violence, and stress (CDC, 2013). The U.S. Department of Labor Occupational Safety and Health Administration (OSHA) reported that in 2010 healthcare and social assistance agencies reported 653,900 cases of injuries or illness (Wrightson & Lincoln, 2013). Musculoskeletal sprains and strains were the most common type of workers’ compensation claim made by hospital workers (OSHA, 1999). The CDC (2005) reported that transmission of Mycobacterium tuberculosis infection is a significant occupational health risk in healthcare settings (Jensen et al., 2005).

Approximately more than three million individuals are injured annually due to needlestick or sharp instrument injuries (WHO, 2002). Healthcare providers in the USA alone sustain approximately one million needlestick injuries per year. The OSHA reported that in the US, 1 out of every 7 healthcare providers accidentally suffered from a needlestick injury annually (Stoker, 2004). A report from O’Connor (2009) suggests that needlestick and other sharp instrument injuries account for 100,000 injuries to National Health Service staff each year in the United Kingdom (UK). Hofmann et al. (2002) estimated that annually 500,000 needlestick injuries occur in Germany.

The incidence of occupational exposure to blood and body fluid is related to the prevalence of transmissible infectious diseases in the community. Reports discussed below show that the Middle East has a high prevalence of hepatitis B and C along with a number of cases of HIV.

Hepatitis B is highly endemic in parts of the Middle East (WHO, 2013a).Andre et al. (2000) reported that, due to comprehensive population vaccination programmes, the pattern has shifted towards intermediate endemicity in countries such as UAE but Egypt, Oman and Saudi Arabia still have high endemicity (André, 2000). The Health Authority of Abu Dhabi
reported the incidence of new cases of hepatitis B to be 641 in 2010 and 670 in 2011 (Olarte, 2012).

In a recent paper Hanafiah et al. (2013) reported that the Middle East is estimated to have a high prevalence (> 3.5%) of hepatitis C. Ramia and Eid-Fares (2006) reported that the number of HCV carriers in the Eastern Mediterranean countries is close to the number of HCV carriers in the Americas and Europe together (WHO, 1999). The Health Authority of Abu Dhabi reported the incidence of hepatitis C to be 557 in 2010 and 577 in 2011 (Olarte, 2012).

HIV infection is present in UAE; in 2011 there were 726 cases of UAE nationals who had HIV infection and were residing in UAE. The report comments on the presence of female sex workers and the sex industry in UAE; there is no HIV prevention programme for these workers and their clients (“Country Progress Report United Arab Emirates,” 2012). The report from the United Nations also shows that the prevalence of HIV in the Middle East is on the rise (Hillen, 2010).

The World Health Report in November 2002 reported that approximately 4.4% of HIV, and 40% of hepatitis B and C infections amongst healthcare providers worldwide are the result of occupational exposures (Rogers et al., 2002). In the developing regions, 40-65% of hepatitis B and C infections in healthcare workers were attributable to occupational exposure. In contrast, in the developed regions, the occupationally attributable fraction for hepatitis C infection was only 8-27%, and that for hepatitis B was less than 10%. This lower rate of infection following exposure was mainly attributed to better pre-employment immunisation and post-exposure management (Prüss-Üstün et al., 2003).

The known risk of HIV infection after a percutaneous exposure with an HIV-contaminated instrument or needle is estimated to be 0.3% or approximately 3 infections per 1,000 exposures (Prüss-Üstün et al., 2005). A separate study of potential health consequences of occupational exposure conducted in 2005 estimated that these infections would result in worldwide premature deaths of 736 (range 129 to 3,578) healthcare providers during the years 2000 to 2030 (Warnock III et al., 2010). In the UK there have been five documented cases of healthcare providers acquiring HIV after occupational exposure and 14 cases where occupational exposure was a possible or probable cause (Health Protection Agency, 2008). France has reported 14 documented and 34 possible cases where healthcare providers acquired HIV after occupational exposure (Kortum, 2010).
Infection following an occupational exposure to blood and body fluid has a low incidence, but high severity. Many occupational injuries and illnesses to which healthcare providers are exposed are non-fatal although serious. On the other hand, 25% of individuals with chronic hepatitis B and nearly 100% of those infected by HIV if not treated appropriately eventually die from this acquired infection, with considerable morbidity prior to death (Lau et al., 1997; WHO, 2013b). It does not only affect the healthcare provider; it also affects the families. The health impact of blood-borne pathogen infections is therefore considerable.

1.3.4 Historical perspective on blood and body fluid exposures

Since 1845, when the first needle was used, this essential part of healthcare provision has been a source of occupational injury for healthcare providers (Stoker, 2004). Disposable syringes became available in the market in the early 1960s which reduced the burden slightly as sterilising and reusing the same syringe were no longer required.

The first documented case of hepatitis B seroconversion after an occupational exposure occurred in 1978 (Stoker, 2004). Maki and McCormick (1981) reported that one of most important causes of needlestick injuries was recapping attempts, and warned healthcare providers not to recap needles. Despite their recommendation in 1981, recapping was still being reported 3 decades later as a cause of blood and body fluid exposures (Muralidhar et al., 2010; Tadesse & Tadesse, 2010). A detailed history of sentinel events in blood and body fluid exposures is summarised in Appendix 1.

The occupational health hazard potential for the health providers was realised once it was observed that HIV could be transmitted after an occupational exposure to infected body fluid (Prüss-Üstün et al., 2005). In the US, workers’ compensation protection is available for healthcare providers occupationally infected by a blood-borne pathogen (Tereskerz & Jagger, 1997). Ippolito et al. (1999) identified 94 definite cases of healthcare providers and 170 possible cases worldwide who had acquired HIV between 1984 and September 1997. Evans and Abiteboul (1999) also summarised the occupationally acquired HIV infections in published reports between 1984 and December 1997; however they provide a slightly different number, with 95 definite and 191 possible cases. The latter study included cases reported in the last 3 months of 1997, which could be the reason for the slight difference in the two reports. The UK Health Protection Agency Centre for Infections in 2005 reported a summary of occupationally acquired HIV in the literature published between 1984 and 2002. They identified 106 definite and 238 possible cases globally (Tomkins & Ncube, 2005). Do et
al. (2003) reviewed 20 years of data from the US national surveillance data for HIV, showing that 57 healthcare providers had acquired HIV while working.

### 1.3.5 Legislation related to occupational exposures

In this section I will discuss country-specific development of regulations and standards to protect healthcare providers from this hazard. Countries with formal legislation specific to blood and body fluid exposure were selected for the discussion.

In 1987 the US Center for Disease Control (CDC) was the first federal agency to publish guidelines to protect healthcare providers (CDC, 1987). In the same year OSHA issued an advisory notice but it was not until 1991 that OSHA published the “Blood-borne Pathogens Standard” (OSHA, 1991). In September 1998, the State of California passed the needle safety law, and became the first state to have a law on safe needles (Jagger & Perry, 2002). The US Congress made changes to the language of the Blood-borne Pathogens Standard and developed the “Needlestick Safety and Prevention Act” to prevent occupational exposure to blood and body fluid (US Government, 2000). On 6 November 2000, the Needlestick Safety and Prevention Act was signed into law, and within 6 months OSHA revised the Blood-borne Pathogens Standard in 2001 to include emerging controls which had become available since the previously published standard. This included retractable needles and needles with shields, and requirements to keep a log of all the incidences of needlestick injuries and to involve employees in the preparation of an exposure plan (OSHA, 2001). OSHA and the National Institute of Occupational Health and Safety (NIOSH) have updated these guidelines in recent years to help employers and healthcare facilities comply with these regulations.

In Canada each province is responsible for its own occupational safety and health regulations and programmes. Each province has a provincial Occupational Health and Safety Act which protects the right of all employees. Five provinces have passed some additional legislation related to needle safety. In November 2003, the Alberta government circulated a provincial-level Occupational Health and Safety Code (OHS Code) which set the standard for protecting the health and safety of workers especially in relation to blood-borne pathogen exposures in healthcare workers. Part 35 of this “Health Care and Industries with Biological Hazards” Standard required employers to make sure that:
• Sharps containers were available and used;
• Workers did not recap needles;
• Biological hazards were included in the hazard assessment;
• Written policies and procedures governing the storage, handling, use and disposal of bio-hazardous materials were developed;
• Protocols for post-exposure management of exposed workers to blood and body fluid were in place.

This code was updated in 2009 as a part of the Alberta Occupational Health and Safety Act (Government of Alberta, 2009). Since then, Ontario, Manitoba, Saskatchewan, Nova Scotia, and British Colombia have added specific regulations to their Acts which address the safer use of needles. The regulations require that all healthcare workplaces protect workers by implementing safety-engineered needles whenever feasible. Safe work practices in relation to needle use are also required (Hughes, 2010; “Ontario Occupational Health and Safety Act,” 2007).

In the UK all employers (which include general medical and dental practitioners working in the National Health Services) have a legal obligation under the Health and Safety at Work Act 1974 to ensure that all their employees are appropriately trained and are proficient in the procedures necessary for working safely (Expert Advisory Group, 1998). They are also responsible for following the “Management of Health and Safety at Work Regulation 1999” which states they are responsible for their employees, anyone on their premises, and whoever may be affected by the work. Healthcare facilities are also required to follow the “Control of Substances Hazardous to Health Regulation 2002” in which the employer has the legal responsibility for assessing the risk of infection to employees and implementing suitable protection (National Archives, 2002). The Health Act (2006) provided a specific Code of Practice for healthcare-associated infection, which placed an emphasis on prevention and control. It required healthcare facilities to implement policies that required safe medical devices (National Archives, 2006). The directives and Act presented above guide the hospitals to provide preventive measures including engineering controls, needle-free systems and training.

The European Union Directive 2000/54/EC of the European Parliament and the Council of 18 September 2000 stressed the protection of workers from risks related to exposure to biological agents at work (EU Council, 2000) and dealt with the use of safe methods to prevent healthcare workers’ exposure to blood, body fluids, needlestick injuries, and other
biological contaminants. The Directive mandated all members to comply with the minimum requirements designed to guarantee an effective and improved standard of safety and health with regard to the protection of healthcare workers from the risks related to exposure to biological agents at work (European Federation of Nurses Associations, 2004). The importance of using safer needles and a comprehensive approach towards safety was emphasised by the European Union on 10 May 2010, when they passed the Council Directive 2010/32/EU. This Directive added an agreement on prevention of sharps injuries in the hospital and healthcare sector reached by the European Hospital and Healthcare Employers’ Association, an organisation representing employers, and the European Federation of Public Services Unions, a European trade union organisation (EU Council, 2010). The purpose of the framework was to achieve the safest possible working environment, by taking an integrated approach in establishing policies related to risk assessment, risk prevention, training, awareness and monitoring. It required a post-exposure plan and follow-up procedure (EU Council, 2010). The member states were responsible for developing country-specific regulations and standards to implement the Directives.

Three states of Australia (New South Wales, Queensland, and Victoria) have policy guidelines or directives regarding sharps injuries and needlestick prevention (Hughes, 2010). There is no federal regulation specific to needlestick injury prevention, but the “Alliance for Sharps Safety and Needlestick Prevention” is advocating that Australia adopt legislation requiring the mandatory use of safety-engineered medical devices and training programmes for healthcare providers (Demann, 2011).

The NZ Health Strategy includes a framework to reduce the occupational incidence of infectious disease; it required the District Health Boards and hospitals to ensure that they had proper post-exposure prophylaxis and protocols for needlestick injury (Ministry of Health, 2001). The District Health Boards have needlestick prevention and management protocols which consist of staff education, sharps disposal units, needle safe devices and safe work practices (Fullerton & Gibbons, 2011).

A detailed literature search of countries with legislation, regulations or directives on blood-borne pathogens or blood and body fluid exposure did not find any examples from the Middle East or South Asia, although there are some less comprehensive guidelines and recommended practices published by health boards or professional bodies in these regions. This finding suggests that there are two distinct groups: 1) countries which have gone through the process of maturing through different legislative and regulatory changes to a stage of
mandatory reporting of blood and body fluid exposure and having a response plan, and 2) countries where prevention and management of exposure to blood and body fluid has not yet been considered a governmental responsibility. Some of these countries in the second group have local or hospital based record keeping or relevant guidelines, but no formal national, provincial or state programme. The UAE is no exception, having yet to develop relevant occupational health policies and procedures.

1.4 Important characteristics of the Gulf region related to the study

1.4.1 UAE legislation (immigration and deportation)

UAE is a sovereign nation with immigration laws which are similar to the other members of the Middle East and Gulf Cooperation Council. The immigration law does not restrict any individual from travelling into the country on the basis of disease status. However, to stay in the country for work or residence every individual over 18 years is required to undergo a medical examination. In 1981, the federal law on the prevention of communicable diseases outlined the country’s health and deportation rules. These rules were called the Infectious Disease Case Notification Form, Government Law (No. 27). The federal law required physicians to report cases of HIV infection, tuberculosis, syphilis and a number of other infectious diseases to the Ministry of Health within 24 hours of identification. Individuals applying for or renewing their work or residency visa are required to have a compulsory medical fitness test that screens them for a number of deportable diseases including HIV infection, leprosy and tuberculosis. This federal law was updated in 2008, ordering officials to “remove all positive cases” of people with HIV infection, old or new cases of tuberculosis, leprosy and syphilis, hepatitis B and C (Underwood, 2010). Hepatitis C was removed from the list later pending more studies before its implementation. According to this law, individuals with certain diseases will not be allowed to work or reside in the country, and if acquired during their stay, they will be asked to leave the country immediately (Underwood, 2010).

This immigration law is particularly relevant to this thesis because two of the three commonly acquired diseases (hepatitis B and HIV) after an occupational exposure to blood or
body fluid are on the list of deportable diseases. If a healthcare provider was to acquire any one of them he/she would be asked to leave the country.

1.4.2 Impact of culture and religion

The UAE was formed by a group of tribally organised Arabian Peninsula sheikhdoms in 1971 (National Media Council, 2009). The official national language is Arabic, although English, Urdu and Hindi are also widely spoken and understood. The majority of the inhabitants are immigrants from neighbouring Arab countries, and South Asian countries such as Pakistan, and India. These communities share many common values and traditions which form the unwritten social value system.

Culture plays an important role in daily life: it influences each individual and the community, defining cultural norms and expectations. Cultural beliefs can associate different groups, activities and diseases with widespread stigma. Hasnain (2005) argued that while most cultures stigmatise HIV, these beliefs are more prevalent in the Middle East and South Asia than in developed Western countries, due to the religious doctrine related to sexual orientation and addiction. Islamic doctrine (shari’a) law prohibits homosexuality, adultery, prostitution, and drug use; these activities are therefore seen to be a violation of the cultural norms and stigmatised (Gezairv, 1992). Due to these cultural values, the public believes that HIV is not present in the community, as those activities are assumed not to occur. The second important reason that stigma is associated with HIV is that the community assumes that all HIV infections are transmitted by sexual promiscuity or drug use only. Hasnian (2005) argued that the reason stigma remains high in Muslim countries is that they do not recognise that HIV could be transmitted by other means (such as from mother to child during pregnancy, delivery and breastfeeding, blood transfusion, and occupational exposure to infected body fluid). Hence, because of this misconception, compassion for an individual with HIV is considered tolerance of the practices which caused the infection. The available statistics demonstrate lower numbers of HIV infective cases in the Middle East compared to other regions of the world. While the reliability of this statistic has been widely disputed, it provides the government and the people with a false sense of protection. Recent reports from the United Nations show that the prevalence of HIV infection in the Middle East is on the rise (Hilleary, 2010).
The impact of stigma in the Middle East and Asian countries is not limited to the individual as in Western societies; the whole family can be stigmatised. Foreman et al. (2009) pointed out that in Asian societies their cultures place great importance on collectivism; therefore, in these societies the whole family is stigmatised for the individual’s action.

1.5 Sheikh Khalifa Medical City

The work for this thesis was largely undertaken in the Sheikh Khalifa Medical City (SKMC), located in Abu Dhabi, the capital of UAE. The hospital seeks to practice modern medicine comparable to the best hospitals and medical centres in the world. It provides comprehensive healthcare services in all disciplines relevant to the needs and priorities of the community and promotes a work environment sensitive to the social and cultural values of the community of Abu Dhabi. The hospital endeavours to implement an efficient model of healthcare delivery with a team of internationally trained healthcare providers from more than 40 different nationalities to work as one team. It consists of 14 specialised outpatient clinics (Sheikh Khalifa Medical City, 2010).

The hospital is presently managed by the Cleveland Clinic Foundation from the US, but is owned and operated by the Abu Dhabi Health Services Company. It is staffed by healthcare providers trained in many different countries of the world. An important issue which arises among these multinational trained healthcare providers is the consequent breadth of perspectives on what constitutes best practice. Organisational best practices and counselling techniques needed to be sensitive to the culture and religious values of the people of Abu Dhabi, as well as to those of expatriate workers, which in some cases will be similar. It becomes more complex when dealing with issues related to the health and safety of hospital employees, due to the lack of legislation around occupational health and safety specifically related to blood and body fluid exposure when this study was initiated in 2008. These important and unique factors played an important role in why a standardised treatment and follow-up protocol nested in a comprehensive blood and body fluid exposure programme that would be practical and effective in the working environment of the hospital was important to increase participation.
1.6 Summary

Blood and body fluid exposures are recognised as an emerging occupational health and safety hazard. While less commonly reported than occupational musculoskeletal injuries, the high rates of morbidity and mortality following such infections means that efforts need to be taken to prevent these diseases. It is likely that most incidents of occupational exposure occur in the developing world and are not reported, compared to fewer occupational exposures in the developed world and proportionally more exposures being reported. A significant incidence of new infections annually of hepatitis B, hepatitis C and HIV among healthcare providers in the developing countries, indicates special strategies are required to address contextual features, i.e. legal, cultural and religious elements, all of which significantly affect participation in blood and body fluid exposure programmes.
Chapter 2: Literature reviews

2.1 Introduction

A detailed systematic review of the scientific literature, national guidelines, and guidance documents on preventive measures and post-exposure management was performed to inform the understanding of the content and approach to management of blood and body fluid exposure incidents in hospital settings. Reporting practices for occupational exposures were examined by reviewing studies which assessed the KAP of healthcare providers. Barriers to participation in a blood and body fluid exposure programme were reviewed to understand the healthcare providers’ perspectives on non-compliance. In addition to systematic reviews of quantitative studies on the above-mentioned topics, a structured review of qualitative studies was performed to explore participants’ views in more detail.

2.2 Methodology

2.2.1 Systematic review

A systematic review of literature was selected where possible because it is reproducible and has the potential to reduce bias, thus providing more reliable findings from which conclusions can be extracted and decisions made (Antman et al., 1992; Oxman & Guyatt, 1993). It provides a structured methodology of reviewing all forms of published data (articles, books, online publications, reports, guidelines, conference papers and consensus statements) on the research topic (Hemingway & Brereton, 2009). The important features of a systematic review are (Higgins & Green, 2011):

- A pre-defined set of objectives and inclusion criteria for studies;
- A reproducible methodology;
- A systematic search for literature to identify all studies meeting eligibility criteria;
- A synthesis and presentation of the characteristics and findings of the studies included;
- An assessment of the validity of the results of the included studies.
Systematic reviews of the following topics were performed and will be discussed in this chapter:

- Blood and body fluid exposure management guidelines;
- Scientific literature on reporting;
- Barriers to participation.


The search was limited to articles published in English and related to humans. Furthermore, the grey literature (material which is not formally published, such as working papers, conference proceedings, hospital protocols to respond to exposure, technical reports or other documents which are not normally subject to editorial control or peer review) were searched and added to the list of documents to be reviewed. It is also appropriate in systematic reviews to contact experts. We contacted four experts in occupational medicine for advice on appropriate data or asked them whether they could identify a source of unpublished data not available for examination elsewhere. This exercise did not provide new data.

In addition, the bibliographic references of all the full articles were hand searched as well as those of the articles that were found while tracking the bibliographic references (Baggaley et al., 2006). Google and Google Scholar were used to find guidelines, guidance documents, reporting systems, post-exposure treatment and follow-up.

The data search and analysis was performed by two reviewers separately who performed the search using the same search engines and keywords in different combinations. The articles were screened by both the reviewers separately by title, abstract and, where required, full text. I, an occupational health specialist, was the first reviewer, while the second reviewer was a physician and epidemiologist. We ranked the articles separately into three categories based on the inclusion criteria (Levack et al., 2006):
(A) Expected to be helpful in addressing the study questions;

(B) Might be helpful in addressing the study questions;

(X) Not helpful/applicable in addressing the study questions.

All studies marked as "B" by one of the reviewers were then reviewed by the other reviewer to decide whether it would be included or not.

2.2.2 Qualitative literature search

A structured literature review of qualitative data enabled diverse sources of information to be synthesised, analysed logically, and intellectualised (Baumeister, 1997). It examined published qualitative studies and publications related to barriers to participation, knowledge and practices assessment, and lived experiences of healthcare providers related to blood and body fluid exposure.

In order to be included in this review, papers needed to meet a number of predetermined criteria. These criteria included the following:

- The studies needed to have explored either a) the perceptions and experience of healthcare providers regarding occupational exposure to patients' blood or body fluid, or b) the healthcare providers' knowledge, attitude, and practices regarding universal precautions for blood or body fluid exposure, including barriers to best practice;

- The studies needed to have explored these issues within a hospital environment;

- The studies needed to be published in a peer-reviewed journal or as a research thesis; and

- The studies needed to have used qualitative methods, reported with sufficient details (e.g. including information on participant selection, data collection, data analysis and theory generation etc.) to make auditing the research process possible.

A detailed search strategy for the review is presented in section 2.6.1.
Each study was analysed line by line and themes were identified within the study. The reviewer then synthesised the important findings of the studies followed by a discussion on how the findings of the studies helped in examining the core relations of practices and barriers.

2.3 **Blood and body fluid exposure management guidelines**

2.3.1 **Background**

In response to the detection of HIV and hepatitis C in the 1980s, public health agencies issued guidelines to provide occupational health protection systems for healthcare providers. The Canadian Laboratory Centre of Disease Control and the US Center for Disease Control published separate guidelines which stressed the use of “universal precautions” and best practice related to infection control (CDC, 1987; LCDC, 1987).

The earliest comprehensive blood and body fluid exposure programme was published by a group of researchers from the University of California Los Angeles and Duke University (Duke University Safety Committee, 2010; Go et al., 1991). The United States Public Health Services (US PHS) agency published its first document related to post-exposure prophylaxis for HIV in 1990, which was then updated in 1996, and again in 1998 preliminary to a comprehensive post-exposure guideline which was published in 2001; post-exposure management for body fluid infected by HIV was later updated in 2005 and recently in 2013 (CDC, 1990, 1996, 1998, 2001b, 2005, 2013). Blood and body fluid exposure health protection programmes were developed by various countries and universities, most of which were in concordance with the US PHS guidelines. The objectives of this review were to:

- Characterise current evidence-based guidelines and national guidance documents used by healthcare providers originating from various countries;
- Compare and contrast their contents;
- Consider their application in a multicultural setting in an emerging country.
2.3.2 Literature search

An extensive computerised search was performed as described in section 2.2.2 using the following search words:

- Occupational;
- Guidelines;
- Guidance;
- Blood and body fluid exposure;
- Needlestick injury;
- Blood-borne pathogens;
- Hepatitis B;
- Hepatitis C; and
- Human immunodeficiency virus.

Guidelines, guidance documents, and articles related to blood and body fluid exposure programmes which met all the following inclusion criteria were selected for the systematic review:

1. Addressed the management of occupational exposure to blood and body fluid;
2. Provided a detailed description of post-exposure treatment and follow-up of blood and body fluid exposure;
3. Were based on best practice protocols endorsed by healthcare providers for use in clinical practice;
4. Were studies reported in the English language; and
5. Were limited to human studies only.

Articles which assessed a BBFE intervention but did not provide description of an explicit process of developing the BBFE programme (prospective or retrospective clinical audits) were excluded. Post-exposure prophylaxis of non-occupational exposure to HIV, and those addressing pre-exposure awareness only, were also excluded.

The selected guidelines and articles (16) were critically evaluated using “Appraisal of Guidelines Research and Evaluation” (AGREE II), which is composed of 23 items organised into six domains (Brouwers et al., 2010).

The domain considered the documents for:
(1) Scope and purpose;
(2) Stakeholder involvement;
(3) Methods for formulating the recommendations;
(4) Health benefits, adverse effects, and risks;
(5) Applicability; and
(6) Editorial independence.

Each item was rated on a seven-point rating scale. A detailed description of the 23 items, their definitions, and grading criteria for the tool were available on the AGREE website (Brouwers et al., 2010). The website of the guideline developers was examined by both reviewers and the supervisor for background information on the development processes which were followed. The tool averaged the score for the appraisers while calculating domains. In conformity with the instructions, the two reviewers independently rated the 23 items. The results of the appraisal are presented in table 2.1. After examining different reliability measurements Cohen’s Kappa was selected because it was appropriate for categorical data (DeCoster, 2004). The inter-rater agreement on the methodological quality of the 16 selected documents was determined as 0.84.

### 2.3.3 Data analysis

The analysis was performed as described in section 2.2.3. The guidance documents (five) were not subjected to critical appraisal through the AGREE II instrument, but were appraised by the two reviewers for:

- Comprehensiveness of detail;
- Clarity of instructions;
- Consultation during development;
- Applicability in a hospital setting.

Disagreements between the reviewers were resolved by consensus and discussion within the research team.
2.3.4 Results

A stepwise Cochrane protocol (Higgins & Green, 2011) as described by the “QUOROM” (Moher et al., 1999) style flowchart (see figure 2.1) initially identified 218 articles, guidelines and guidance documents which were published in English.

Complete citations and abstract where necessary were obtained of all articles, and guidelines excluding those which were not in English, and screened (n=218).

182 articles were excluded due to the following reasons:
- Study assessed BBF exposure (reporting rate) only = 17
- Assessed work practices = 18
- Examined compliance with universal precautions = 28
- Managing HCP with HIV or hepatitis = 5
- Hepatitis B or C treatment and compliance = 14
- Hepatitis B or C biomarkers = 7
- HIV testing and treatment guidelines = 9
- Study assessed risk of occupational exposure = 13
- Study examined treatment options after BBFE = 5
- Study of knowledge, attitudes and practices of BBFE = 9
- Study related to HIV in schools/dental clinic/sports = 5
- Study examined infection control practices = 9
- Study not related to BBFE = 35
- Duplicate studies (from different searches) = 8

Full text of guidelines/guidance documents were obtained and reviewed (n=36) with addition of full text obtained from bibliography and web search (n=4), (which brought the total to n=40).

19 guidelines/guidance documents were excluded due to the following reasons:
- Commentary on guidelines = 12
- Infection control guideline not BBFE = 2
- Guideline specific to HIV non-occupational exposure = 3
- BBFE compliance assessment = 2

After the screening (n=21) guidelines/guidance documents were selected for the systematic review.

Figure 2.1: Summary of steps taken for inclusion of guidelines/guidance documents in the systematic review
They were reviewed by title and abstract following which 36 documents meeting the inclusion criteria were selected for full text review. Following bibliographic review of the full text documents, four further documents were added to the search which also met the inclusion criteria, and from these, 21 documents were selected after detailed appraisal.

### 2.3.4.1 Guidelines

To compare accepted global best practice a systematic review of evidence-based blood and body fluid exposure guidelines was performed.

Table 2.1: Comparison of AGREE II scores of the included guidelines

<table>
<thead>
<tr>
<th>Institution</th>
<th>Scope, purpose</th>
<th>Stakeholder involvement</th>
<th>Rigour of development</th>
<th>Clarity</th>
<th>Applicability</th>
<th>Editorial independence</th>
</tr>
</thead>
<tbody>
<tr>
<td>US PHS-CDC</td>
<td>94</td>
<td>77</td>
<td>87</td>
<td>97</td>
<td>91</td>
<td>N/A</td>
</tr>
<tr>
<td>WHO / ILO 2007</td>
<td>94</td>
<td>83</td>
<td>76</td>
<td>83</td>
<td>93</td>
<td>N/A</td>
</tr>
<tr>
<td>WHO / ILO 2005</td>
<td>91</td>
<td>97</td>
<td>80</td>
<td>80</td>
<td>75</td>
<td>N/A</td>
</tr>
<tr>
<td>LCDC 1997</td>
<td>97</td>
<td>88</td>
<td>86</td>
<td>88</td>
<td>79</td>
<td>N/A</td>
</tr>
<tr>
<td>Australian BBFE</td>
<td>97</td>
<td>50</td>
<td>44</td>
<td>83</td>
<td>87</td>
<td>N/A</td>
</tr>
<tr>
<td>UK BBFE 1998</td>
<td>88</td>
<td>72</td>
<td>52</td>
<td>94</td>
<td>64</td>
<td>N/A</td>
</tr>
<tr>
<td>British Columbia CDC 2010</td>
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<td>38</td>
<td>12</td>
<td>88</td>
<td>91</td>
<td>N/A</td>
</tr>
<tr>
<td>YHS, Ca. 2010</td>
<td>88</td>
<td>47</td>
<td>11</td>
<td>88</td>
<td>93</td>
<td>N/A</td>
</tr>
<tr>
<td>Up to Date</td>
<td>97</td>
<td>41</td>
<td>54</td>
<td>77</td>
<td>41</td>
<td>N/A</td>
</tr>
<tr>
<td>E-medicine</td>
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<td>27</td>
<td>68</td>
<td>77</td>
<td>72</td>
<td>N/A</td>
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<tr>
<td>U. of California, Los Angeles</td>
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<td>61</td>
<td>79</td>
<td>88</td>
<td>68</td>
<td>100</td>
</tr>
<tr>
<td>U. Alberta</td>
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<td>87</td>
<td>95</td>
<td>94</td>
<td>96</td>
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<tr>
<td>Duke U.</td>
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<tr>
<td>Johns Hopkins U.</td>
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<td>83</td>
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<td>85</td>
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</tr>
<tr>
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<td>83</td>
<td>78</td>
<td>94</td>
<td>66</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Sixteen guidelines met the inclusion criteria, and were grouped as follows:

- Eight national and international guidelines;
- Five university hospital programmes;
- Two post-exposure treatment protocols; and
- One professional organisation guideline.

These guidelines were critically analysed to assess their strength. The guidelines are discussed with reference to the guideline development process and content.

**Process**

To examine whether the guidelines were explicitly evidence-based, we used the definition of evidence-based medicine provided by Sackett et al. (1996, p. 71):

"The conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research."

The guidelines developed by WHO and the International Labour Organisation (ILO) had input from subject specialists from many countries; these guidelines acknowledged the lack of resources both in treatment providers and availability of post-exposure prophylaxis. National guidelines prepared in the US, Canada, UK, or Australia had input from a group of specialists from the respective country.

The preventive measures were discussed in detail in the Infection Control manuals. The university hospital guidelines were different from the international guidelines because they benefited from multidisciplinary input from infection control and safety professionals.

The treatment protocols on websites such as UpToDate and e-medicine were prepared by a group of physicians working in the same hospital and these protocols were regularly updated. They were prepared after a detailed review of the literature by the subject specialists and then reviewed by the editors.
<table>
<thead>
<tr>
<th>Year</th>
<th>Institution</th>
<th>Country</th>
<th>Evidence</th>
<th>Focus</th>
<th>Preventive measures</th>
<th>Treatment protocol</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>US PHS-CDC</td>
<td>USA</td>
<td>LR, CO</td>
<td>Risk assessment, post-exposure management</td>
<td>Y</td>
<td>Y</td>
<td>H</td>
</tr>
<tr>
<td>2007</td>
<td>WHO / ILO</td>
<td>NA</td>
<td>LR, CO</td>
<td>Post-exposure management</td>
<td>N</td>
<td>Y</td>
<td>H</td>
</tr>
<tr>
<td>2005</td>
<td>WHO / ILO</td>
<td>NA</td>
<td>LR, CO</td>
<td>Post-exposure management</td>
<td>N</td>
<td>Y</td>
<td>H</td>
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<td>CDC</td>
<td>Canada</td>
<td>LR, CO</td>
<td>Infection control</td>
<td>Y</td>
<td>N</td>
<td>H</td>
</tr>
<tr>
<td>2002</td>
<td>Australian</td>
<td>Australia</td>
<td>LR, CO</td>
<td>Post-exposure management</td>
<td>N</td>
<td>Y</td>
<td>H</td>
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<tr>
<td>1998</td>
<td>UK BBFE</td>
<td>UK</td>
<td>LR, CO</td>
<td>Preventive measures, post-exposure management</td>
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<td>M</td>
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<tr>
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<td>Canada</td>
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<td>Post-exposure management</td>
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<td>Y</td>
<td>H</td>
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<tr>
<td>2010</td>
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<td>Canada</td>
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<td>N</td>
<td>Y</td>
<td>H</td>
</tr>
<tr>
<td>2010</td>
<td>Up to Date</td>
<td>US</td>
<td>LR, CO</td>
<td>Post-exposure management</td>
<td>N</td>
<td>Y</td>
<td>M</td>
</tr>
<tr>
<td>2010</td>
<td>E-medicine</td>
<td>USA</td>
<td>LR, CO</td>
<td>Post-exposure management</td>
<td>N</td>
<td>Y</td>
<td>M</td>
</tr>
<tr>
<td>1991</td>
<td>U. of</td>
<td>USA</td>
<td>LR, CO</td>
<td>Post-exposure management</td>
<td>N</td>
<td>Y</td>
<td>M</td>
</tr>
<tr>
<td>2001</td>
<td>U. Alberta</td>
<td>Canada</td>
<td>LR, CO</td>
<td>Post-exposure management</td>
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<td>Y</td>
<td>M</td>
</tr>
<tr>
<td>2010</td>
<td>Duke U.</td>
<td>USA</td>
<td>LR, CO</td>
<td>Risk assessment, post-exposure management</td>
<td>Y</td>
<td>Y</td>
<td>M</td>
</tr>
<tr>
<td>2010</td>
<td>U. Newcastle</td>
<td>Australia</td>
<td>LR, CO</td>
<td>Risk assessment, post-exposure management</td>
<td>Y</td>
<td>Y</td>
<td>H</td>
</tr>
<tr>
<td>2010</td>
<td>Johns</td>
<td>USA</td>
<td>LR, CO</td>
<td>Post-exposure management</td>
<td>N</td>
<td>Y</td>
<td>H</td>
</tr>
<tr>
<td>2006</td>
<td>WGO</td>
<td>NA</td>
<td>LR, CO</td>
<td>Post-exposure management</td>
<td>N</td>
<td>Y</td>
<td>M</td>
</tr>
</tbody>
</table>

Note: LR, literature review; CR, Cochrane review; SR, systematic review; CO, consensus opinion; H, highly applicable; M, moderately applicable; N, not applicable.

**CONTENT**

The US PHS guidelines "Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Post-exposure Prophylaxis" were published in 2001 and revised in 2005 (CDC, 2001b, 2005). They recommend a comprehensive blood and body fluid exposure programme which would contain prevention, awareness, education, training, reporting, and post-exposure management.
They recommended the exposure to be assessed for severity and then to start the basic or expanded regimen (discussed in section 1.2.4). The basic regimen consists of two drugs: Zidovudine and Lamivudine (Combivir) ("Combivir," 2012). The tablet consists of 150mg of Lamivudine and 300mg of Zidovudine, both synthetic nucleoside analogue reverse transcriptase inhibitors with activity against HIV-1. The primary mode of action is inhibition of reverse transcriptase via DNA chain termination after incorporation of the nucleotide analogue. Both of them are weak inhibitors of cellular DNA polymerases α, β, and γ ("Lamivudine / Zidovudine," 2011). After oral administration the active ingredients are rapidly absorbed and extensively distributed throughout the body. They have low binding to plasma protein. Lamivudine is mostly excreted from the body unchanged via urine. Zidovudine is mainly metabolised by the hepatic system ("Lamivudine / Zidovudine," 2011). The expanded regimen consisted of three drugs: the basic regimen with an addition of a protease inhibitor, either Lopinavir or Ritonavir (CDC, 2005).

A recent update of the Guidelines in September 2013 stressed the need for starting the post-exposure prophylaxis as soon as possible. The new changes were related to the post-exposure prophylaxis (PEP) medication regimen; they advised that it should contain three (or more) antiretroviral drugs: Raltegravir (Isentress; RAL 400 mg) PO twice daily in addition to Truvada, 1 PO once daily (Tenofovir DF [Viread; TDF] 300 mg, and Emtricitabine [Emtriva; FTC] 200 mg). The second change was that if a newer fourth-generation combination HIV p24 antigen–HIV antibody test is available and utilised for follow-up HIV testing of an exposed healthcare provider, HIV testing can be concluded at 4 months after exposure. In cases where the newer testing is not available, follow-up HIV testing will remain at 6 months after an HIV exposure (Kuhar et al., 2013).

The WHO and the ILO jointly published a post-exposure management guideline (ILO and WHO, 2005) and a separate guideline more specific to occupational exposure to HIV (WHO and ILO, 2007). The panel of experts from a number of countries, staff from WHO, and ILO reviewed the medical information on HIV post-exposure prophylaxis and agreed that there was good research that supported the use of PEP as soon as possible, within 72 hours (WHO and ILO, 2007). Most of the subsequent guidelines published by national and provincial healthcare agencies have explicitly and extensively relied on the US PHS guidelines, for example British Columbia and Yukon Health Services (British Columbia CDC, 2010; "Management of Exposure to Blood/Body Fluid in a Health Care Setting," 2002; Yukon CDC, 2010).
Blood and body fluid exposure programmes from five university hospitals were selected for review. The earliest guideline which described post-exposure prophylaxis in detail was a journal article published in 1991 by a group of physicians from the University of California, Los Angeles (Go et al., 1991). They were the first to respond to the emerging threat of healthcare providers being exposed to blood-borne pathogens. The authors based the guideline on a detailed review of literature and expert opinion. They stressed the importance of a single treatment protocol.

Duke University’s “Blood-borne Pathogens Exposure Control Plan” was first approved in 1992 and has been regularly reviewed. The control plan had a detailed account of how improvements in engineering controls had been introduced and reviewed. There were separate plans for the hospital and research laboratories. Aspects of prevention and training were covered in the infection control and safety manual (Duke University Safety Committee, 2010). This programme is a good example of how infection control procedures and post-exposure management can complement each other to form a comprehensive blood and body fluid exposure programme.

The University of Newcastle’s blood-borne pathogen guideline followed the policy directive to manage occupational BBFE exposures (Department of Health, 2005; University of Newcastle, 2008). It was a good example of a multidisciplinary approach similar to that of Duke University where the prevention of BBFE was managed by the infection control team (nurses) and post-exposure assessment was performed by the physicians. It also recommended health surveillance of the exposure source (patient) where the first result was negative for HIV for 3 months to assess whether it was in the window period for HIV; none of the other post-exposure guidelines required this assessment (NSW Department of Health, 2005). The window period is the time from exposure to seroconversion when the source may be asymptomatic or experiencing seroconversion illness. They based the 3 month testing on CDC advice that 97% of individuals develop antibodies in the first 3 months after infection; in rare cases it may take up to 6 months (Brooks, 2013).

Johns Hopkins University and the New York State Department of Health AIDS Institute have updated their evidence-based HIV post-exposure management guidelines based on the consensus of specialists in the field and a review of the scientific literature (AIDS Institute, 2010). The guidelines recommend that post-exposure prophylaxis for HIV should start within 36 hours along with the use of rapid HIV testing followed by Western Blot testing. The AIDS Institute recommended different HIV post-exposure prophylaxis from the present best
practices recommended by US PHS, WHO, ILO, and other national and international agencies who recommend the use of a combination of two drugs. They recommended using the HAART (highly active antiretroviral therapy) regimen consisting of two nucleoside agents and a protease inhibitor or non-nucleoside reverse transcriptase inhibitor, based on the argument that the window of opportunity to stop HIV infection before it reaches the lymph nodes is 36 to 72 hours, therefore a more aggressive approach would increase the likelihood of preventing seroconversion. They stressed the importance of post-exposure counselling for hepatitis C. Hospitals can select either of the two protocols and decide which to follow (AIDS Institute, 2010).

The University of Alberta guidelines provided information on how healthcare providers should protect themselves against the consequences of potentially being exposed to infected blood or body fluids while on international clinical assignments. It was advised that healthcare providers should obtain 1 week’s supply of HIV post-exposure prophylaxis with Lamivudine and Zidovudine (Combivir), keep a flow chart showing what to do in case of an exposure, and report to the faculty and provincial health board in case of an exposure (Skilten et al., 2001). The guideline reflected the increased risk of exposure to blood-borne pathogens outside Canada, and the high probability that there would not be a blood and body fluid exposure health protection programme in overseas facilities where they would be working.

Cao et al. (2011) reported that Medline, UpToDate and e-medicine were used as resources in developing online health management systems and answering complex cases by physicians. Therefore, UpToDate and e-medicine web-based post-exposure management protocols for HIV-infected blood were added to the review. Both treatment protocols had a detailed list of available medications which could be used in case of an exposure. They referred to the US PHS 2001 and 2005 guidelines for the management of blood and body fluid exposure (Mathieu & Gernsheimer, 2010; Weber et al., 2010). In addition, they provided a list of available medications and combinations which could be used as alternatives to those recommended in the guidelines if the latter were not available. A list of medications to be used in case of resistance to the preferred medication was also discussed (Mathieu & Gernsheimer, 2010; Weber et al., 2010).

The World Gastroenterology Organisation published a guideline for post-exposure management which provided a detailed discussion on treatment options. The guideline briefly discussed the preventive measures and importance of hepatitis B immunisation. The post-exposure management was in agreement with the US PHS guidelines (WGO, n.d.).
Infection control guidelines published by Canada (LCDC, 1987), the US (CDC, 1987), and the UK Health Department (Expert Advisory Group, 1998) provided an extensive literature review on the epidemiology of the transmission of blood-borne pathogens, after which they discussed strategies for primary exposure risk reduction. The guidelines stressed the importance of hepatitis B immunisation and use of universal precautions as a primary preventive measure and explored the role of engineering controls. They recommended engineering solutions such as safe devices, needle-free connectors, and equipment designed to reduce injuries from sharps. The importance of hand hygiene, personal protective equipment and proper disposal procedures was also discussed in detail. These documents provide a structure for assessing a preventive strategy to reduce needlestick injuries and blood and body fluid exposures. In contrast the majority of the other guidelines stressed post-exposure management only.

All of the guidelines advocated a similar post-exposure management for hepatitis B; if the healthcare provider had hepatitis B antibodies more than 10 International Units / litre at any time in the past then no action was required. If the healthcare provider had not been immunised, he/she needs to be given either hepatitis B immune globulin and/or hepatitis B vaccine, the treatment regimens which have been found to be effective (Seeff et al., 1978). In cases of prevention for non-responders to the vaccine, hepatitis B immune globulin is advised. When given after an exposure, a single dose of hepatitis B immune globulin had been shown to be 90% effective in preventing hepatitis B seroconversion and infection when administered within 7 days of exposure (Beasley et al., 1983). The second dose of hepatitis B immune globulin should be given after 4 weeks; the effectiveness is reported to be up to 95% (AIDS Institute, 2008; Grady & Lee, 1975; Weinbaum et al., 2003).

The guidelines concurred with the fact that, so far, there is no effective post-exposure prophylaxis for hepatitis C exposure. There are reports suggesting that a vaccine may be possible in the future but the means of achieving that is not readily apparent at present (Koff, 2007; Mikkelsen et al., 2011). The guidelines advised blood investigation for the employee to achieve early identification of HCV and treatment (British Columbia CDC, 2010; CDC, 2001b; Yukon CDC, 2010).

The majority of the guidelines agree with the HIV post-exposure treatment outlined in US PHS Guidelines 2001 and 2005 (British Columbia CDC, 2010; CDC, 2001b, 2005; Duke University Safety Committee, 2010). The US PHS guidelines 2005 recommend examining the exposure to determine whether the basic or expanded regimen should be started (discussed in
detail earlier in the section). The US PHS guidelines 2013 have changed the recommended PEP for HIV: they now advise the use of three (or more) drugs for 4 weeks post exposure (discussed in detail earlier in the section). The New York State Department of Health AIDS Institute (NYSDOH AI) and Johns Hopkins University recommended the use of the HAART regimen following occupational exposure to HIV (AIDS Institute, 2010). The significant findings of the systematic review are discussed in table 1 Appendix 2.

Generally speaking, all the national and faculty guidelines reviewed recommended similar protocols. This gives confidence that the post-exposure management has been assessed by a number of experts and has constantly been updated with new evidence-based research, an example of which is the changes in post-exposure management of HIV in the recent US PHS Guidelines.

2.3.4.2 Guidance Documents

Five out of twenty-one documents selected for the systematic review were guidance documents, i.e. “codes of practice,” and sixteen were guidelines or “protocols” for BBFE programmes. For the purpose of this review, legislation, regulations, standards and national implementation guidance documents related to BBFE are termed as “guidance documents”. Five guidance documents were selected for the review, four of which outlined the responsibilities of an employer and were the legislative documents of the USA, Canada, England, and European Union (CCOHS, 2005; EU Council, 2010; HSE, 2008; “Ontario Occupational Health and Safety Act,” 2007; OSHA, 1991). The fifth was from Joint Commission International, an international body which certifies that a hospital is following internationally recognised best practices (JCI, 2010). The certification endorses that the hospital is in compliance with international best practice.

These documents were selected because they provided explicit information related to compliance with protocols for protection against blood and body fluid exposures. These were the minimum preventive and post-exposure management practices a hospital was required to have. The aim was to review these documents systematically and analyse the legislative requirements for compliance. In the absence of a national regulation/standard related to blood and body fluid exposures in UAE and the Middle East, a corporate policy could be synthesised based on the analysis of selected guidance documents.
Table 2.3: Characteristics of guidance documents

<table>
<thead>
<tr>
<th>Institution</th>
<th>Comprehensiveness</th>
<th>Clarity</th>
<th>Consultation</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA 1991</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>OH&amp;S Act, Ontario Reg. 207</td>
<td>+</td>
<td>++</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>HSE 2008</td>
<td>+</td>
<td>+++</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>EU Directive 2010</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>JCI 2010</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

The most comprehensive description of an employer’s responsibilities in the prevention and management of blood and body fluid exposure was found in the “Blood-borne Pathogens Standard” developed by OSHA, which is responsible for the regulation of occupational health and safety in the USA. It detailed the preventive measures to reduce occupational exposure, reporting, documentation requirements, the need for a post-exposure management protocol, and follow-up. It provides detailed discussion on how a healthcare facility should prepare to protect its staff, and its recommendations remain valid today (OSHA, 1991).

The Occupational Health and Safety Act, Ontario, Regulation 474/07 provided advice about preventive measures, stressing the provision of safety-engineered needles and a management programme. It encouraged employers to assess the risk and pursue all preventive measures to make the workplace safe (“Ontario Occupational Health and Safety Act,” 2007). The guideline demonstrates that in Canada it is the responsibility of the employer to take all necessary and possible preventive measures for the safety of the employee.

The Health and Safety Executive (HSE) from England published “Blood-borne Viruses in the Workplace: Guidance for Employers & Employees.” The guidance document was prepared for employers and employees with general information such as: what blood-borne viruses are, in which occupations exposure can take place, and how to respond to an exposure (HSE, 2008). The document was not specific to hospitals and did not provide guidance on prevention and management of an exposure to a healthcare provider.

The European Union Council Directive 2010/32/EU of 10 May 2010 required Member States to bring into force the laws, regulations and administrative provisions necessary to comply. It provided detailed responsibilities of the employers (healthcare facilities) to achieve the safest possible working environment. Risk assessment for exposure was to be conducted
followed by eliminating the risks where possible. It required informing the staff of the possible risks and training them in how to use safe devices properly. The employer needed to develop policies and procedures for post-exposure management and follow-up (EU Council, 2010).

The process of development for such documents typically includes a detailed literature review, participation of stakeholders, use of subject specialists, and community consultation before the document is added to legislation (Treasury Board of Canada Secretariat, 2010).

Joint Commission International, an international agency which accredits health facilities, required that the healthcare facility develop and implement a BBFE programme which should meet or exceed the national or provincial legal requirements and should utilise evidence-based practices. They provided a generic guidance document detailing the steps required to develop a facility specific BBFE programme. It provided a useful process which enables all accredited facilities to develop a plan. It was included in the review because most of the hospitals in developing countries are trying to achieve this certification to demonstrate that their workplace is in compliance with international standards (JCI, 2010). Joint Commission International did not force facilities to make exposure reporting mandatory or hepatitis vaccination compulsory because each facility had to be sensitive to the local legal requirements and culture. It helped in developing a policy or programme but the details had to be determined by the hospital itself.

The basic requirements for compliance were similar in each guidance document, but OSHA provided the most comprehensive description. Therefore if a hospital’s BBFE programme meets OSHA requirements it would comply with or exceed the legislative requirements of Canada, England, and the EU.

2.4 Scientific literature on reporting

Reporting an occupational exposure to blood or body fluid is the most vital step of the BBFE programme. The most serious consequence of failure to report an exposure is that it prevents access to risk assessment and subsequent treatment and follow-up. Exposure reporting has been studied to assess the effectiveness of BBFE programmes; the majority of published studies demonstrated that most of the exposures were not reported (CDC, 1997a; Osborn et al., 1999). These studies were generally from Western countries. Very few studies documenting BBFE reporting rates have been published about the Middle East and UAE
(Jacob et al., 2010; Zaidi et al., 2010). A regional assessment conducted by the WHO EMRO estimated an average of four needlestick injuries per healthcare provider annually (WHO, 2010b). Therefore, a systematic review was performed to identify studies which compared actual blood and body fluid exposures to the reported incidence of blood and body fluid exposure. The objectives of the review were to assess:

- Differences in the practices of professional groups;
- The nature and context of blood and body fluid exposure;
- The variation in blood and body fluid exposure versus reporting.

### 2.4.1 Literature search

A systematic computerised search was performed as described in section 2.2.2 using the following search terms: “needlestick injury,” “reporting,” “blood and body fluid exposures,” and “healthcare provider.” It was repeated with “needlestick injury” and “reporting.” In addition the bibliographic references of all the full articles were examined along with articles which were found while tracking the bibliographic references (Baggaley et al., 2006).

Studies which met all of the following eligibility criteria were selected for the systematic review:

1. Studies that documented the exposure and reporting rate of blood and body fluid exposure in a tertiary/teaching hospital;
2. Studies that described the professional association of the participants;
3. Studies that mentioned the timeframe during which the study was conducted; and
4. Studies published in peer-reviewed journals.

Studies which extrapolated data from surveillance programmes or retrospective clinical audits did not compare actual exposures versus reported exposures; they reported the number of blood and body fluid exposures per 100 beds annually. Therefore, those studies were not included in the review because they did not compare actual blood and body fluid exposures to the proportion of reported exposures.
2.4.2 Data analysis

The analysis was performed as described in section 2.2.3. The majority of articles which compared exposure with reporting rates were KAP studies. KAP studies are cross-sectional, observational studies which investigate health status or explore knowledge, attitudes and practices at a given time. The National Health and Medical Research Council Evidence Hierarchy of designations of "levels of evidence" has given this type of study a "level IV" designation. These studies tend to be more useful in generating hypotheses (Coleman, 2009). The studies did not use the same or even similar questionnaires and had different primary objectives, thus it was not possible to scientifically aggregate the statistical power of the reported studies. It was not possible to perform a meta-analysis (quantitative analysis). Due to this limitation, best-research synthesis was performed using an analysis system similar to those of van Tulder et al. (1999), Maher (2000) and Levack et al. (2006), modified to accommodate cross-sectional studies:

- Strong evidence: Studies which had a response rate of more than 80%, had a detailed description of the methodology, included statistical analysis, and compared results to the body of current literature;
- Moderate evidence: Studies which had a response rate of 70-80%, had a brief description of the methodology, included statistical analysis, and discussed results;
- Limited evidence: Studies which had a response rate of 60-70%, had a very short description of the methodology, and presented results with no discussion;
- No evidence: Studies which had a response rate of less than 60%, had no description of the methodology, and vague results, which were not discussed.

The critical appraisal was performed using a tool adapted from the questions recommended for critical appraisal from an article by Guyatt et al. (1993). The tool had 11 questions designed to help the reviewer evaluate the strengths and weaknesses of the article in a systematic fashion. The first two questions were screening questions: if the answer to both was "yes," it was advised to proceed with the remaining questions. The reviewer had the option to record a "yes," "no" or "can't tell" answer to most of the questions. The reviewers read the article by Guyatt et al. (1993) and agreed on what information in the articles to be reviewed would yield a "yes" response to each of the 11 questions.

Data were extracted from the selected studies on the following headings: total number of participants, the response rate of the survey, the number of needlestick injuries or blood
and body fluid exposures reported, percentage of exposures reported compared to the actual number of needlestick injuries and blood and body fluid exposure which took place to assess the needlestick injury reporting pattern sampling methodology used by the researcher, country where the study was performed, year of study, and year of publication.

### 2.4.3 Results

An initial search identified 163 studies which were published between 1960 and 2010. All 163 studies were reviewed by title and abstract and 52 selected for their full texts to be reviewed. The articles were obtained and assessed as to whether they met the inclusion criteria. Seven additional articles were added to the search through bibliographic review of the full text articles; those articles met the inclusion criteria. Hence 59 full text articles were reviewed, but out of these only 23 articles were selected for the review.

Results from the critical appraisal are tabulated in table 2.4. Cohen’s Kappa, as used to determine the inter-reviewer agreement on the methodological quality of the 23 selected studies, was 0.87.
Complete citations and abstract where necessary were obtained of all papers, excluding those in which were not in English, and screened (n=163).

111 papers were excluded due to the following reasons:
Did not assess BBFE reporting rates = 32
Did not compare number of exposures to number of exposures reported = 35
Not a tertiary or secondary hospital based study = 18
Did not assess number of NSI/BBFE = 17
Duplicate found in both PubMed and OVID = 9

Full text of articles were obtained and reviewed (n=52) with addition to full text copies obtained from bibliography and other search engines (n=7), which brought the total to n= 59.

36 papers were excluded due to the following reasons:
Did not assess BBFE reporting rates = 10
Did not compare number of exposures to number of exposures reported = 21
Not a tertiary or secondary hospital based study = 5

After the screening (n=23) papers were selected for the systematic review.

Figure 2.2: Summary of steps taken for inclusion of studies for effectiveness of reporting in the systematic review
<table>
<thead>
<tr>
<th>Reference</th>
<th>Issue</th>
<th>Methodology</th>
<th>Sample</th>
<th>No bias</th>
<th>Data</th>
<th>Sample size</th>
<th>Result</th>
<th>Analysis rigorous</th>
<th>Clear finding</th>
<th>Applicability</th>
<th>Adds knowledge</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>10</td>
</tr>
<tr>
<td>Schmid et al.</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Y</td>
<td>7</td>
</tr>
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<td>Tabak et al.</td>
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<td>Y</td>
<td>Y</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>9</td>
</tr>
<tr>
<td>Smith</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>9</td>
</tr>
<tr>
<td>Au et al.</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Y</td>
<td>N</td>
<td>Y</td>
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<td>Y</td>
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<td>Y</td>
<td>9</td>
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<tr>
<td>Wicker et al.</td>
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<td>Y</td>
<td>Y</td>
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<tr>
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<td>Thomas &amp; Murray</td>
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<td>Y</td>
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<td>Y</td>
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<td>Y</td>
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<td>Gurubacharya et al.</td>
<td>Y</td>
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<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
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<td>N</td>
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<td>Maqbool</td>
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<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>9</td>
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<tr>
<td>Hashemipour &amp; Sadeghi</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Y</td>
<td>11</td>
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<td>Jacob et al.</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>11</td>
</tr>
</tbody>
</table>
Thirteen out of 23 studies assessed occupational exposure for more than one professional group (physicians, nurses and paramedical staff); ten studies focused on a specific professional group, mainly those which are known to be more prone to body fluid exposure: surgeons (five), medical students (three), physicians (one), and nursing students (one). The data represents 13 countries: the UK (seven articles), USA (three), Germany (two), Iran (two), and one each from Australia, Ethiopia, Israel, Mexico, Nepal, Pakistan, Saudi Arabia, Taiwan and UAE.

The articles used questionnaires to explore the practices of the healthcare providers. The respondents were anonymous, hence opinion bias was reduced and it was assumed that the respondents would state the facts honestly and comprehensively. The studies explored not only the reporting patterns of occupational injuries likely to result in exposure to blood and body fluids but also examined it in relation to universal precautions, compliance with use of personal protective equipment, and use of safety devices. This helped in examining a variety of factors which could influence reporting of blood and body fluid exposure.

Sharma et al. (2009) examined practices of medical students and reported that they were more likely to be accidentally exposed to blood or body fluids compared to their senior colleagues and less likely to report the exposure. This was in concordance with the findings of Reda et al. (2009) who reported the risk of sustaining a needlestick injury to be inversely associated with length of work experience. Hashemipour and Sadeghi (2008) reported that medical and dental students were found to have a high risk of sustaining a blood and body fluid exposure during their training. They recommended adding more preventive measures focusing on the importance of reporting and post-exposure prophylactic treatment to reduce exposures and increase reporting.

Manian assessed the reporting of blood and body fluid exposure among surgeons; the study revealed that 29% of surgeons had one or more occupational exposure every month, but the majority of the surgeons stated that they do not report blood and body fluid exposure, and 10% had never reported a single exposure (Manian, 1996). In a separate study Moghimi et al. (2009) demonstrated that surgeons who had proper knowledge of the risk of seroconversion had safer practices; they were more concerned about blood-borne infections, and ordered fewer tests. Moghimi et al. (2009) suggested that under-reporting may be linked to the substantial underestimation of the risk of seroconversion after an occupational exposure to body fluid.
Efetie and Salami (2009) demonstrated that 75.0% of nurses were reporting exposures and following universal precautions, compared to 15.2% of doctors ($p < 0.05$). This finding was in agreement with studies performed by Zafar et al. (2008), Efetie and Salami (2009), Jankovic et al. (2009), and Raghavendra et al. (2006), who reported that nurses were more likely to report an exposure compared to physicians, and followed universal precautions more closely.

Only 5 out of 23 studies had a detailed description of the event which led to the exposure. The majority of the studies did not focus on cause of exposure, but instead focused on the practices of healthcare providers related to universal precautions, use of personal protective equipment (gloves, double gloves, face shield, gown), proper disposal of needles, and proper use of safe devices. An Australian study of nursing students found that opening a capped needle was the most common reason for injury followed by opening an ampoule, needle penetrated cap, disposal in sharps box, broken ampoule, and disassembling a needle kit (Smith & Leggat, 2005b). These results demonstrate the need for training nursing students in how to perform these tasks without injuring themselves. Nursing training programmes could benefit from this study and prevent future injuries. Injuries caused while opening a capped needle or ampoule would not be classified as an occupational exposure to body fluid because those items would not be contaminated with body fluid.

Sharma et al. (2009) performed a similar study focusing on the causes of blood and body fluid exposure in medical students and found that passing needles, loading needles, and cleaning up after a procedure were common reasons for sharps injuries in junior physicians (all of which would be classified as exposure to body fluid). This highlighted the importance of training junior staff in these procedures (Sharma et al., 2009). Zafar et al. (2008) from Pakistan reported three main practices which were found responsible for blood and body fluid exposure: injecting or withdrawing blood samples, suturing in surgery, and recapping syringes. Tadesse and Tadesse (2010) from Ethiopia and Wicker et al. (2008) from Germany reported similar causative events: emergency situations, suturing and cutting (surgery), during and after blood withdrawal/ injections, unexpected patient movement, fatigue, and recapping needles. This systematic review demonstrated that injecting, suturing and recapping were the most common causative events which resulted in blood and body fluid exposure. They could be addressed by using needle-free systems, blunt suture needles and proper disposal of needles. Fatigue and stress were also identified as causes of risky practices leading to blood and body fluid exposure (Gander et al., 2007; Zafar et al., 2009); these factors need to be studied for their impact on healthcare providers, and whether the injuries occur because of
improper technique, not following the procedure, or trying to work faster and increasing the chances of error in decision making and manipulation.

Four out of 23 studies examined the device which was used while the exposure took place. Syringes, needles, and glass items were the three most common devices in the four studies (Lee et al., 1999; Shiao et al., 1999; Smith & Leggat, 2005b; Tadesse & Tadesse, 2010). Shiao et al. (1999) gave a detailed description of the types of devices which were found to be the causative device: normal syringe, glass item, insulin syringe, unspecified item, suture needle, blood glucose lancet, and intravenous kit.

Blood and body fluid exposure reporting was found to be low in most of the countries and in all professional groups; a summary of the results is tabulated in table 2.5. In the table actual BBFE (when a respondent said that they had an exposure within the last 12 months) is compared to the proportion of reported BBFE (when a respondent said they had an exposure and reported it to the occupational health and safety clinic).

Exposure rates have been described in three data types:

- Number of exposures/100 beds/year;
- Number of exposures/(100 or 1,000) healthcare providers/per year;
- Reporting rate (total actual exposure versus proportion of reported exposures).

The majority of epidemiological studies have referred to numbers of reported exposures either per bed or per healthcare provider and are unable to assess the underlying non-reporting of occupational exposures. The KAP studies have been used by researchers to evaluate the ratio of actual exposures to reported exposures, by attempting to quantify the proportion of exposures that were not reported.

The actual exposure to blood and body fluids in the studies reported in table 2.5 was found to range between 14% and 87% by healthcare providers who responded in the selected studies (Shiao et al., 1999; Smith & Leggat, 2005). In the studies reported in table 2.5 the percentage of actual incidents that were reported ranged from 2.3 to 77% (Au et al., 2008; Tabak et al., 2006). This makes the cumulative evaluation of exposures based on reports of blood and body fluid exposures almost impossible. There appears to be an inconsistent relationship between estimated actual exposure rates and the proportion of such exposures which are reported and captured in study data.

When the studies were analysed by country, Australia, Germany, Israel, Pakistan, the UK and USA generated at least one study where the healthcare providers reported more than
50% of the occupational exposures to blood and body fluid (Makary et al., 2007; Raghavendran et al., 2006; Schmid et al., 2007; Smith & Leggat, 2005a; Zafar et al., 2008). Most of the other countries had reporting rates lower than 50%: Saudi Arabia 7%, UAE 18%, Iran 18%, Taiwan 18%, Nepal 21%, and Ethiopia 38% (Alam, 2002; Askarian & Malekmakan, 2006; Gurubacharya et al., 2003; Jacob et al., 2010; Shiao et al., 1999; Tadesse & Tadesse, 2010). The summaries of significant findings from each article are discussed in table 2 Appendix 2.
<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Country</th>
<th>Actual BBFE (%)</th>
<th>Proportion of BBFE reported (%)</th>
<th>Study population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kennedy et al.</td>
<td>2009</td>
<td>UK</td>
<td>81</td>
<td>19</td>
<td>Surgeons (consultants, trainee)</td>
</tr>
<tr>
<td>Schmid et al.</td>
<td>2006</td>
<td>Germany</td>
<td>26</td>
<td>55</td>
<td>All medical staff</td>
</tr>
<tr>
<td>Tabak et al.</td>
<td>2006</td>
<td>Israel</td>
<td>66</td>
<td>77</td>
<td>All medical staff</td>
</tr>
<tr>
<td>Smith</td>
<td>2005</td>
<td>Australia</td>
<td>14</td>
<td>60</td>
<td>Nursing students</td>
</tr>
<tr>
<td>Au et al.</td>
<td>2008</td>
<td>UK</td>
<td>36</td>
<td>2.3</td>
<td>Surgeons</td>
</tr>
<tr>
<td>Wicker et al.</td>
<td>2008</td>
<td>Germany</td>
<td>31</td>
<td>28</td>
<td>All medical staff</td>
</tr>
<tr>
<td>Sharma et al.</td>
<td>2009</td>
<td>USA</td>
<td>59</td>
<td>47</td>
<td>Resident surgeons</td>
</tr>
<tr>
<td>Askarian &amp; Malekmakan.</td>
<td>2006</td>
<td>Iran</td>
<td>71</td>
<td>18</td>
<td>Medical, dental, nursing and midwifery students</td>
</tr>
<tr>
<td>Hettiaratchy et al.</td>
<td>1998</td>
<td>UK</td>
<td>N</td>
<td>17</td>
<td>Junior doctors less than 10 years</td>
</tr>
<tr>
<td>Tandberg et al.</td>
<td>1990</td>
<td>Mexico</td>
<td>77</td>
<td>35</td>
<td>All medical staff in emergency dept.</td>
</tr>
<tr>
<td>Makary et al.</td>
<td>2007</td>
<td>USA</td>
<td>83</td>
<td>51</td>
<td>Surgeons in training</td>
</tr>
<tr>
<td>Shiao et al.</td>
<td>1999</td>
<td>Taiwan</td>
<td>87</td>
<td>18</td>
<td>All medical staff</td>
</tr>
<tr>
<td>Thomas &amp; Murray</td>
<td>2009</td>
<td>UK</td>
<td>44</td>
<td>20</td>
<td>Surgeons</td>
</tr>
<tr>
<td>Lee et al.</td>
<td>1998</td>
<td>USA</td>
<td>56</td>
<td>47</td>
<td>EM residents</td>
</tr>
<tr>
<td>Burke &amp; Madan</td>
<td>1997</td>
<td>UK</td>
<td>46</td>
<td>27</td>
<td>Doctors and midwives</td>
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<tr>
<td>Kerr et al.</td>
<td>2009</td>
<td>UK</td>
<td>73</td>
<td>52</td>
<td>Surgeons</td>
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<tr>
<td>Zafar et al.</td>
<td>2008</td>
<td>Pakistan</td>
<td>45</td>
<td>53</td>
<td>All medical staff</td>
</tr>
<tr>
<td>Tadesse &amp; Tadesse</td>
<td>2010</td>
<td>Ethiopia</td>
<td>30</td>
<td>38</td>
<td>All medical staff</td>
</tr>
<tr>
<td>Raghavendran et al.</td>
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<td>UK</td>
<td>53</td>
<td>66</td>
<td>All medical staff</td>
</tr>
<tr>
<td>Gurubacharya et al.</td>
<td>2003</td>
<td>Nepal</td>
<td>74</td>
<td>21</td>
<td>All medical staff</td>
</tr>
<tr>
<td>Maqbool</td>
<td>2002</td>
<td>Saudi Arabia</td>
<td>74</td>
<td>7</td>
<td>Nurses, paramedical</td>
</tr>
<tr>
<td>Hashemipour &amp; Sadeghi</td>
<td>2008</td>
<td>Iran</td>
<td>74</td>
<td>9</td>
<td>Medical, dental students</td>
</tr>
<tr>
<td>Jacob et al.</td>
<td>2010</td>
<td>UAE</td>
<td>19</td>
<td>18</td>
<td>All medical staff</td>
</tr>
</tbody>
</table>
2.5 Barriers to participation

It was important to assess the healthcare providers’ reasons for not reporting occupational exposures and consequently denying themselves the benefits of post-exposure management.

Kennedy et al. (2009) suggested the following to be the barriers to reporting an exposure, as healthcare providers felt that:

- The process was time consuming;
- There was a low risk of transmission;
- They were too busy;
- Post-exposure prophylaxis would be ineffective.

Tabak et al. (2006) also reported that healthcare providers’ perceptions of the infectivity risk of the disease and effectiveness of the post-exposure prophylaxis were the best predictors of reporting compliance.

Knowledge, attitudes and practice studies were initially used by Family Planning organisations to understand community awareness of services (Khan, 1967; Mauldin, 1965). Our review of the literature found that this methodology of assessing perceptions and practices has been widely used in public health, most notably in issues related to occupational and non-occupational exposure of healthcare providers to HIV. The review showed that quite a few researchers had conducted a questionnaire or interview-based cross-sectional study to assess the KAP of healthcare providers associated with blood and body fluid exposure. These studies provide anonymous views of the healthcare providers’ perceptions and self-reported practices. Therefore, a systematic review of KAP studies assessing blood and body fluid exposure practices was conducted. The objectives of the systematic review of barriers to participation were:

- To identify common themes concerning the knowledge of healthcare providers about blood or body fluid exposures;
- To understand a range of attitudes and practices reported in different countries; and
- To identify commonly published reasons for practices such as non-reporting and non-compliance with protocols.
2.5.1 Literature search

A systematic literature search was performed using the following search terms: "knowledge or attitude or practices", "healthcare worker", "healthcare providers", "blood-borne pathogens or blood," and "body fluid exposure." The same terms were used in multiple search engines. In addition, the bibliographic references of all the full articles were examined and those articles which were found were examined while tracking the bibliographic references (Baggaley et al., 2006).

Studies which met all of the following inclusion criteria were selected for the systematic review, i.e. those that:

1. Assessed knowledge, attitudes and practices related to blood-borne pathogens or needlestick injuries or blood and body fluid exposures;

2. Were undertaken between 1960 and 2010;

4. Were published in peer-reviewed journals; and

5. Were conducted on healthcare providers working in a hospital/tertiary or secondary healthcare facility.

Studies which extrapolated data from surveillance programmes, retrospective clinical audits, KAP studies assessing non-occupational exposure to HIV or universal precautions, and studies related to veterinary medicine were excluded from the review.

2.5.2 Data analysis

The overall study methodology adopted for data analysis and critical appraisal is detailed in section 2.2.2. Data were extracted from the selected studies on the basis of the following information:

- Total number of participants;
- The response rate of the survey;
- Number of blood and body fluid exposures;
- Number of reported blood and body fluid exposures;
- Research methodology used by the researcher;
- Goal of the study; and
- Significant results and conclusion.
2.5.3 Results

The initial search of the different databases identified 721 studies which were published in English between 1960 and 2010. All 721 studies were reviewed by title and abstract; those which did not meet the inclusion criteria were excluded.

Only 46 out of 721 articles were selected for full text review. These articles were obtained and assessed to see whether they conformed to the inclusion criteria. Fourteen articles were added to the search after being found while tracking the bibliographic references of the full text articles following a hand search, and which met the inclusion criteria. Hence 60 full text articles were reviewed, from which 17 articles were selected after detailed appraisal of the full text.

Critical appraisal of each study was performed using 11 questions adapted from Guyatt et al. (1993). The results are presented in table 2.6 (Guyatt et al., 1993). Cohen's Kappa was used to determine the inter-rater agreement on the methodological quality of the 17 selected studies, and was 0.92.
Complete citations and abstract where necessary were obtained of all papers and screened (n=721).

675 papers were excluded due to the following reasons:
Not a Knowledge, Attitude and Practices study = 240
Did not assess needlestick injury or blood and body fluid exposures = 94
KAP but only assessed universal precautions = 68
KAP assessing specific healthcare interventions = 25
Study performed on patient not HCP = 22
Study conducted for primary healthcare or rural health centre = 21
Studies not related to blood and body fluid exposure = 154
Studies not published in peer-reviewed journals = 51

Full text of articles were obtained and reviewed (n=46) with addition of full text copies obtained from bibliographies and other search engines (n=14), which brought the total to n=60.

43 papers were excluded due to the following reasons:
Not a Knowledge, Attitude and Practices study = 14
Did not assess needlestick injury or blood and body fluid exposures = 16
KAP but only assessed universal precautions = 9
Study performed on patient not HCP = 4

After the screening (n=17) papers were selected for the systematic review.

Figure 2.3: Summary of steps taken for inclusion of studies on barriers to participation in the systematic review
Table 2.6: Comparison of the evaluation scores of studies selected on barriers to participation

<table>
<thead>
<tr>
<th>Reference</th>
<th>Issue</th>
<th>Methodology</th>
<th>Sample</th>
<th>No bias</th>
<th>Data</th>
<th>Sample size</th>
<th>Result</th>
<th>Analysis rigorous</th>
<th>Clear finding</th>
<th>Applicability</th>
<th>Adds knowledge</th>
<th>Total</th>
</tr>
</thead>
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<td>Zafar et al.</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>10</td>
</tr>
<tr>
<td>Muralidhar et al.</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>9</td>
</tr>
<tr>
<td>Tadesse &amp; Tadesse.</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>11</td>
</tr>
<tr>
<td>Efetie &amp; Salami</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>8</td>
</tr>
<tr>
<td>Reda et al.</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Y</td>
<td>N</td>
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<td>10</td>
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<td>Moghimi et al.</td>
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<td>Raghavendran et al.</td>
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<td>Y</td>
<td>Y</td>
<td>6</td>
</tr>
<tr>
<td>Gurubacharya et al.</td>
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<td>Y</td>
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<td>Manian</td>
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<td>Slater et al.</td>
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<td>Min et al.</td>
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<td>Hashemipour &amp; Sadeghi</td>
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<td>Jankovic et al.</td>
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<td>Jacob et al.</td>
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</table>

The 17 KAP studies selected for review were each conducted in a hospital. The composition of healthcare providers in these studies varied: seven studies had participation from all professional groups, two studies assessed practices of only nursing and para-medical healthcare providers, two studies focused only on physicians and nurses, two studies looked into the practices of surgeons and gynaecologists respectively, one study examined the practices of medical students, and one study did not provide a breakdown of the professional groups participating in the study. Due to the differences in the population studied and research methods, it was not possible to perform a meta-analysis. Summary findings of the selected articles are discussed in table 3 Appendix 2.

The review focused on how healthcare providers perceived and reacted to an occupational exposure. It also examined the high risk activities which typically result in exposure to blood and body fluid.
2.5.3.1 Healthcare providers’ knowledge related to BBFE

Knowledge was assessed in all 17 studies. The review showed that physicians were more knowledgeable than nurses regarding blood and body fluid exposures and transmission of diseases through occupational exposure by needlestick injury (Jankovic et al., 2009). Most surgeons overestimated the seroprevalence of HIV, hepatitis B and hepatitis C in the community, while they under-estimated the risk of transmission of the diseases after an exposure. Moghimi et al. suggested that under-estimation of the risk of transmission of the diseases after an exposure could be the reason for low reporting rates of blood and body fluid exposure (Moghimi et al., 2009).

The majority of healthcare providers (70%) considered they had adequate knowledge about the risk of blood and body fluid exposure, but nonetheless provided incorrect answers when quizzed (Scouler et al., 2000). Physicians over-estimated the transmission of disease after an occupational exposure to blood-borne pathogens in comparison to surgeons, who under-estimated the risk of transmission (Scouler et al., 2000). Zhang et al. (2009) reported substantial gaps in the knowledge of healthcare providers related to universal precautions and transmission of blood-borne diseases following an exposure. The gaps in knowledge varied from study to study; 30-61% of healthcare providers were not aware that hepatitis C was transmitted in blood (Gurubacharya et al., 2003), and 21% did not consider HIV to be transmissible after blood or body fluid exposure (Alam, 2002). In contrast to this, Slater et al. (2007) reported that most of the healthcare providers perceived HIV infection to be the most likely disease transmitted by needlestick injury followed by hepatitis C and hepatitis B. These studies demonstrated that healthcare providers were not aware of post-exposure transmission rates. If knowledge significantly affects the reporting rate, one important intervention would be the education and training of healthcare providers. Education or training could focus on risk of transmission of diseases after an occupational exposure and the effectiveness of post-exposure prophylaxis. It would be important to assess the impact of these sessions on improving accuracy and comprehensiveness of knowledge and changes in their practices.

Better knowledge levels among healthcare providers were demonstrated in some studies. A study performed in Ethiopia revealed that 99.4% of the healthcare providers correctly stated that HIV, hepatitis B, hepatitis C, and herpes simplex 1 and 2 are diseases transmitted after a needlestick injury (Reda et al., 2009). A similar finding was reported by a study performed in Nepal: that 96% of healthcare providers knew that hepatitis B was transmitted through needlestick injuries (Gurubacharya et al., 2003). A study conducted in
Nigeria showed that 97% of physicians were found to have good knowledge regarding universal precautions (Efetie & Salami, 2009). These studies reported that physicians were well aware of the transmission of disease post exposure and of the use of proper universal precautions, but nonetheless had low levels of reporting BBFE incidents (Gurubacharya et al., 2003). It is therefore probable that practices are only partially driven by knowledge about BBFE.

Nurses were found to report exposures more regularly than physicians and were following universal precautions more closely, although physicians were found to have better knowledge of disease transmission after exposure (Jankovic et al., 2009; Zafar et al., 2008). Nurses’ compliance with protocols has been linked to their training, constant reminders and audits by peers. It has been argued by Efetie and Salami (2009) that nurses complied with protocols because of their sound knowledge of the risks and protective precautions. Their study reported that 92% of nurses had good knowledge related to universal precautions out of which 75% practiced universal precautions at all times (Efetie & Salami, 2009).

2.5.3.2 Attitudes Related to Blood and Body Fluid Exposure

Three out of 17 studies in the review examined attitudes, and reported attitudes that may determine compliance with safe practices (Efetie & Salami, 2009; Raghavendran et al., 2006; Zafar et al., 2008):

- Carelessness and risky attitudes;
- Noncompliance with universal precautions;
- Demotivation due to fatigue and stress; and
- Downplaying the risk of BBFE transmission.

Hospitals in these studies reported that needlestick injuries were found to have a significant association with length of work experience of the healthcare provider, which had a protective impact (Reda et al., 2009). All three studies demonstrated that occupational stress and being overworked are two important factors which lead to reduced motivation and subsequently to risky and careless attitudes (Zafar et al., 2008).

The authors suggested that positively influencing the practices of healthcare providers by reducing their workloads, providing extra hours for administrative assignments and documentation, reducing work hours, and designing better rotations for shift workers will improve compliance.
Most studies were not successful in exploring the attitudes, perceptions and beliefs of healthcare providers and their impact on practices. Qualitative studies may be more appropriate to explore attitudes, perceptions and beliefs related to blood and body fluid exposure because they provide the opportunity to explore the worldview of the participants. The choice of mixed methods research was a direct result of the inability to characterise barriers to participation through attitudinal factors alone.

2.5.3.3 PRACTICES RELATED TO BLOOD AND BODY FLUID EXPOSURE

A number of researchers have endeavoured to examine practices associated with blood and body fluid exposure, precautionary measures, and post-exposure actions. In 10 out of the 17 studies selected, practices related to universal precautions were explored. It was reported that 61-77% of healthcare providers were aware of the universal precautions, but only 23-27% followed them (Alam, 2002; Gurubacharya et al., 2003). Raghavendran et al. (2006) reported that only 31% of the physicians “almost always” practiced universal precautions compared to 80% of nurses who adhered to the guidelines. Moghimi et al. (2009) reported that only 12.9% of surgeons stated that they follow universal precautions. Three different studies showed that less than 50% of healthcare providers reported that they follow universal precautions (Hashemipour & Sadeghi, 2008; Jankovic et al., 2009; Zhang et al., 2009). The most common reason given for not following the universal precautions was non-availability of personal protective equipment (Efetie & Salami, 2009; Reda et al., 2009) which may be as important a reason as lack of knowledge or poor attitudes to safety and risk.

Recapping and improper disposal were identified as high risk practices which compromised the safety of healthcare providers (Reda et al., 2009; Tadesse & Tadesse, 2010). Muralidhar et al. (2010) reported that 63% of healthcare providers stated that they recapped needles after use. In a separate study Raghavendran et al. (2006) assessed the practices related to sharps disposal: 70% of the healthcare providers reported that they made sharps safe for others, and 21% admitted to leaving sharps for other healthcare providers to clean later. Recapping was found to be practiced by 43% of the respondents. These findings were in concordance with those of Talaat et al. (2003) who reported that 62.4% of healthcare providers acknowledged that they threw used needles in the waste basket. It can be argued that these practices could be an indicator of stress, pressure to work fast, and demotivation which affects behaviour and leads to careless mistakes. A counter-argument would be the perceived risk of performing these tasks compared to a disinclination of the healthcare
provider to walk to the sharps container for disposal of used needles or sharps. It has been argued by Raghavendran et al. (2006) that because physicians were three times more likely not to properly dispose of sharps after a surgical procedure, nurses and operation department staff would have had to dispose of the sharps (putting them at risk of exposure). On the contrary some healthcare providers put themselves at higher risk by practices such as recapping the needle after use, which are not due to disinclination. More research is required to study why healthcare providers purposely put themselves in danger by recapping and others by improper methods of disposal.

These post-exposure practices were assessed in 13 out of the 17 articles selected for review. A wide range (22-74%) of the healthcare providers surveyed had an exposure in the previous year, but only 10-50% of those exposures were reported. In a study conducted on medical students in Iran 90% of exposures were not reported due to the following reasons: they did not know how to report (46.7%), who to report to (17.5%), or where to report to (11.7%), and some believed reporting would not make a difference (15.6%) (Hashemipour & Sadeghi, 2008). Being unaware of the reporting system for occupational exposures was also reported in other studies to be the cause of not reporting the exposure (Tadesse & Tadesse, 2010). Reporting of occupational exposure may increase if the reporting procedure becomes more accessible, familiar, and proven to be effective.

Hepatitis B is the only vaccine-preventable disease of the three (HIV, HCV, HBV) most commonly transmitted occupational diseases. Six out of 17 studies asked whether the healthcare provider had completed the immunisation course and had the post-immunisation blood tests. Cumulative results revealed that 60-80% of respondents had taken the vaccine but only 10-14% had their antibodies checked (Alam, 2002; Moghim et al., 2009; Zhang et al., 2009).

Talaat et al. (2003) conducted a study in Egypt where hepatitis B and C are endemic. Their study showed that only 15.8% of the respondents reported to have completed immunisation for hepatitis B. Talaat et al. (2003) used Kane’s model to predict post-exposure infections: the estimate was 24,004 new hepatitis C and 8,617 hepatitis B infections in healthcare providers every year due to occupational exposure. Therefore, a universal vaccination programme for all healthcare providers at the employer’s expense could potentially prevent 8,000 new cases of hepatitis B infection annually among healthcare providers after occupational exposures.
2.6 Qualitative review: Perceptions and barriers to participation

To provide a more comprehensive overview of the healthcare providers’ knowledge about and attitude towards an occupational exposure and the influence of culture and stigma as barriers to participation in blood and body fluid exposure programmes a review of the qualitative literature was required. Therefore, a structured literature review of qualitative studies was performed to identify and synthesise findings from studies which explored the perceptions and experiences of healthcare providers regarding occupational exposure to patients’ body fluid or the management of risk of such exposure.

2.6.1 Literature search

A systematic search was performed as described in section 2.2.5. A computerised search was performed in OVID involving the following databases: AMED (Allied and Complementary Medicine) 1985 to April 2013, Medline 1996 to April 2013, and Nursing Database 1948 to April 2013; and in EBSCO on CINAHL. A unique search strategy was developed for each database. These search strategies were individually designed to make use of the subject headings and search terms specific to each database. However, each search strategy was based on a common core framework, which combined the following:

a) Search terms to identify qualitative studies;

b) Search terms to identify studies on either blood or body fluid exposure OR on infection control; and

c) Search terms to identify studies on the experience, beliefs, knowledge, attitudes, or practice of healthcare providers.

The selection of search terms for each of these components of the review was based on search strategies used in previous reviews on similar topics or on recommendations from search strategy experts. So for instance, the search terms used to identify qualitative studies were derived from the work of Shaw et al. (2004), Flemming and Briggs (2007), and the Joanna Briggs Institute (2008). Search terms and subject headings for identifying studies on blood or body fluid exposure were based on strategies from published Cochrane reviews on this topic (Hughes et al., 2011; Young et al., 2007). For a full outline of the search terms used for each database, please refer to table 4 Appendix 2.
In addition to searching these databases, a search of the grey literature was performed using Google Scholar. Finally, the bibliographies of all included studies were also examined for any other potentially relevant publications.

**Critical Appraisal**

Critical appraisal of all included studies was performed using a tool adapted from the Critical Appraisal Skills Programme (2010). This tool has ten questions designed to help reviewers evaluate the strengths and weaknesses of a qualitative article. The first two questions were screening questions: if the answer to both was “yes,” it was advised to proceed with the remaining questions. This tool then continued with eight further questions, with the option to record a “yes,” “no” or “can’t tell” answer to these. The reviewers agreed on what information in the articles to be reviewed would be required to yield a “yes” response to each of the ten questions. The critical appraisal of the studies provided a context for interpretation of the findings from these studies. Each study was separately examined within the context of the research paradigm in which it was conducted.

**2.6.2 Data analysis**

The analysis was performed as described in section 2.2.6. The data extraction included descriptions of the research question, study method, study population, country of origin, and data collection.

**2.6.3 Results**

The results of the search strategy are reported in a “QUOROM” style flowchart (figure 2.4) (Higgins & Green, 2011; Moher et al., 1999) which summarises the steps followed to arrive at the number of studies selected in the structured review. An initial search of the different databases identified 2,089 studies. All 2,089 studies were reviewed by title and abstract and those which did not meet the inclusion criteria were excluded. Only 19 out of 2,089 articles were selected for their full texts to be reviewed. These 19 articles were obtained and assessed as to whether they met the inclusion criteria. Thirteen additional articles were added to the search through bibliographic review of the full text articles and Google Scholar search, and screened for inclusion. Hence the full texts of 32 publications were screened for
inclusion in total. Of these 32 publications, however, only eight met the criteria for inclusion in this review. Critical appraisal was performed on these eight, by using ten questions adapted from the Critical Appraisal Skills Programme (Critical Appraisal Skills Programme, 2010), the results of which are tabulated in table 2.7.

Complete citations and abstract where necessary were obtained of all articles in English, and screened (n=2089).

2,070 articles were excluded due to the following reasons:
Not related to BBFE = 1,830
Not a qualitative study = 94
Did not study beliefs, experiences or KAP of HCP = 26
Did not study barriers to reporting BBFE = 109
Not a hospital based study = 13

Full text of guidelines/guidance documents were obtained and reviewed (n= 19) with addition of full text obtained from bibliography and web search (n=13), (which brought the total to n=32).

23 articles were excluded due to the following reasons:
Detailed review of the methods demonstrated they did not follow qualitative methods: 13
Assessed infection through non-occupational exposure = 4
Did not study beliefs, experiences or KAP of HCP = 6

After the screening (n=8) guidelines/guidance documents were selected for the systematic review.

Figure 2.4: Summary of steps taken for inclusion of qualitative articles related to occupational exposures in the structured review
Table 2.7: Comparison of the critical review of selected studies

<table>
<thead>
<tr>
<th>Reference</th>
<th>Aims</th>
<th>Methodology</th>
<th>Research design</th>
<th>Recruitment strategy</th>
<th>Data collection</th>
<th>Relationship of researcher</th>
<th>Ethics</th>
<th>Analysis rigorous</th>
<th>Clear finding</th>
<th>Adds knowledge</th>
<th>Total</th>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Lymer (2004)</td>
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<td>Hagstrom (2006)</td>
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<td>Lymer et al.</td>
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<td>Lin (2007)</td>
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<td>Chan (2009)</td>
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<td>Gamele (2012)</td>
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<td>Y</td>
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<tr>
<td>Naidoo (2010)</td>
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<td>Y</td>
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2.6.3.1 Characteristics of Included Studies

The characteristics of the eight studies included in this review are presented in table 2.8. Overall, these eight studies could be grouped into one of three categories on the basis of the general subject of their findings:

1) Studies that explored the perceptions of healthcare providers regarding their experiences of occupational exposure to patient blood or body fluid, and

2) Studies that assessed the barriers and KAP relating to an effective blood and body fluid exposure programme. Because of the diversity of study contexts and methods used, it was not possible or appropriate to undertake a full qualitative synthesis of the themes emerging from these studies; therefore a narrative summary of the findings from these studies is presented below instead.

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Table 2.8: Characteristics of included studies

<table>
<thead>
<tr>
<th>References</th>
<th>Focus of study</th>
<th>Method</th>
<th>Participants</th>
<th>Data collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ward (2012)</td>
<td>Experiences and learning needs of nursing students related to infection prevention</td>
<td>Semi-structured interviews</td>
<td>n = 31 nursing students and 32 nurse mentors. Country of origin UK</td>
<td>63 interviews; 50 min per interview</td>
</tr>
<tr>
<td>Lymer (2004)</td>
<td>Factors influencing motivation to practise universal precautions</td>
<td>Grounded theory</td>
<td>n= 15; 9 nurses, 6 nursing assistants. Country of origin Sweden</td>
<td>60 interviews; 45-60 min per interview</td>
</tr>
<tr>
<td>Hagstrom (2006)</td>
<td>Barriers to implementation of a sharps safety programme</td>
<td>Not stated, based on analysis of focus group discussions</td>
<td>n = 5 nurses, 7 certified surgical technologists. Country of origin US</td>
<td>4 focus group sessions; 1 hour per session</td>
</tr>
<tr>
<td>Lymer (2003)</td>
<td>Factors that influence HCP actions in case of occupational BBFE</td>
<td>Grounded theory</td>
<td>n= 15; 9 nurses, 6 nursing assistants. Country of origin Sweden</td>
<td>60 interviews; 45-60 min per interview</td>
</tr>
<tr>
<td>Lin (2008)</td>
<td>Experience of occupational exposure to HIV</td>
<td>Not stated, method fits with grounded theory however</td>
<td>n = 33 healthcare providers. Country of origin China</td>
<td>33 interviews; 2 hours per interview</td>
</tr>
<tr>
<td>Chan (2009)</td>
<td>HCP perceptions of occupational exposure to HIV</td>
<td>Grounded theory</td>
<td>n = 20; 10 nurses, 10 trainee nurses. Country of origin Thailand</td>
<td>20 interviews; 60-90 min per interview</td>
</tr>
<tr>
<td>Naidoo (2010)</td>
<td>Experiences of student nurses who sustained needlestick injuries</td>
<td>Phenomenology</td>
<td>n = 8 nurses</td>
<td>8 interviews; 1 hour per interview</td>
</tr>
</tbody>
</table>

2.6.3.2 Perceptions of healthcare providers related to occupational exposure

Four studies explored the perceptions of healthcare providers regarding their experiences of occupational exposure to patient blood or body fluid. Gamede (2012) undertook a descriptive qualitative analysis to explore the perceptions of 12 occupational health nurses regarding needlestick injuries when working in South Africa. The majority of
the participants in the study reported that nurses felt they were more at risk of sustaining a needlestick injury compared to all other healthcare provider groups. They expressed the view that occupational exposure to body fluids caused trauma to the healthcare provider, both physically and emotionally. Fear and stress were associated with such occupational exposure, and these led to low mood and absenteeism from the workplace. Exposure to infected body fluid, particularly HIV-infected body fluid, was reported to have an influence that extended to the nurses’ family members as well, which added further stress. The participants felt that better infrastructure, clinical resources, and increased numbers of occupational health nurses were required to properly respond to the number of occupational exposures.

Naidoo (2010) also performed a qualitative study (using phenomenological methods) that examined occupational exposure via needlestick in South African hospitals, but in this study the participants were eight nursing students who had actually experienced a needlestick injury 4 to 12 months earlier. Four major themes emerged from interviews with these participants:

1) The traumatic nature of these occupational accidents,

2) The students’ reactions to such incidents,

3) The intervening factors contributing to these incidents, and

4) The nursing students’ need for support.

Like Gamede (2012), Naidoo (2010) reported that such exposures had great impact on the nursing students in question, not just physically but emotionally as well, and that the students had developed sustained feelings of fear over the incident. These participants voiced the need for a more proactive approach to prevention and management of needlestick injuries, including better methods for reporting exposure, clearer guidance regarding when to start the post-exposure prophylaxis, and better support for peers and family members. Naidoo (2010) reported that one student was so stressed by the needlestick injury that he or she had developed post-traumatic stress syndrome. The paper concluded with a proposal to implement further health education and prevention strategies, counselling sessions for people exposed to workplace injuries, and the need for improved reporting procedures.

Lin et al. (2008) performed 33 in-depth interviews with healthcare providers to explore their or their colleagues’ experiences of an occupational exposure to HIV in China. Five themes emerged from these interviews:

1) Perceived risk,
2) Actual exposure,

3) Post-exposure concerns,

4) Guidelines, and

5) Barriers to compliance.

The respondents in this study again expressed the significant stress and anxiety that was associated with occupational exposure to HIV, but reported that healthcare providers did not always follow universal precautions when they had heavy workloads or when responding to emergencies. They identified the following as barriers to compliance of reporting the exposure: negative attitudes of the hospital management (i.e. not paying compensation for or providing insurance against such exposure), ignorance of the availability of post-exposure prophylaxis, unavailability of post-exposure prophylactic medication, and side-effects of the medication (which were considered to discourage its use). Lin et al. (2008) recommended further training of healthcare providers on the risk of occupational infections and on appropriate hospital management of exposure to encourage and support healthcare providers to comply with universal precautions and post-exposure guidelines.

Chan et al. (2009) explored the perceptions of Thai nurses about occupational exposure to HIV using semi-structured interview methods. Twenty nurses were interviewed, with the following themes emerging from these interviews: exposure to HIV was a feared occupational hazard, social stigma, disease of carelessness, innocent victims, and acceptance. The participants’ fear of HIV infection was mainly due to perceived social factors rather than the health impact of the disease. The authors recommended interviewing healthcare providers with actual occupational exposure to body fluid infected with HIV to provide insight into the lived experience of this phenomenon.

These four studies which explored the perceptions of healthcare providers were able to reveal the feelings about and fears of having an occupational exposure to body fluid. Healthcare providers reported that these types of incidents were highly traumatic, not only in the physical sense but also in terms of the emotional and psychological consequences. Naidoo (2010) reported one episode where a BBFE event resulted in post-traumatic stress syndrome. Furthermore, the respondents in these studies reported that just having BBFE guidelines for clinical practice was insufficient to protect healthcare providers, and that more awareness was required by healthcare providers regarding the benefits of using universal precautions, the risks of infection after an exposure, and regarding current best practice methods of post-
exposure prophylaxis. Most of the studies reported the need for improving the infrastructure to support post-exposure assessment and prophylaxis.

2.6.3.3 Barriers to an effective BBFE programme

Four studies were identified that reported on barriers to implementation of an effective BBFE programme. Two of these studies were conducted by one group of authors (Lymer et al., 2003, 2004), who used grounded theory methods to interview nurses and assistant nurses regarding their views on BBFE programmes.

The first of these two studies explored the factors that influence healthcare providers’ actions in cases of occupational BBFE (Lymer et al., 2003). The authors described the process that healthcare providers go through as they move from a work-task-orientated action to diagnosis-orientated actions. They commented that the junior nurses tended to learn their BBFE practices from their more senior colleagues, as they found that theory they learned in school did not always comply with how clinical work was structured or supported in actual hospital environments. They also reported that, in comparison to practices learned in nursing school, nurses’ behaviour in real clinical environments tended to permit a great level of risk taking. Hence universal precautions were not followed at all times, instead only when nursing providers felt that a particular patient could have an infection which required precautions. These experiences had influenced the nurses’ theoretical knowledge and reduced the perception of risk.

The second article by Lymer et al. (2004) focused on compliance with BBFE guidelines. Important themes which emerged from this analysis were: the impact of significant others (charge nurse and infection control nurse) in forming the culture of safety practice, the pace of work and its impact on BBFE practice, the availability of protective equipment, and the influence of socio-cultural phenomena on practice. They recommended that case studies based on observation of the practice of the participant would be a suitable future research strategy to form a better understanding of barriers to compliance.

Hagstrom (2006) reported the results of focus group discussions to examine these barriers further. The participants perceived the following to be the barriers to participation: ineffective communication, inconsistent practices, being powerless, negative attitudes, new inexperienced staff, and time restrictions. Hagstrom (2006) recommended improved collegial communication as a vital strategy in improving participation in sharps programmes.
Ward (2012) performed a qualitative study including 63 in-depth interviews to assess the attitudes of nurses (students and mentors) towards the work of the infection control practice nurse. Three major themes emerged from the data: the impact of the presence of the infection control practice nurse, attitudes towards this role, and the preferred qualities of an infection control practice nurse. The participants in this study reported that clinical practice did improve in the presence of the infection control nurse, but that the relationship between these professionals and other healthcare workers could be improved. The participants in this study expressed the view that feedback on injection practice could be more positive and friendly. Ward (2012) concluded that the relationship between infection control and prevention nurses and other staff could improve if there was more frequent and regular contact, and if practical advice was provided in a friendly manner.

Qualitative methods are able to explore the perceptions of healthcare providers about barriers to participation in BBFE programmes. They provide an informative discussion on how participation in such programmes could be increased, taking into account the realities of clinical practice in hospital environments. The studies also demonstrated the influence of senior healthcare providers’ behaviour (e.g. charge nurse, infection control nurse, and manager) on other staff members’ activities. The importance of communication, workload management, and attitudes towards BBFE programmes were also identified as key barriers to following occupational exposure guidelines.

2.7 Conclusion

The review of guidelines, guidance documents and scientific articles demonstrated a high level of broad consistency in recommended practices to prevent potential BBF exposure incidents through the use of universal precautions, safe equipment, and safe practices including reporting and post-exposure management. However, such protocols were not readily available especially in the developing and emerging countries (Middle East) which have a higher number of occupational exposures, where hepatitis B and C are endemic in the population, and there is low participation in preventive measures. Low levels of reporting were noted as a concern as it denied healthcare providers access to post-exposure protocols.

Reasons for the asymmetry of risk and participation were explored in a review of KAP studies in a range of countries. While knowledge about the diseases transmitted through
BBFE plays some role in reporting rates, more important factors include the systemic factors such as the availability of equipment and non-systemic factors such as stress, fatigue, attitude, and risk perception etc., thus there appear to be a number of barriers to reporting associated with post-exposure anxiety and stress.

The research questions in these various studies directed the selection of methods. In comparison the qualitative studies explored the issue of occupational exposure and compliance with guidelines, but provided information on the perceptions of the participants only. The strength of this qualitative research however is in providing information on the argument behind the attitude or practice, which is essential to understand in order to improve or modify it. The quantitative studies described in this chapter focused on the causes of occupational BBFE, on reporting of such exposure, on barriers to reporting, and on the practices of different professional groups that lead to exposure. The qualitative studies explored beliefs and knowledge of healthcare providers regarding BBFE, and observed BBFE management in practice, to examine how knowledge translates into practice (if at all). These studies reported inconsistencies in these regards.

The quantitative studies were questionnaire based and had limited opportunities for the respondents to add to the data, compared to the qualitative interviews where the issues of attitudes or barriers were covered in in-depth discussions. The results from the quantitative studies demonstrated that the barriers were carelessness, not following guidelines of universal precautions, demotivation due to fatigue and stress, and healthcare providers' perception of low risk of blood and body fluid exposure. The results were more or less similar but the qualitative studies provided a wealth of reasoning for the barriers to reporting the occupational exposure. The qualitative study performed by Ward (2012) provided an excellent example of how attitudes could be explored and the results used to improve future practices.
Chapter 3: Theory of culture and stigma in context of HIV infection

This literature review chapter will discuss the theory of the impact of culture and stigma associated with HIV infection on the healthcare providers.

Culture affects our worldview; it forms our values, and influences our attitudes and practices. The term culture embodies the inner "me" (an individual’s thoughts, beliefs, ideas, and feelings) and his/her interaction with the outside world and the community. Culture has a very powerful influence over our lives as it informs traditions and affects the actions of groups of people. Hence it is essential to understand how culture forms our values and attitudes.

While conducting the research it became evident that in addition to the systemic factors which were related to the hospital there was another important aspect of blood and body fluid exposures – stress due to stigma. In the first qualitative study examining lived experiences of the healthcare providers the participants reported severe stress due to stigma. This aspect of stigma was further explored in the second qualitative study. The present chapter will lay the foundation of the discussion around culture and stigma to be followed in the later studies.

When a literature search was performed to assess the impact of stigma on the healthcare providers occupationally exposed to body fluid infected with HIV, very few papers were identified (Chan et al., 2009). There is evidence that stigma associated with HIV infection discourages people from participating in screening and post-exposure protocols (Cassell & Surdo, 2007). Due to a paucity of research on this topic, it was essential to explore the topic of stigma more broadly, and to take advantage of research conducted on the impact of culture and stigma on mental health, disability, and HIV infection in general.

3.1 Literature search

To reveal the influence of stigma on healthcare providers exposed to HIV-infected body fluid, a theory-building technique was used to link studies exploring the impact of stigma associated with disability and mental illness to those which examined its effect on healthcare providers (Baumeister, 1997; Mitchell & Egudo, 2003). A narrative review was performed,
which examined the evolution of stigma, the impact of stigma, and then stigma associated with HIV infection. A detailed description of the search methodology is provided.

The reviewers searched OVID, PubMed and Google Scholar with the following terms individually and in combination: “culture,” “impact of culture,” “stigma,” “impact of stigma,” “stigma and HIV,” and “impact of stigma of HIV on individual” from 1950 through October 2011. The review included studies published in English, debating the phenomena and history of culture and stigma, impact of stigma and culture on health, disease and disabilities which were stigmatised, stigma and HIV, and the impact of HIV stigma on health. Studies published in languages other than English, anthropological studies debating culture without reference to health or disability, and those discussing stigma in a political and racial context were excluded from the review. In addition the references/bibliographies of the selected articles were hand searched. We also reviewed books on culture, stigma, and stigma associated with HIV. Interviews with and biographies of healthcare providers who seroconverted due to occupational exposures were reviewed.

3.2 Culture

Culture is a social phenomenon; the etymology of the word “culture”, from the Latin word *cultura*, is derived from *colere*, which has the dual meanings of “cultivate” and “worship” (Spinkin, 1983). The modern use of this word in the sense of “cultivation through education” first appeared in the 1500s (Harper, 2011). Kroeber and Kluckhohn (1952) compiled a list of 164 definitions of culture in “Culture: A Critical Review of Concepts and Definitions”. A common theme found among most of the definitions of culture is that it is the sum of a society’s customs, habits, beliefs, and values (Kroeber & Kluckhohn, 1952). Beals et al. (1967) defined culture as ideas, feelings, and practices that individuals adopt as members of a system, which is composed of people, tradition, material objects, and habitually performed activities. Grossi et al. (2011) suggested that there are two popular approaches which define culture, the “anthropological” approach, which views culture from the perspective of group identity, and the “cultural economics” approach, which relates culture to a set of activities that involve inputs and outputs.
In the anthropological approach, culture is seen as a product of social and human interactions. It has been argued that culture and cultural identity is not only an attributive dimension, in fact it is the representation of how people interact and behave in society (Hall et al., 1997; Richerson & Boyd, 2005). Grossi et al. (2011) believe that culture can be characterised in three forms principally embodied in different levels: in the minds and attitudes of the people, goods produced by the society, and institutional states.

The cultural economic approach is relatively recent, evolving after a debate in the 1970s on the relationship between culture and social development (Throsby, 1999). It argues that culture could be perceived as a form of capital presenting a different magnitude of influence on the development process of a territory. The approach defines “culture as capital for human development”; it is perceived as being the worth embodied in an asset that generates a value (Throsby, 1999). Assets can be tangible, for example buildings, roads, hospitals or arts collections, or intangible such as history, folk songs, tradition, and health related behaviours and ideas. Throsby (1999) found that the tangible cultural capital is related to the consumption of goods and usage of services while intangible cultural capital is associated with attitudes and practices. Both tangible and intangible capital create value in society in economic (consumption) and social (relationship network) terms as well as their contribution to the production of new art and culture.

The WHO has recognised culture as one significant determinant of health – acknowledging the impact culture has on human behaviour and its influence on the social and economic environment (WHO, 2010a; Wilkinson & Marmot, 2003). The WHO stressed that access to and utilisation of healthcare services are often considered important factors that affect health, whereas factors such as where we live, our environment, genetics, social status, education, and interaction within our community have been demonstrated to have more influence on our health.

Leininger (1970) argued that culture had a significant influence on people’s health practices. The impact of culture could be psychological or physical. Psychological impact includes the beliefs around health and illness; in some cultures illness is viewed as a form of punishment for sins (Covey, 2005), while in other cultures, e.g. the Igbo in Nigeria, illnesses
are caused by your enemies who submitted your name to evil spirits (John-Nwankwo, 2009). Psychological illnesses in many cultures are considered to be diseases of the soul and thus dealt with through spiritual treatment only. These perspectives influence the choice of healthcare utilisation. The effect of culture on health is confounded by environmental factors: in the developing world a number of infectious diseases are caused by poor hygiene, polluted water, cultural restrictions on food, and low socio-economic status. On the other hand, a study performed by Russell and Jewell (1992) showed that in America, the African-American population’s cultural beliefs and health practices had a significant impact upon their health and wellbeing regardless of their educational level and economic status. We need to appreciate the holistic approach to healthcare, where the boundaries of medicine go beyond the prescription, into the environment and social context of where one works and lives.

3.3 Stigma

In research and popular discourse stigma as a physical mark or sign has become a rather archaic notion (Weiss et al., 2006). This change is the legacy of Goffman’s (1963) conceptualisation of the term stigma in his book “Stigma: Notes on the Management of Spoiled Identity”. Goffman (1963) discussed the role of society in formation of stigma. In his view society categorises people on the basis of attributes, which help in routine social interactions. Society creates an image of people, the “virtual social identity”, based on some attributes which the society feels they should possess; if they possess those attributes then their “actual social identity” conforms to the demands of the society (virtual social identity); these individuals are considered normal. According to Goffman (1963), if a person has an attribute (less desired) that makes him different from others, he is “thus reduced in our minds from a whole and usual person to a tainted, discounted one. Such an attribute is stigma.” (Goffman, 1963, p. 3). Dovidio et al. (2000, p. 5) defined stigma as:

“A term that involves both deviance and prejudice but goes beyond both. Stigma involves perceptions of deviance but extends to more general attributions about character and identity. Stigma is more inclusive than prejudice because it involves individual-based responses to deviance, as well as group-based reactions as a function of category membership. Because stigma is socially defined, there is considerable variation across cultures.”
In Goffman's view if a stigmatising attribute is present in an individual but is not known to others, it is a "discreditable" property or characteristic that the society would not perceive positively. He argues that when this attribute is known by others it "discredits" the individual; it spoils his or her social identity. He describes three broadly different types of stigma (Goffman, 1963):

- Physical deformities:
- Blemishes of individual character: and
- Tribal stigma.

Physical deformities are the most visible attributes. Individuals with physical deformities are easy to identify, such as a person without sight. The second category includes attributes related to character, mental state or habits, such as dishonesty, mental disorders or addiction. The third category is stigma due to race, nation or religion (i.e. due to the social group, or subgroup, to which one belongs).

Stigma and discrimination are complex in nature, varying across time, person and context, making analysis and especially intervention very difficult. Skinner and Mfecane (2005, p. 158) argued that "stigma and discrimination are cruel social processes that offer some feeling of protection to the powerful, while increasing the load on the individual or group who is victimised in the process. Stigma can be seen as a tool used by more powerful groups to protect themselves as people."

If we review different diseases or health states such as disfigurement, leprosy, psychiatric illness, mental handicap, and infective tuberculosis, they all have been stigmatised in some stage of human history (Sontag, 1989). Parker et al. (2002) suggested that societies use stigma as a strategy to create "distinction or difference" which legitimises social discrimination (Parker et al., 2002). This shows that stigma is created when a society or community is afraid of a disease, event or an act. This then provides emotional reassurance for those in power as it divides the society into those who are fine (i.e. "us") and those who are not (i.e. "them"). "Others" are therefore labelled as responsible for their suffering which is considered a result of their acts or their association with a particular group. They can then be labelled as guilty not only in themselves, but also for their influence on others (e.g. by infecting others). This has a snowball effect on the burden of stigma on these people (Crewe, 1992).

The systematic exclusion of stigmatised groups has been debated and explained as four components of the stigma concept (Link & Phelan, 2001):
1. Distinguishing and labelling differences;
2. Associating human differences with negative attributes;
3. Separating “us” from “them”; and
4. Loss of status.

Goffman (1963) argued that the difference between a “normal” individual or group and one that has been stigmatised was a question of subjective perception. Stigma (similar to beauty) is in the eye of the beholder (Goffman, 1963). Stigma associated with mental health conditions provides a particularly strong example. The modern concept of stigma and mental illness pre-dates psychiatry; ancient Egyptians knew about mental disorders 5,000 years ago (Okasha, 2005). However it has to be recognised that the institution of psychiatry has not helped in reducing the stigma or discriminatory practices (Byrne, 2000). Weiss et al. (1994) explained how deep rooted this behaviour is: it starts at playschool and endures into early adulthood. Weiss et al. (1994) gave an example of children who make fun of mentally challenged children, or who do not associate with a child with physical disability. These authors stressed that if not corrected these actions become accepted practice in early adulthood. Weiss et al. (1994) demonstrated this in a cohort study which confirmed the same prejudices on re-examination eight years later. In a similar study by Green et al. (1987), consistent negative public attitudes regarding disability were demonstrated to continue to exist at five separate points over 22 years.

Stigma related to mental illness appears to be widespread in Western society. Studies where attitudes of the general population towards mental illness were measured have suggested that the majority of people in the United States (Link, 1987; Rabkin, 1974) and many western European countries (Brockington et al., 1993; Hamre et al., 1994) tend to stigmatise mental illness. These views were not limited to lay members of society as, unfortunately, healthcare providers and even professionals from most mental health disciplines subscribed to stigmatising stereotypes (Keane, 1990; Lyons & Ziviani, 1995). Stigma and discrimination appears to be less evident in Asian and African countries (Horacio, 1991), although this finding needs to be verified by more research in these countries. The few published articles about Muslim countries have demonstrated that the stigma of mental illness seems almost non-existent in Islamic societies (Baasher, 2001; Dols, 1987; Horacio, 1991; Ng, 1997).
3.3.1 Stigma and HIV

Stigma related to HIV has its own unique characteristics, and is “heightened because it is layered upon pre-existing stigmas associated with gender, homosexuality, drug use, promiscuity etc.” (Lee et al., 2002). Individuals and groups are discredited due to gender (Golub, 1999; Parker et al., 2002), sexual orientation (Crewe, 1992; Walpin, 1997), and profession, i.e. prostitution (Wojcicki & Malala, 2001). Historically, the infectivity of HIV has been magnified in the media internationally (Bennett & Sharpe, 1996). Media representation and public perceptions of HIV created fear and anxiety, which stigmatised HIV infection. It was initially associated with the gay population and later associated with other high risk groups (prostitutes, drug users, and those with multiple partners) which, notably, were already stigmatised by society (Herek & Glunt, 1988).

Applying Goffman’s terminology, if an individual is reported to have an HIV infection, his or her status changes from being secretly involved in drugs or having a sexual orientation which is “discreditable,” to becoming publicly known as a member of the high risk groups that are “discredited”. On the other end of the spectrum are people who contract HIV but not via illegal drug use or stigmatised sexual practices; these people are labelled as “innocent victims” (Government of South Australia, 2011: Merchant et al., 2008). Ogden and Nyblade (2005) have discussed this as the “innocence-to-guilt” continuum. This is a visible shift in the way society views people living with HIV and AIDS; they have separated a sub-group of people who were not stigmatised due to their personal practices prior to acquiring infection with HIV. This on the one hand supports the concept of layered stigma associated with HIV infection (which remains a problem) and on the other hand demonstrates the degree of success achieved by advocacy campaigns against stigma related to HIV (Ogden & Nyblade, 2005).

Deacon et al. (2005) identified three sources of stigma associated with HIV infection:

1. Burden, resulting from a person’s inability to be productive and requiring care from others;
2. Fear, resulting from fear of infection;
3. Blame, resulting from negatively viewed behaviours which may have caused HIV infection.

Deacon et al. (2005) have argued that such stress is higher in Asian countries compared to Western countries, because of concern about how the community would treat the families
of those infected. Therefore, the notion of "face saving" was a major concern for people with HIV infection in these societies. Similar results were found in a study conducted in China which found HIV-related stigma brought disgrace to the family (Yan et al., 2008). Chen et al. (2007) linked this attitude to "Confucian teaching." The Confucian code of conduct stressed self-discipline, sincerity, integrity, honesty and honour. Family was the most important pillar of Confucius' teaching, which then guided relationships and social roles. It was essential for all members of the society to defend the honour of the family and society at large (Chen et al., 2007). In such a society the family is held responsible for an individual’s behaviour which led them to acquire HIV, therefore not only the person with HIV but the whole family is considered to be involved in such a practice, even if only indirectly.

Stigma was found to be most profound in settings with limited access to antiretroviral therapies. Research has shown that access to antiretroviral therapies reduced HIV-related stigma (Abadía-Barrero & Castro, 2006; Wolfe et al., 2008). This suggests that when a society is reassured that the disease has a treatment (or is at least manageable), the stigma is reduced. This can be explained by two reasons. First, stigma is a social defensive procedure to protect those who are not affected; hence once a group feels it is not at risk (which might for example involve better knowledge about methods of HIV transmission) they lower the protective shield, and the level of stigma is reduced. Second, when individuals who have the illness or disease are assured that they will have a better quality of life, they are more likely to be open about having the disease, increasingly normalising it within their communities. When the group of those who are visible as having the disease gets bigger and when members of this group begin to help one another, the society slowly becomes more accepting of them. Secretary-General of the United Nations Ban Ki-moon shared his vision of how the stigma of HIV could be reduced.

"We can fight stigma. Enlightened laws and policies are key. But it begins with openness, the courage to speak out. Schools should teach respect and understanding. Religious leaders should preach tolerance. The media should condemn prejudice and use its influence to advance social change, from securing legal protections to ensuring access to health care." ("Fight the Stigma", 2012)

Political factors have also influenced efforts to reduce community stigmatisation as a means to control the transmission of HIV since the early days of the pandemic. Stigma and discriminatory practices can be perpetuated or reduced through legislation, government policies, and national strategies. Politics, laws and policies develop the environments in which
HIV prevention, treatment, care, and support services are delivered. Conservative and traditional ideologies have negatively affected the efforts to reduce the epidemic; they have been proven to be counterproductive, by discouraging the vulnerable groups to come forward for screening and treatment. Studies have shown that national HIV prevention policies have a significant impact on the way in which the HIV epidemic plays out in a country.

Recently the United Nations Programme on HIV and AIDS (UNAIDS) (2010) reported that 71% of countries now have some form of legislation in place to protect people living with HIV from discrimination. However, Ban Ki-moon, Secretary-General of the United Nations, believes that “almost all [countries] permit at least some form of discrimination” (Sanwar, 2011).

On 10 June 2011 the United Nations member states recognised the ILO recommendation concerning HIV and AIDS and the World of Work, 2010 (No. 200) as a key human rights instrument in the global HIV response. The ILO declaration stated that “We [...] call on employers, trade and labour unions, employees and volunteers to eliminate stigma and discrimination, protect human rights and facilitate access to HIV prevention, treatment, care and support” (para. 85) (Bowers, 2011; UNAIDS, 2011). The declaration also identifies the workplace as one of the arenas in which to reach and engage with young leaders in the response to the epidemic (Bowers, 2011). There are many countries in the world that restrict the entry, residence and stay of foreigners who are HIV-positive. These actions strengthen stigma and discrimination against people living with HIV (Wiessner & Culver, 2011).

### 3.3.2 Impact of HIV stigma on individuals

Individuals living with HIV infection reported the influence of stigma; the impact was different in different communities, more severe in some than others. The impact of stigma was present in most of the communities though the severity differed.

“I would rather die than be cured, for if I were cured, I would have to live the rest of my life with the stigma of once having had AIDS. I would like to have a new life without the history of the disease” (Songwathana & Manderson, 2001, p. 1).

This was the feeling of a young man who had HIV. His desire to die was not due to the biological consequences of the disease. It was because of the cruel social scrutiny and exclusion he faced. A number of those who had lost hope lost it because of the stigma, due to the social exclusion and disgrace they and their family were facing. They were forced to face
the real experience of discrimination (Brown et al., 2003). Discrimination comprises acts or omissions in the content of stigma (Link & Phelan, 2001). Stigma not only legitimises discriminatory actions at an individual, societal and political level but also can provide protection for those who commit these acts and can contribute to political leaders making biased decisions.

The United Nations Secretary-General Ban Ki-moon said, “Stigma remains the single most important barrier to public action...” and that it was the key factor due to which individuals were reluctant to be tested, to disclose their HIV status or to take antiretroviral therapies (Fight the Stigma, 2012). The International Centre for Research on Women divided the impact of HIV-related stigma on an individual into (Ogden & Nyblade, 2005):

- Loss of employment (income/livelihood);
- Loss of family (marriage and childbearing options);
- Loss of opportunity to have good healthcare;
- Loss of caregivers in the home;
- Loss of hope and feelings of worthlessness; and
- Loss of reputation and social position.

Most of these losses are not due to the infectivity of HIV, but due to the harsh social process of exclusion. This systematic discrimination affects all aspects of an individual’s daily life, for example their relationship with their family and caregivers, friends and social clubs, employment opportunities, along with access to the best healthcare, and even travel and leisure.

Goffman (1963) discussed three forms of stigma: felt stigma, courtesy stigma, and enacted stigma.

**Felt Stigma**

One of the most important consequences of felt or perceived stigma is “internal stigma” or “self-stigma.” This refers to how people who have HIV feel about or regard themselves, for example, blame, shame, and self-hatred (Jacoby, 1994). It also refers to the self-imposed restrictions and behaviours performed to mirror public perception:

“The way I saw myself fundamentally changed within a matter of minutes. I thought that I was marked, different from everyone else. I felt dirty, ashamed, guilty (although I
wasn’t sure why I felt guilty; it just felt like an appropriate response).” (Smart, 2009, p. 124).

Self-stigma is a product of negative community reaction; it has hindered efforts to address this epidemic by building a wall of silence and shame surrounding the epidemic. It can manifest as one or more of the following feelings (Smart, 2009):

- Self-blame, regret, shame, doubt, guilt;
- Self-exile, self-exclusion from social activities and support groups;
- Self-harm and thoughts that they were responsible for this;
- Loss of confidence and will to fight the disease;
- Self-isolation and exclusion from society; and
- Fear of spreading the disease and reducing contact with family.

Goffman (1963) described felt stigma as the stigmatised person feeling that “he does indeed fall short of what he really ought to be” (Goffman, 1963, p. 7). Following this, feelings of shame, blame and self-derogation can arise. According to Goffman: “The immediate presence of normal is likely to reinforce this split between self-demand and self, but in fact self-hate and self-derogation can occur when only he and the mirror are about” (Goffman, 1963, p. 7).

**COURTESY STIGMA**

According to Goffman (1963) courtesy stigma is the discrimination the family, friends and caregivers of stigmatised individuals may face. In such a situation it is possible for the family members or close contacts to distance themselves from the stigmatised person (Goffman, 1963). People living with HIV infection have multiple sources of stress: the infectivity of the disease, economic pressure, stigma, discrimination, and stress related to the family. Clinical and empirical findings suggest the burden associated with family stress is second only to that of the disease itself (Jones et al., 2007; Rotheram-Borus et al., 1998).

“My psychological pressure is big in this aspect. I first considered what effects this will have on my offspring, my children…” (Married female with HIV, age 56) (Li et al., 2008, p. 435)

Notably, if the family supports the individual, he or she has a strong shelter: emotional and psychological support is the most important, followed by economic and social assistance (Li et al., 2006). Families share the effects of the infection and the stigma related to it. In developing countries, family members may have to endure verbal and physical abuse as well
as social exclusion associated with HIV-related stigma (Sealey, 1995). In Nigeria, when one member of a family becomes HIV-positive, the whole family is called an AIDS family by other villagers (Alubo et al., 2002). Similarly in Indonesia, entire families have been reported to experience rejection by their local communities because of the HIV-positive status of one family member (Busza, 1999). Moreover, not all families are supportive of people with HIV; many HIV-positive individuals have found themselves to be stigmatised and discriminated against within their home (“HIV & AIDS Stigma and Discrimination,” 2013).

**Enacted Stigma**

Goffman (1963) described enacted stigma as behaviours and perceptions of the society towards the stigmatised individual. An example of enacted stigma would be hesitation to shake hands with a person who has vitiligo. Discrimination which takes place at a personal level or institutional level such as being refused healthcare or a job are forms of enacted stigma.

For people with HIV it is not easy to go back to work after a diagnosis due to felt and enacted stigma from co-workers and employers. Discrimination and exclusion at the workplace cause fear and anxiety leading to concealment of the diagnosis where possible:

“It is always in the back of your mind: if I get a job, should I tell my employer about my HIV status? There is a fear of how they will react to it. It may cost you your job; it may make you so uncomfortable it changes relationships. Yet you would want to be able to explain about why you are absent, and going to the doctors.” (Dodds et al., 2004, p. 17)

Vitry-Henry et al. (1999) studied people living with HIV and found that the primary reason for unemployment was psychological (due to stigma). Physical symptoms did not have a major influence on work capability. Communities have been known to verbally and physically abuse people perceived to have HIV or AIDS (Nardi & Bolton, 1991). Physical violence against people living with HIV has been reported in many countries, including attacks on men who are assumed to be gay, physical abuse against sex workers and street children in Brazil (Daniel & Parker., 1993), and in extreme cases killing of people with HIV in Colombia, India, Ethiopia, South Africa, and Thailand (Foreman et al., 2009; Parker et al., 2002).
3.3.3 Impact of HIV stigma on healthcare providers

The healthcare environment has been identified as a priority area in which HIV-associated stigma and discrimination should be addressed. Studies have revealed stigmatisation of patients with HIV infection among doctors and nurses. They have found healthcare providers to be judgmental while providing care to groups marginalised on the basis of their sexual or drug use practices. Chan and Reidpath (2007) assessed the perceptions of Thai nurses towards patients with HIV infection and found that the level of discrimination varied according to the perceived method of transmission:

“If a housewife is infected by her husband, we must sympathize, pity and take care of her much more than those people living with HIV who visit sex workers and use drugs. These people harmed themselves and are placed on the lower end of the [social distance] scale.” (p. 770)

The findings were in concordance with a similar study performed by Andrewin and Li-Yin (2008). They found that healthcare providers in Belize were more likely to exhibit discriminatory behaviour towards patients belonging to high risk groups (men who have sex with men, injection drug users, and commercial sex workers) than to those who are perceived to have contracted HIV through “morally sanctioned” practices. They recommended that HIV training with stigma reduction strategies should be given to healthcare providers. The United States Agency for International Development has sponsored a project to develop training material for healthcare providers in the Middle East and North Africa region.

3.4 HIV and culture

Due to a lack of reliable statistical information on HIV infection in the Middle East and North Africa, governments in these regions have been able to believe that they had managed to escape the HIV epidemic. A United Nations report (UNAIDS, 2010) showed that numbers of HIV-infected individuals in these regions are on the rise however: more than 400,000 people are currently living with HIV infection across the Middle East and North Africa.

Abu-Radda et al. (2010) performed a comprehensive systematic review of HIV, sexually transmitted infections and risk behaviour studies from the Middle East and North Africa region. They concluded that although they do not provide complete protection against spreading HIV, almost universal male circumcision and arguably the established conservative sexual norms appear to have played a protective role in limiting HIV transmission in the
region (Abu-Raddad et al., 2010). They felt that stigma and discrimination associated with HIV infection played a negative role however, as it discouraged people from coming forward for screening, and accessing medication for HIV infection. Stigma was reported as a major barrier against rational evidence-based policy decisions (Abu-Raddad et al., 2010).

Islam places a high value on chaste behaviour and prohibits sexual intercourse outside of marriage. Homosexuality, adultery, prostitution, and use of any form of drugs and alcohol are strictly forbidden by Islam (Gezairv, 1992). Due to these values, the community and their leaders find it easy to believe that HIV infection is not present in Muslim countries. Published studies have shown that HIV infection not only exists but is on the rise in these communities. The logical explanation is that despite Islamic teachings, there are individuals who engage in activities that lead to transmission of HIV (Hasnain, 2005). Hasnain (2005) argued that in Islamic countries religion defines the cultural norms. She advised that future HIV prevention programmes should address the following contentious issues:

- Gender inequality;
- Stigma and discrimination; and
- Ignorance/misinformation;

She strengthened her argument with examples of two successful HIV prevention programmes in Uganda (Kagimu et al., 1998) and Senegal (Meda et al., 1999). The Islamic Medical Association of Uganda in 1992 designed an AIDS prevention programme after conducting a baseline survey. They trained 3,000 religious leaders and their assistants, who in turn educated their communities about AIDS during home visits and at religious gatherings. After two years, there was a significant increase in accurate knowledge of HIV transmission, and methods of preventing HIV infection (Green et al., 2002).

While discussing the regional impact of stigma on HIV infection in the Middle East, it is important to review the Jewish perspectives. The review demonstrated that like the Muslim community, the Jewish community felt that HIV infection was not a huge concern. They felt that due to their code of conduct, they had protection from this disease. However, again, problems with reporting on HIV prevalence are possibly a limiting factor here. Hildebrand (2000) stated that “To date, no data on Jews and AIDS exist.” He included quotes from people he interviewed to understand the community perspective, one of which was Aizic, a specialist from the HIV and AIDS Programme of Jewish Family Service. Aizic shared his views regarding the stigma associated with HIV in the Jewish community of greater Los Angeles (Hildebrand, 2000):
“We don’t like to talk about uncomfortable things or things that will bring, or may bring, perceived shame or guilt. Even today, there seems to be a disproportionate amount of belief that AIDS is something to keep quiet and not to discuss. It’s Reform, Conservative, Progressive, Orthodox – across the board in Jewish life.” (Paragraph 8)

Another participant said:

“Still, the Orthodox are the most stringent in not talking about AIDS…They believe [AIDS] is confined to a specific population, and they do not belong to that population. I have several Orthodox clients who don’t even want to come into this building for fear that if someone from their community sees them with me… that will cast a negative mark.” (Paragraph 9)

Hildebrand debated the role of the community in reducing the stigma and helping those suffering from AIDS. He presented arguments from individuals who felt the Jewish community never placed a value or judgment on any illness and that the response was appropriate although there is a long way to go, and counter-arguments from those who were facing the stigma (Hildebrand, 2000).

Petros et al. (2006) conducted a study in South Africa to explore the perception of stigma associated with HIV. They found that blame for contracting HIV played a central role in the stigma, while blame was refracted through multiple prisms of culture, race, homophobia and xenophobia. Religion played a significant role in developing a supposedly safe zone, creating a feeling that HIV could not affect a specific community; he quoted an adult Jewish male who demonstrated the social perceptions (Petros et al., 2006, p. 73):

“It’s more than fear ... It’s an aberration as well. Do you think the distinction would be made between a Jewish doctor say who contracts AIDS from a little prick and somebody who was ... homosexual ....”

3.5 Conclusion

This literature review on culture and stigma demonstrated that this social phenomenon has a long history. A number of physical deformities, diseases and characteristics have been stigmatised throughout history. Goffman (1963) has discussed the range of ways that stigma can be expressed: from felt stigma, to courtesy stigma, to enacted stigma. Goffman’s (1963) model of stigma, along with research published on culture and stigma across a range of
diseases, provide a framework for predicting the consequences of stigma and how stigma can be addressed.

Research on the institutionalisation and politicisation of stigma associated with HIV showed that societies in general have accepted stigma associated with HIV. This stigma has subsequently affected every aspect of the lives of people with HIV: from their basic human rights, to access to healthcare and work and so forth. Stigma has also hindered individuals' options to travel and enjoy life. Stigma is a serious threat to quality of life for people living with HIV; it prevents people from coming forward to be tested and treated.

The review also showed that addressing HIV infection requires a number of strategies. An important association of HIV with stigma and cultural responses was identified; it showed that the impact of stigma in Western society was limited to the individual compared to Eastern society where the family was blamed. This finding was important for our research because the primary research was conducted in the Middle East and it was perceived by the participants that the level of stress in UAE was higher than if they were in a Western society. This aspect of stigma will be discussed in the following qualitative studies.

The review demonstrated a gap in the literature: social and cultural factors including stigma associated with HIV, and the influence of religion and law on the healthcare providers' decision about reporting an exposure and post-exposure stress had not been studied. There was not a single published article which examined the impact of these social factors on the healthcare providers after an occupational exposure to HIV especially from the Middle East.
Chapter 4  Methodology

This chapter discusses the rationale of the thesis and describes how the four studies evolved. It then discusses the methodological issues and research paradigms underpinning the studies. After that there is a discussion on how different research methodologies were used to achieve the aims of this research. Details regarding the specific methods (as opposed to methodology) employed for each empirical study reported in this thesis are not described in this chapter, but are instead covered at the beginnings of chapters 5, 6, 7, and 8.

4.1 Rationale of the thesis

Hepatitis B and hepatitis C are highly prevalent in the Middle East and there is a growing presence of HIV in the community (André, 2000; WHO, 2013a; PharmARC, 2010; Fallahian & Najafi, 2011). Due to high prevalence of blood-borne pathogens in the Middle East measures needed to be introduced to prevent the transmission of hepatitis and HIV to healthcare providers in occupational settings. The absence of BBFE disease prevention and health protection programmes in the region meant that it is an urgent imperative that health policy makers understand what makes BBFE programmes successful, in this specific context, and whether this is different from the success factors reported for BBFE programmes elsewhere (mainly in the West). A preliminary study of the factors that determine the effectiveness of introducing BBFE programmes in the Middle East’s multi-cultural setting, indicated that traditional evaluative techniques, based on quantitative paradigms, would not meet the research aims and objectives. Systemic factors identified in the pre-intervention study and published literature by similar studies using quantitative methods were able to improve organisational processes; but to examine factors influencing the decision to report a BBFE it was important to explore the complexities related to beliefs and perceptions of the healthcare providers. It was apparent that the determinants of effectiveness were external to the BBFE programmes themselves, driven by cultural, gender, religious and public policy considerations. This was quite different from other reported studies in the Western world, where the determinants of effectiveness were located within the design of the programme. Recognising the complexity of the determinants for the design of successful BBFE programmes in the multicultural organisational setting, it was therefore decided to explore these external drivers to participation. Consequently, the only way that such success factors
could accurately be assessed was by the adoption of qualitative research methodology. Having established successful participation by traditionally defined measures, using quantitative techniques, this extension of the scope of the study (supported by the supervisors and approved by the University) necessitated the revision of the doctoral research programme to have a mixed methods methodology as its basis.

4.2 Rationale of mixed methods research paradigms

The value of mixed method research paradigms has been debated for quite some time (Steckler et al., 1992; Willig, 2008; Yardley, 2001). Yardley suggested that mixed methods have their own place in health research alongside either purely quantitative or qualitative academic inquiry (Yardley, 2001). It is from this mixed methods perspective that the current thesis was undertaken.

One of the challenges of the mixed methods approach is that quantitative and qualitative research are largely based on different underlying philosophies. The objective of this chapter is to demonstrate how they were combined to produce an integrated, coherent body of work for the whole thesis. In the following sections I will present the theoretical basis and techniques of research, especially the qualitative paradigm which I explored while performing the studies.

Aliaga and Gunderson (2005) described quantitative research as studying phenomena by collecting numerical data that are analysed using mathematically based methods. The numerical data gives the studies the ability to be analysed using a mathematical model. The statistical power of the study allows the reader to have confidence that the results could be generalised. Quantitative research has been widely used in medicine because of its ability to predict how one population of people (often in comparison to another population) will respond to a given event, stimulation, intervention or other related variable (Muijs, 2004). The research investigates causal relationships for a sample group (e.g. the effect of a medication on a particular health outcome) and then generalises the findings from this study to the whole population (e.g. regarding the effect of that medication).

In comparison, qualitative research tends to focus on understanding the life experiences or perceptions of individual people rather than populations of people. The aim of qualitative research is thus to produce what might be considered “explanatory” theory: theory which
explains individual beliefs or experiences. In fact, one possible function of qualitative research might be to help in understanding or interpreting the findings of quantitative research. Franche (2005, 2006) performed systematic reviews of quantitative and qualitative studies related to return to work (Franche et al., 2005; MacEachen et al., 2006). The quantitative review highlighted systemic factors which were found to be helpful in returning the worker back to their pre-injury workplace: work accommodation offers, contact between healthcare provider and workplace, early contact with worker by workplace, ergonomic work site visits, and presence of a return to work coordinator (Franche et al., 2005). The qualitative review was able to take the discussion further by appreciating the complexities related to beliefs, roles, and perceptions of many people involved. Goodwill and trust are overarching conditions that are central to successful return-to-work arrangements (MacEachen et al., 2006). In the qualitative paradigm, researchers explore the perspectives and experiences of the participants to examine how a person or group of people perceive an experience. The findings are specific to the participants' worldview but provide an opportunity to understand the possible range of views of a group of individuals.

There are some terminologies and theories which help in understanding the difference between quantitative and qualitative research. The term “nomothetic” is used to refer to an intellectual tendency to generalise – and thus can be associated with quantitative research. This term originated from a Greek word “nomothetikos,” from “nomothetēs” meaning lawgiver; it has been used in research or formulation of general or universal laws (Jupp, 2006). This approach is used in social science and health sciences to conduct research (including population-based surveys or randomised controlled trials) in which structured methodologies are used, which could be replicated and controlled to generate quantitative data in order to explain a causal relationship (Harris, 2008).

Charmaz (2006, p. 4) described quantitative research as being based on “Beliefs in a unitary method of systematic observation, replicable experiments, operational definitions of concepts, logically deduced hypotheses, and confirmed evidence often taken as the scientific – formed the assumptions upholding quantitative methods”. She stressed that this brought statistical strength to research findings but lost the qualities of human experience. The aim of nomothetic research in health sciences is to predict how certain people (or their bodies) would respond to certain situations; hence it produces “predictive theory” (Charmaz, 2006). Curtis (2007) argued that a major difference between quantitative and qualitative research is the number of cases versus variables used in each. Curtis and Curtis stated “That is, case-centric research usually combines a single or few cases with many variables and values, while
variable research is the opposite — few variables with many cases. This reflects the differing focuses of research” (Curtis & Curtis, 2011, p. 8). They stressed that it was the number of cases in the quantitative studies which gave strength to the findings; however, quantitative researchers are limited in the number of variables they can consider at one time.

Quantitative research is characterised by its deductive approach towards the development of knowledge in health sciences. It is often based on hypothetico-deductive methodology, with the aim of controlling all variables except those under investigation. A cause or effect is proven by using a certain method, when all other possible explanations have been rejected or taken into account; hence the results are considered the truth about how the item under inquiry worked (Dean, 2003).

In contrast to nomothetic research there is research with an ideographic orientation. The term “ideographic” refers to an intellectual inclination to specify. It is a research approach used in social sciences that focuses on specific variables such as events, people, and experiences. It concentrates on what is particular to them (Jupp, 2006). It is derived from a Greek word “idios,” meaning “private” or “personal.” It explores the individual, who is viewed as a unique person with a unique set of dimensions (e.g. their life history, personal attitudes, social environment etc.) that set him or her apart from other individuals. Thus the aim of ideographic research is to better understand each individual participant’s life, beliefs, and experience (on a given topic) in an in-depth manner. The strength of ideographic research is in the number of variables it can include, in contrast to the large number of cases that are central to nomothetic research; hence ideographic research produces “explanatory theory.” The capacity for words to enhance data is most useful in this context.

Crotty (1998) suggested that the aim of qualitative research is to explore the unique factors of the individual in order to be able to better understand his or her worldview; generalisability is not the intention of this approach.

“Our interest in the social world tends to focus on exactly those aspects that are unique, individual and qualitative, whereas our interest in the natural world focuses on more abstract phenomena, that is, those exhibiting quantifiable, empirical regularities” (Crotty, 1998, p. 68).

Laugharne and Laugharne (2002) argued that qualitative research has emerged as a result of the critique of positivism, and tends to be characterised by beliefs in the existence of multiple truths, multiple perspectives and uncertainty. Researchers involved in qualitative
research keep an open mind, to examine how different phenomena have different meanings for different individuals (Yardley, 1999).

The quantitative and qualitative research methodologies described above may appear to be worlds apart but there are, however, several researchers who advocate the use of combined methodologies, with one paradigm enlightening the other. These methods could be used with one method acting as a precursor to the other, or with both being run alongside one another, or with a merging of the two approaches in one study (Steckler et al., 1992). Mixed methods may be challenging for researchers who are committed to a particular paradigm, but they can offer the researcher the best of both worlds (Steckler et al., 1992). The advantage of using a combined approach is that it allows the opportunity to explore a qualitative methodology, as well as the ability to produce results which are reproducible and generalisable.

4.3 Epistemology, theoretical perspective, methodology, and methods

Terms such as “nomothetic” and “ideographic” are not the only way to distinguish between quantitative and qualitative research. There are other ways in which these approaches to science can differ. Crotty (1998) has highlighted four elements that are useful for understanding the theoretical underpinning of social sciences:

1. Epistemology;
2. Theoretical perspective;
3. Methodology; and

These elements provide structure to our quest for knowledge and are interrelated: methods detail the steps taken to conduct a study, methodology is a description of the strategy and rationale for selecting a specific method, theoretical perspective provides information on the underlying assumptions, and epistemology underpins the research with the philosophical stance used to arrive at conclusions regarding the nature of the reality.

4.3.1 Epistemology

Epistemology is defined as the study of knowledge and justified belief (Steup, 2011). It questions the theoretical perspectives and methods used to identify or arrive at a conclusion.
and verify it. Klein (2005, para 1) described epistemology as a fundamental part of philosophy, stating that:

“Epistemology is one of the core areas of philosophy. It is concerned with the nature, sources and limits of knowledge. Epistemology has been primarily concerned with propositional knowledge, that is, knowledge that such-and-such is true, rather than other forms of knowledge, for example, knowledge how to such-and-such.”

He argued that there are many different views on “proposed knowledge” or “propositional knowledge”, but the universal assumption is that knowledge is true belief. Crotty (1998, p. 3) defined epistemology as “the theory of knowledge embedded in the theoretical perspective and thereby in the methodology.” He described three types of epistemologies: objectivism, constructionism, and subjectivism.

Objectivists believe that reality exists independent of any interaction or consciousness. A flower in a garden is a flower; it has inherent properties of colour, fragrance, and texture which are independent of us studying it or touching it. Early ethnographic research was performed with this philosophy to uncover what might be considered “objective” truths. Rand (1962) described objectivism as a philosophy of living on earth: as humans our only means to perceive reality is through our senses which become our source of knowledge by which we can objectively try to understand things or events (Rand, 1962). Therefore, objectivism rejects scepticism (in the classical Greek sense of the term “scepticism”, which implied denial of all certainty in anything) and mysticism (acceptance of faith or feeling as knowledge). Peikoff (1993) described objectivism as a philosophy of advocating for reason and egoism. In an objectivist view, if research is performed in the right way the results would produce an objective truth. Objectivist philosophers argue that our senses combined with our mental faculties provide us with a consciousness which has the capacity to observe, interpret, argue, and draw conclusions regarding new knowledge based on pre-existing knowledge. From an objective epistemological position the researcher is concerned with minimising bias during data collection and data analysis (by keeping their influence separate from the research process) and would be able to generalise from findings.

By contrast, constructionists believe that knowledge and meaning come into existence through our interaction with things in the world; hence meaning is constructed not discovered. Constructionists do not view the researcher as being separate from the research process, but rather as being an important part of the research process. Merleau-Ponty argued against the concept of there being a world with objects in space which we simply perceived through our
senses. Instead, he suggested that while the objects in the world may have potential meanings, the meanings we give them are created by our conscious interaction with those objects (Rouse, 2004). Constructivists claim that a world of objects holds no meaning until humans (or other sentient creatures) consciously engage with those objects to give them meaning (Michael, 1998). Furthermore, the meaning given to one object may be different for two individuals; the interpretation of that object depends on how he or she interacts with the object and the result of that interaction. This means that people may construct different meanings for the same entity or reality. For instance, a rose can be many colours but it is still a flower; different colours can be used to show different sentiments. Furthermore, different cultures may use different coloured roses very differently. Therefore from a constructionist perspective, what a rose of any particular colour (the object) means to any one person (the subject) is constructed through the interaction of that person with the rose, and is not inherent to the rose. Even the very thought of what is perceived by the word “flower” or “rose” is a constructed truth.

Lastly, subjectivists believe that knowledge or meaning is not generated by an interaction of subject and object but imposed on the object by the subject. Hence the object plays no role and it is the subject who decides how and when to use it, which gives it meaning (Crotty, 1998). In this context, a red rose could be given in a wedding ceremony to show love, joy and life, whereas the same flower when laid on a coffin or grave demonstrates feelings of grief. This suggests that the object itself (flower, colour, or fragrance) does not play a role in deciding the meaning. Subjectivism tends to be used in post-modern or post-structuralist research methods. These viewpoints can be considered problematic however because if all meaning is subjective and there is no “object” of research, then how can any understanding on a given topic be shared? Further debate on this topic however is outside the scope of this thesis. Nevertheless, the key point here is that it is important to know the approach taken to attain the knowledge or meaning as one’s epistemological stance has a direct bearing on how the knowledge is to be gained and used.

4.3.2 Theoretical perspective

The theoretical perspective underpinning any particular study forms the link between the methodology applied to understand knowledge or meaning and the researcher’s epistemological perspective. This theoretical perspective explains the reason and principles for selecting a methodology. It allows the researcher to express the assumptions considered
while selecting the methodology; hence it could be considered a statement of assumptions. When we state for instance that an observational study was performed, the assumptions in such a methodology would be the issues related to language, inter-subjectivity (the sharing of subjective states by two or more individuals) and communication. Theoretical perspectives bridge the strategies used in the research (i.e. the methodology) to the epistemology while providing the reader with the confidence that standard assumptions apply to the research findings. Two examples are given below (Crotty, 1998):

• Positivism (which relates experimental research to objectivism), and
• Interpretivism (which relates methodologies such as ethnography or grounded theory to constructionism).

Crotty (1998) argued that positivism and various strands of interpretivism have been the most influential theoretical perspectives in contemporary social science research (Gray, 2009). A few of the popular theoretical perspectives will be discussed to understand the significance of adopting theoretical perspectives that are congruent with the researcher’s epistemology and determine the types of research methodologies that emerge from them.

**POSITIVISM**

Social science research from the 1930s to 1960s was dominated by the positivist paradigm. The fundamental argument underpinning this perspective was that the social world existed external to the investigator or researcher, and the most appropriate method to understand its properties was to measure them directly by observation. Therefore, they advocated that ideas or theories can only become a part of knowledge if they can be proved through measurement and observation (Gray, 2009). The confidence in scientific knowledge is placed on the basis that the information is accurate and certain. This certainty is based on the unbiased observation of what might be considered “facts”. In the process of obtaining knowledge via the positivist paradigm the researcher is not considered a part of the research, but as an independent observer.

However, Popper (1968) argued that a theory cannot be proven only by multiple observational facts, because a single observation that refutes the previous observations can demonstrate it to be false. He therefore proposed the view that theories or ideas can be proven to be false, but that they cannot ever be fully proven to be true. This gave birth to the deductive approach to science, based on a process of developing knowledge through attempts at “falsification” of theory (Schick, 2000), which has become a key characteristic of what is
now known as “post-positivism”. The positivist paradigm is usually very closely associated with quantitative research in general but should not be considered synonymous with it. It is quite possible for qualitative research to be understood positivistically. This happens for instance when a researcher completes a qualitative research study, after which they explore options to generalise the findings by performing quantitative research to validate and confirm the findings (Crotty, 1998).

**INTERPRETIVISM**

Contrary to the views of positivists and post-positivists, interpretivism explores the historical and cultural interpretation of social science (Crotty, 1998). Schwandt described interpretivism as having been created in part to counter the dominance of natural science philosophies (i.e. positivist) in social sciences (Schwandt, 1994). According to Williams and May (1996) the mind produces a worldview through interpretation. Interpretivism is closely associated with constructivism (the epistemology). Williams and May (1996) argued that the nomothetic approach may be helpful in natural sciences where the purpose of gathering data is to have rigour, reliability and reproducibility in order to be generalisable. Social sciences on the other hand, are concerned with people and their interaction with realities of the world (ideographic). The purpose of interpretivism is to explore the unique experience and perception of individuals. These findings give an explanation of how individuals react to experiences or world realities; they are not intended to be generalised. The five common examples of the interpretivist approach are: symbolic interactionism, phenomenology, realism, hermeneutics and naturalistic inquiry. Below is a discussion of only two of these – the approaches that were central to this thesis: symbolic interactionism and phenomenology.

**SYMBOLIC INTERACTIONISM**

Symbolic interactionism is particularly relevant to some methods used in this thesis. The term “symbolic interactionism” was coined by Blumer, a colleague of Mead; it is one of the major theoretical perspectives in social sciences (Blumer, 1969). The perspective can be traced to the intellectual work which was started by Weber and Mead who highlighted the importance of the subjective meaning of human behaviour, social process and pragmatism (McClelland, 2000). The fundamental principles of symbolic interactionism are as follows (Gray, 2009):
• Individuals interpret meanings from objects and actions;
• Meanings are developed from social interaction;
• Meanings are dependent on an interactive process used by people while dealing with the phenomena that they encountered.

Symbolic interactionism is one version of a theoretical perspective called “interactionism”. In interactionism it is proposed that all social processes are derived from human interactions. It focuses on the specific details of what happens between individuals in everyday life. Interactionists explore the interpretation and use of symbols to communicate with one another, create a sense of self, and to uphold our experiences as the reality of a specific social situation. “Symbolic” interactionism examines how humans use and interpret language and other forms of communication to create social meaning.

Symbolic interactionism assumes that social life is a process which is dynamic and ever-changing in nature; we as individuals and groups by our actions create and define our culture or social world (Charmaz, 2006). Glaser (1998) claimed that as individuals we are always making meaning; as most of us are unable to read minds we react to what we think is meant by the dress, language and gestures of other people around us. Symbolic interactionism coupled with pragmatism provided the philosophical background to Glaser and Strauss’ work, which resulted in the development of grounded theory, the methodology (Stern & Porrr, 2011).

Hence meaning would change from person to person and with time. Grounded theory, ethnography and participative observation methods are research methodologies associated with symbolic interactionism.

**Phenomenology**

Phenomenology is the study of subjective experiences and consciousness. In phenomenology the aim is often to get beyond the label we (as humans) impose on concepts to undercover the “things themselves” we (or others) experience (Willis, 2001). A phenomenological theoretical perspective suggests that if we visit an object (in this case, the object may be a social process or experience) without being biased by our present understanding of it we can find a new meaning to the object or authenticate the prevailing meaning or concept. Phenomenology is often associated with the art and science of hermeneutics, which is concerned with interpretation – usually of texts. In hermeneutics the meaning of the text is not the straight translation but it emerges from interactions between factors such as historical intention, author, and interpreter (Lincoln & Guba, 1985).
4.3.3 Methodology

Yardley (2001) defined methodology as the research strategy which is applied to achieve a certain outcome after applying a specific method. It provides the rationale of why a certain method was applied. Survey research, as an example of one particular methodology, is often associated with the positivist theoretical perspective, which intends to measure findings directly by observation. Therefore, the methods used may be questionnaires or observations, which convert participant responses to numbers or categories to be counted, with the survey research resulting in knowledge based on a positivist perspective.

4.3.4 Methods

Methods are the step by step procedures utilised in the research to gather data and analyse it. Examples of methods from various methodologies include open or close ended questionnaires, interviews, coding, analysis and interpretation of the findings. Methods also include the processes used for identification of the object of the research (the population in question), processes used for selection of samples from that object of inquiry (e.g. research participants), and strategies used for managing scientific rigour and ethics in research. In order to develop the readers’ confidence in any participant study, the methods used need to be documented in detail. It is not sufficient to state “interviews were conducted” or “facilitated focus group sessions;” it is crucial to provide details of who conducted the interviews, what kind of questionnaire was used, what types of questions were asked, whether they were recorded, what kind of analysis was performed, who analysed the data and finally the findings. Furthermore, the methods used in a study have to be consistent with the chosen methodology, theoretical perspective and epistemology employed by the researcher.

4.4 Research approach used in this thesis

The thesis consists of four studies conducted to document the participation of healthcare providers in a new hospital-based BBFE programme and the impact of culture and stigma on the healthcare providers, in terms of their experience of an exposure and participation in the programme. To accomplish these objectives, both quantitative and qualitative research methods were applied. The effectiveness of the programme was assessed by comparing pre-
and post-intervention findings internally and the statistical data were then compared externally to other published studies. This was only possible when quantitative (nomothetic) research methodology was applied. Hence two quantitative studies were performed: a KAP study and an effectiveness study. The KAP study was conducted to assess the gaps in knowledge and practices of the healthcare providers. The effectiveness study consisted of pre- and post-intervention clinical audits (review of clinical records); it examined the impact of the BBFE programme.

A qualitative research methodology was used to explore the experience of the healthcare providers who were exposed to body fluid infected by HIV. The intention of the study was to examine factors influencing post-exposure stress, both organisational and non-organisational (culture and stigma). A cross-cultural comparison of their perspectives was performed to study the impact of culture on post-exposure stress. Table 4.1 illustrates how these studies helped in accomplishing the research objectives and summarises the underpinning research methodologies, then each study is examined and debated regarding the four elements described by Crotty (1998).
Table 4.1: An overview of the studies in this thesis and their underlying research methodology

<table>
<thead>
<tr>
<th>Research goal</th>
<th>Objectives</th>
<th>To examine the participation in and experience of a new BBFE programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>To assess the knowledge and practices of HCPs</td>
<td>KAP study</td>
<td>Modified objectivist epistemology, positivist theoretical perspective, survey research methodology, statistical analysis.</td>
</tr>
<tr>
<td>To determine the characteristics of an efficient BBFE programme</td>
<td>Pre-post assessment of BBFE programme</td>
<td>Modified objectivist epistemology, positivist theoretical perspective, pre-post observational study methodology, statistical analysis.</td>
</tr>
<tr>
<td>To document the lived experience of the HCPs</td>
<td>Impact of culture &amp; stigma</td>
<td>Constructionist epistemology, symbolic interaction theoretical perspective, abbreviated version of grounded theory methodology, theme identification.</td>
</tr>
<tr>
<td>To undertake a cross-cultural comparison of perception</td>
<td>Cross-cultural comparison</td>
<td>Constructionist epistemology, symbolic interaction theoretical perspective, grounded theory methodology, theme identification comparative analysis.</td>
</tr>
<tr>
<td>Research</td>
<td>Mixed methods</td>
<td></td>
</tr>
</tbody>
</table>

**Blood and body fluid exposure-related knowledge, attitude and practices of hospital-based healthcare providers in the UAE**

The review of the literature showed that since the 1950s, KAP studies have been used by researchers to assess perceptions and practices ("Timeline of history of knowledge attitude and practice studies," 2010). The KAP research methodology was first used by a family planning organisation to understand the attitudes and practices of their clientele (Khan, 1967; Mauldin, 1965). Many researchers have used this methodology to examine the practices of healthcare providers towards patients with HIV infection, universal precautions, and occupational exposures. The KAP studies help in assessing the actual number of blood and body fluid exposures versus the proportion of exposures reported, because in this methodology the proportion of the actual BBFE are examined. The respondents are asked whether they had a BBFE followed by whether they reported it, which enables the researcher
to calculate the proportion of actual BBFEs reported. The ability to examine the practice of the same respondent is not possible in other methodologies such as clinical audits, surveillance studies, and qualitative studies. The strength of this methodology was that the respondents are anonymous so that participants are more likely to provide true and unbiased accounts of their perceptions and practices.

Therefore, a questionnaire-based cross-sectional knowledge, attitudes and practices study was conducted (Bland, 2000). A convenience sampling approach to recruitment was used for this study. While convenience sampling has some acknowledged limitations (for instance, it raises the risk of sampling bias and participants’ responses cannot be verified) it was used in this case because it increased the opportunities for healthcare providers to participate in the study.

In order to avoid repetition of information, the sampling methods, survey instrument, data management and analysis are detailed in chapter 5. A survey research methodology was used with a positivist theoretical perspective, in which data gathered through questionnaire methods was statistically analysed.

**Comparative pre-post clinical audit (observational study) to assess the effectiveness of a newly implemented BBFE programme**

To best assess the effectiveness of the blood and body fluid exposure programme developed and implemented in the hospital, a review of comparative effectiveness research methodologies was performed. The Institute of Medicine defined comparative effectiveness research as:

"Comparative effectiveness research (CER) is the generation and synthesis of evidence that compares the benefits and harms of alternative methods to prevent, diagnose, treat and monitor a clinical condition, or to improve the delivery of care. The purpose of CER is to assist consumers, clinicians, purchasers, and policy makers to make informed decisions that will improve health care at both the individual and population levels.” (Sox & Greenfield, 2009, p. 203).

The following different approaches and methodologies of comparative effectiveness research were examined:

- Randomised controlled trials;
• Diagnostic studies;
• Observational studies (including case-control, cohort and pre-post studies);
• Meta-analysis; and
• Indirect comparisons.

The research methodology selected was observational pre-post study design, because the intention was to assess the effectiveness of the intervention programme developed and implemented by the hospital and the role of the researcher was as an observer only (Stolberg et al., 2004). Concerns have been raised that because pre-post study design lacks a control group, it may overestimate the impact of the intervention (Institute of Education Sciences, 2003). Concato et al. (2000) performed a meta-analysis which compared results from randomised controlled trials and observational studies. They concluded:

"The results of well-designed observational studies (with either a cohort or a case-control design) do not systematically overestimate the magnitude of the effects of treatment as compared with those in randomized, controlled trials on the same topic.” (Concato et al., 2000, p. 1887)

The comparative pre-post clinical audit (observational study) was conducted in two phases: a clinical audit before the intervention and a clinical audit to study its effectiveness two years after the implementation of the new blood and body fluid exposure programme. The method utilised was a review of clinical records related to BBFE. Pre-post observational study methodology was applied with a positivist theoretical perspective. These studies were able to examine the organisational factors to participation.

**LIVED EXPERIENCE OF HEALTHCARE PROVIDERS AFTER AN OCCUPATIONAL EXPOSURE TO HIV**

The intention of this study was to examine the impact of non-organisational factors such as stigma, culture and law on the healthcare providers after an exposure to body fluid infected by HIV and hepatitis C. Qualitative research was the most appropriate methodology for exploring this phenomenon within a social and cultural context (Baxter & Jack, 2008). Qualitative methodology allowed the researcher to view the event or experience from the participants’ worldview and every participant to share his or her personal experience, without being limited to direct or indirect questions, or to a number of topics or options to select from.
The following different qualitative approaches were examined to select an approach for this study (Central Michigan University, n.d; Trochim, 2006b):

- Biography;
- Case study;
- Ethnography;
- Ethnomethodology;
- Grounded theory;
- Phenomenology; and
- Participatory action research.

Biography and case study are good tools to explore the worldview of individuals but not for comparing complex social processes. Ethnography and ethnomethodology have been used to examine social interaction and behaviour within groups and communities (Garfinkel, 1967; Reeves et al., 2008). Participatory action research is an interactive research process that involves collaboration with those individuals affected by the issue or event being examined, and the aim of change (Green et al., 2003). Grounded theory and phenomenology were the two methodologies which have been used to explore lived experience; since that is the focus of this research, grounded theory was preferred for the reasons discussed in the next section.

**Grounded theory**

Grounded theory was selected because it was deemed to be the most suitable approach for exploring lived experience within a complex social system; it allowed constant comparison of emerging themes to develop a theoretical explanation of the phenomena (Kennedy & Lingard, 2006). Glaser and Strauss in the mid-1960s described this new research methodology in their book titled “The Discovery of Grounded Theory” (Glaser & Strauss, 1967). The two co-originators shared common research goals, but represented diverse academic traditions. Glaser, who came from Columbia University, brought to grounded theory the idea of systematic line-by-line examination of data for the emergence of concepts. He advanced the methods of codification of data and constant comparison which are now characteristics of grounded theory (Glaser, 1998). Strauss, by contrast, studied at the University of Chicago under the supervision of Blumer (who is attributed with the development of symbolic interactionism). Strauss brought to grounded theory sociological traditions, such as the notion of “fieldwork” and the view that researchers benefit from investigation of “what people actually do – their actual behaviour – rather than the purity of
abstract theoretical system” (Maines, 1991, p. 5). According to this argument any grounded theory emerging from research needs to be developed from the data related to actual social behaviour (rather than for instance, from armchair theorisation). Later the co-originators parted ways and separately published texts on the principles of grounded theory (Heath & Cowley, 2004). Strauss added procedural steps which Glaser opposed, because he felt that they were antithetical to the grounded theory approach they had first developed (Stern & Porr, 2011). This lead to the formation of different “schools” of grounded theory: Glaserian grounded theory and Straussian grounded theory (Duchsch & Morgan, 2004; Heath & Cowley, 2004).

Over the decades a number of other variations to grounded theory have been developed, including critical theorist, feminist, constructivist and post-modern approaches (Mills, Bonner and Frances, 2006). However, what is common to all these approaches to grounded theory is the systematic analysis of qualitative data to generate theory. Glaser and Strauss (1967) described components of grounded theory as including:

- Simultaneous data collection and analysis;
- Construction of analytical codes from data;
- Utilising the constant comparative method;
- Developing theory during data collection and analysis;
- Use of memos to describe categories; and
- Sampling that aims to construct theory.

Research using grounded theory methodology develops conceptual frameworks or theories based on systematic and structured inductive analysis of the data (Charmaz, 2006). Fundamental to this methodology is that data is the basis of any concept, thought or theory. Once a theory or concept is created from data, further data collection can be based on inductive and deductive analysis to test the theory. The qualitative studies reported in this thesis have used a constructivist approach to grounded theory because the intention of this research was to explore the worldview of individuals and how they perceive certain events and their post-exposure experience. The constructivist approach gave the studies the ability to explore realities as social constructions of the mind of an individual, and raised the possibility that there could be a number of such constructions.

Therefore, a qualitative study design applying an abbreviated version of grounded theory was used to explore the effect of stigma, culture, and law on the healthcare providers
following an occupational exposure to HIV and hepatitis C (Charmaz, 2006; Willig, 2008). The study utilised the theoretical perspective of symbolic interaction, in which meaning was generated by the interpretation and understanding of the interaction between the participants and the interviewer during the interviews.

HEALTHCARE PROVIDERS’ PERSPECTIVES ON STIGMA ASSOCIATED WITH HIV: A CROSS-CULTURAL COMPARISON

An international cross-cultural comparison was required to further investigate the findings of the impact of stigma, culture and law on healthcare providers. The perspectives of healthcare providers working in different cultural contexts were to be explored in relation to stigma associated with HIV. Therefore, the research employed grounded theory (Charmaz, 2006) to explore the beliefs and perspectives of healthcare providers regarding the effects of stigma, culture, and law on the reporting and experience of hypothetical occupational exposure to HIV and/or hepatitis C. The study aimed to explore the perceived determinants of participation in a blood and body fluid exposure programme in two different groups to assess the impact of culture, religion and policies on reporting an occupational exposure. The results would help provide an understanding of the factors which influenced the working environment of a multicultural hospital in an emerging country.

Principles of grounded theory were applied: the study utilised the theoretical perspective of symbolic interaction, in which meaning was generated by the interpretation and understanding of the interaction between the participants and the interviewer during the interviews.

4.5 Conclusion

The empirical work for this thesis commenced with a quantitative research study whereby KAP and the effectiveness of the intervention were first investigated. This was then followed by two qualitative studies in order to better understand and interpret the findings from these studies. The use of mixed methods research helped in examining the research topic holistically; the findings will be discussed in the following chapters.
Chapter 5: Assessing the knowledge, attitudes and practices of the healthcare providers

5.1 Introduction

The study hospital in 2008 implemented a corporate policy that mandated reporting and management of occupational exposures to blood or body fluids. Prior to developing a training and awareness campaign for the programme, it was essential to assess the principal determinants of compliance with post-exposure procedures in this multinational group of healthcare providers in a hospital where the current infrastructure was inadequate. Such determinants were expected to be lack of knowledge of the protocol, a "no reporting culture", and attitudes within the organisation or health behaviours which were contrary to the principles of effective blood and body fluid exposure occupational health and safety management.

An unexpected finding was that the pre-intervention clinical audit demonstrated that the number of reported exposures (per 100 beds per year) was consistent with or lower than rates from published studies from Western countries. There were two possible explanations for such an observation: either that the healthcare providers studied reported most of the exposures and that the true incidence of exposure was comparable to those in developed countries, or the actual number of occupational exposures was very high but that only a low proportion of these were reported. The assumption of an explanation based on a higher than usual rate of exposures was supported by the report published by the WHO EMRO, estimating an average of four needlestick injuries per year per healthcare provider in the Middle East region, higher than many other regions/countries (WHO, 2010). A KAP study was undertaken at the study hospital to ascertain the likely proportion of actual needlestick injuries that would probably be reported in this facility.

The pre-intervention clinical audit identified systemic barriers to participation:

- Lack of specific policy and protocols;
- Lack of clear reporting pathways;
- Absence of a culture of reporting;
- Disposal related issues; and
- The non-availability of safe devices.

These systemic issues were to be addressed in the corporate policy/procedures and assessed in the evaluation study of the implementation (post-intervention clinical audit).

The KAP study allows the assessment of reporting practices and barriers to participation in a reporting scheme. Due to the anonymity of responses, respondents are likely to feel secure enough to provide an honest response, and questions of varying complexity and severity can be asked. Therefore, a KAP study was performed to examine and identify these attitudes and perceptions that acted as barriers to participation in the blood and body fluid exposure programme, and thus the reporting rate of occupational exposures. The study was a precursor to a series of qualitative studies looking at culture and barriers to participation in the programme, and helped in framing the key questions for the qualitative studies that followed.

5.2 Methods

To assess the knowledge, attitudes and practices of the healthcare providers, a questionnaire-based, cross-sectional KAP study was designed using a recognised methodology (Bland, 2000). Healthcare providers visiting the Occupational Health and Safety Clinic from 1 June to 30 June, 2008 were requested to complete a brief self-administered questionnaire.

Sampling

A convenience sampling methodology was applied to ensure a good response rate, but provides only a non-random sampling technique. The benefits of convenience sampling have to be weighed against its inability to represent the population under study; this limitation can be overcome by applying appropriate sampling techniques (Trochim, 2006a). The limitations of this sampling methodology and the impact on the results are discussed at the end of the chapter. Different sampling methodologies for questionnaire-based sampling were reviewed for their strengths and weaknesses in the hospital working environment: population-based sampling, a random sample or stratified sample based on professional groups; requesting all staff members to complete an online questionnaire; and calling a random or stratified number of staff members to answer the questionnaire. Population-based sampling was not used because the information collected by Human Resources did not identify the staff by professional groups or gender. Previous studies within the hospital had shown that the
response rate for mailed or online questionnaire-based surveys was poor when the Human Resources Department used these methods for staff satisfaction and similar surveys. Most of the hospital staff worked rotational shifts and when in the hospital they were not allowed to respond to their personal mobile phones. Therefore, the telephone interview method could not be used. The convenience sampling method, with all staff members visiting the clinic in a specific month being requested to complete the survey was selected. To reduce bias of selecting only the motivated staff all staff members who visited the clinic in June 2008 were requested to complete the questionnaire. The staff members visited the clinic for a number of reasons: reporting an exposure, visa medical, disability assessment, immunisation, travel medicine, musculoskeletal pain, and physical fitness after injury or illness. Blood and body fluid exposure were reported by 9 out of the 340 staff who visited the clinic in June 2008.

Staff members visiting the clinic were requested to complete the survey only once during the month, which meant if they came for a follow-up visit in the clinic they would not fill out the questionnaire again. The Occupational Health and Safety Clinic was visited by 340 clients in June, 60 of whom returned for a second visit. This brought the total of new clients visiting the clinic to 280, out of which 230 completed the questionnaire, resulting in a response rate of 82.14%.

The research proposal was approved by the Research and Ethics Committee of the hospital. Informed consent was obtained from the participants.

**Survey Instrument**

The questionnaire (sample attached as Appendix 3) took less than 5 minutes to complete; it was kept intentionally short so it could be completed within the time the healthcare provider waited in the clinic to be assessed by the physician or nurse. It included questions related to demographic information. The questionnaire was piloted to enhance its validity, as follows. A draft questionnaire was developed and was then given to four occupational health physicians for their comment on its design and content. After receiving their comments, further changes were made. The modified questionnaire was then given to 25 healthcare providers; their responses were examined for clarity, validity, and reliability. The required changes were made before finalising the questionnaire.

The questionnaire was designed to assess the knowledge, attitudes and practices of healthcare providers, in terms of:
• Knowledge -- This was assessed by questions related to the hospital's policy and protocols for blood and body fluid exposure including options of investigation, treatment, immunisation, and management.

• Attitude -- The paired case studies examined the difference in attitudes when a healthcare provider imagined being exposed to a patient known to have hepatitis B, C or HIV infection versus a patient of unknown hepatitis B, hepatitis C, or HIV infection status.

• Practices -- These were assessed by asking whether they had reported an exposure, their immunisation status, and antibody titre. The responses to the scenarios provided indirectly assessed their likely practices in a real-life situation.

Three disease scenarios (involving hepatitis B, hepatitis C, and HIV) were presented to participants as paired case studies with a number of options from which to select what action they would take. The first case study had a question regarding exposure to blood of a patient who was suspected of having hepatitis B, which was followed by a question regarding exposure to a patient who was known to have hepatitis B. The second and third paired case studies had similar questions related to suspected and known cases of hepatitis C and HIV respectively.

DATA MANAGEMENT

Data from the KAP questionnaires were double entered by two clinical coordinators onto the clinic's computers. Both data sets were compared to assess the likelihood and extent of any transcription errors (Trochim, 2006a). The data was then independently verified prior to being coded for analysis.

ANALYSIS

The study data were analysed using Statistical Package for Social Sciences version 18. Descriptive statistical analysis was performed for the demographic data, information related to reporting, and hepatitis B immunisation. The scenarios were analysed using constant comparative analysis, after which the group responses were statistically analysed to explore whether there was a significant difference in the practices; ANOVA was performed and the F-value was reported. A Chi-square test was performed and the p-value was reported for each paired case study.
5.3 Results

Respondents

The survey was completed by 230 respondents, with an overall response rate of 81.4%. The age of respondents ranged from 20 to 55 years, with a median of 26-35 years, two thirds of which were females.

The hospital had approximately 4,800 employees and 500 subcontractors and volunteers; healthcare providers made up 90% of the workforce which was dominated by physicians and nurses. There were approximately 1,100 (23%) physicians and 2,500 (52%) nurses; the Human Resources Department did not have information on the other professional groups. In our study sample nurses constituted more than half of the respondents followed by other professional groups and physicians; the latter professional group was under-represented in the convenience sample obtained.

![Professional Representation in Hospital](image1)

![Professional Representation in Respondent Group](image2)

Figure 5.1: Respondents by profession

The respondents in our survey were trained in 23 different countries, reflecting the diversity of personal and professional backgrounds of the healthcare providers in the hospital. Most of the doctors were male and trained in the Western countries, unlike nurses, most of whom were female and trained in Asian countries.
KNOWLEDGE AND PRACTICES

The questionnaire intended to assess the knowledge and practice of the healthcare providers related to the hospital policy and procedures of reporting an occupational exposure and immunisation practices with questions before the scenario section. The reporting procedure required informing their manager and the Occupational Health and Safety Clinic: it was important to inform their manager immediately, so that the staff member could leave the ward or clinic and visit the Occupational Health and Safety Clinic immediately, the blood of the source patient could be drawn for investigation, and the incident could be investigated to prevent it happening again. As soon as possible the staff member visited the Occupational Health and Safety Clinic where post-exposure management and follow-up was provided. The Occupational Health and Safety Clinic was responsible for maintaining the medical information, ensuring confidentiality, and providing counselling.

Most of the 230 respondents (209; 90%) reported they were aware of a hospital policy to report blood or body fluid exposure. Only 17 out of 230 respondents had an exposure in the last 12 months. Of these, only two reported the exposure to both their manager and to the Occupational Health and Safety Clinic as required by the hospital policy, whereas eight respondents reported the exposure to only one of them.

The seventeen healthcare providers who reported having an exposure were further examined for profession with respect to reporting pattern; they comprised eleven nurses, three physicians, one laboratory staff member and two other healthcare providers. When analysed, in terms of which professional group reported or decided not to report an exposure, the breakdown showed that 7 out of 11 nurses and 1 out of 3 physicians reported the exposure as shown in table 5.1.
Table 5.1. Practice of the study subjects after exposure to patients with diseases

<table>
<thead>
<tr>
<th></th>
<th>Exposure to blood or body fluid</th>
<th>Report to manager and OSH Clinic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Participants Exposed</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>Nurse</td>
<td>133</td>
<td>11</td>
</tr>
<tr>
<td>Physician</td>
<td>19</td>
<td>3</td>
</tr>
<tr>
<td>Laboratory staff</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>Other healthcare providers</td>
<td>67</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>230</td>
<td>17</td>
</tr>
</tbody>
</table>

**IMMUNISATION**

The majority of the respondents (186; 80%) stated that they were immunised for hepatitis B. However, only 91 (40%) had previously had their hepatitis B viral antibody titres checked after immunisation to establish that their immunisation had been effective, which was a hospital policy and recommended in the US PHS Guidelines (CDC, 2001).

**SCENARIOS**

The participants were provided with scenarios to assess attitudes to a theoretical situation (questionnaire in appendix D).

**FIRST PAIRED CASE: HEPATITIS B**

The participants were first asked to select what they would do if they were exposed to blood or body fluid of a patient with suspected hepatitis B. The most common response was “arrange a blood test for the patient and healthcare provider” (55.7%), followed by “a blood test for patient only” (14.3%). The rate of response for “a blood test and taking Engerix B and immunoglobulin” was 13%, “immunoglobulin only” was 4.8%, “vaccine for hepatitis B” was 4.3%, and “no action to be taken” was 3%. They gave different responses when asked what they would do if they were exposed to blood or body fluid of a patient with known hepatitis B infection. The most common action was blood tests for patient and healthcare worker (34.8 %), followed by taking immunoglobulin (22.6%). The rate of taking vaccine for hepatitis B
was 16.1%, requesting blood tests and taking immunoglobulin and vaccine for hepatitis B was 13.0%, and no action was chosen by 2.6%. The attitudes of the participants were statistically different when exposed to suspected versus known hepatitis B- infected body fluid (p <0.001 and F-value 19.5) as shown in table 5.2.

Table 5.2. Attitude to the situation of being exposed to blood or body fluid suspected or known to have hepatitis B virus

<table>
<thead>
<tr>
<th></th>
<th>Suspected hepatitis B</th>
<th>Known hepatitis B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>Blood test, Engerix B, and Immunoglobulin</td>
<td>30</td>
<td>13.0</td>
</tr>
<tr>
<td>Take immunoglobulin</td>
<td>11</td>
<td>4.8</td>
</tr>
<tr>
<td>Take hepatitis B vaccine</td>
<td>10</td>
<td>4.3</td>
</tr>
<tr>
<td>Blood test for patient and healthcare provider</td>
<td>128</td>
<td>55.7</td>
</tr>
<tr>
<td>Blood test for patient only</td>
<td>33</td>
<td>14.3</td>
</tr>
<tr>
<td>No action</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>No response</td>
<td>11</td>
<td>4.8</td>
</tr>
<tr>
<td>Total</td>
<td>230</td>
<td>100.0</td>
</tr>
</tbody>
</table>

F-value 19.5  p-value < 0.001

**SECOND PAIRED CASE: HEPATITIS C**

In the second paired case, the participants were asked to select what they would do if they were exposed to blood or body fluid of a patient with suspected hepatitis C. The most common response was “blood test for patient and healthcare provider” (60.4%), followed by “blood test for patient only” (17.8%). The rate of response for “take immunoglobulin” was 8.3%, “take antiviral” 4.8%, “blood test and immunoglobulin” was 2.2%, and “no action” was 3.0%. They gave different responses when asked what they would do if they were exposed to blood or body fluid of a patient with known hepatitis C infection. The most common response from the healthcare providers was to “take antiviral” (33.0%), followed by “blood test for patient and healthcare provider” (31.7%). The response rate for “blood test and immunoglobulin” was 10.4%, taking “immunoglobulin only” was 10.4%, “blood test for patient only” was 7.8%, and “no action” was selected by 2.2%. The attitudes of the
participants were statistically different when exposed to suspected versus known hepatitis C-infected body fluid (p < 0.001 and F-value 18.5) as described in table 5.3.

Table 5.3. Attitude to the situation of being exposed to blood or body fluid suspected or known to have hepatitis C virus

<table>
<thead>
<tr>
<th></th>
<th>Suspected hepatitis C</th>
<th>Known hepatitis C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>Blood test and immunoglobulin</td>
<td>5</td>
<td>2.2</td>
</tr>
<tr>
<td>Take immunoglobulin</td>
<td>19</td>
<td>8.3</td>
</tr>
<tr>
<td>Take antiviral</td>
<td>11</td>
<td>4.8</td>
</tr>
<tr>
<td>Blood test for patient and healthcare provider</td>
<td>139</td>
<td>60.4</td>
</tr>
<tr>
<td>Blood test for patient only</td>
<td>41</td>
<td>17.8</td>
</tr>
<tr>
<td>No action</td>
<td>7</td>
<td>3.0</td>
</tr>
<tr>
<td>No response</td>
<td>8</td>
<td>3.5</td>
</tr>
<tr>
<td>Total</td>
<td>230</td>
<td>100.0</td>
</tr>
<tr>
<td>F-value</td>
<td></td>
<td>18.5</td>
</tr>
</tbody>
</table>

**THIRD PAIRED CASE: HUMAN IMMUNODEFICIENCY VIRUS (HIV)**

The participants were then asked to select what they would do if they were exposed to blood or body fluid of a patient with suspected HIV. The most common response was “blood test for patient and healthcare provider” (52.2%), followed by “blood test for patient only” (18.3%). The response rate for “blood test and take post-exposure prophylaxis” was 12.2%, “initiate post-exposure prophylaxis without blood test” was 11.7%, “take immunoglobulin only” was 0.9%, and “no action” was chosen by 1.3%. The respondents had different thoughts regarding what they would do if they were exposed to blood or body fluid of a patient with known HIV infection. The majority of the respondents chose one of two options in equal numbers: 35.7% thought they would initiate post-exposure treatment without any blood work, while the other 35.7% responded that they would perform blood tests for the patient and themselves. The respondents who selected the option of performing blood tests for both and starting post-exposure prophylaxis comprised only 10.9%, while performing blood tests for patients only was 6.5%, taking immunoglobulin was 4.3%, and no action was chosen by 1.3%. The attitudes of the participants were statistically different when exposed to suspected
versus confirmed HIV-infected body fluid (p < 0.001 and F-value 21.8) as demonstrated in table 5.4.

Table 5.4 Attitude to the situation of being exposed to blood and body fluid suspected or known to have HIV infection

<table>
<thead>
<tr>
<th></th>
<th>Suspected HIV</th>
<th>Known HIV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>Blood test for both and post-</td>
<td>28</td>
<td>12.2</td>
</tr>
<tr>
<td>exposure prophylaxis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take immunoglobin</td>
<td>2</td>
<td>0.9</td>
</tr>
<tr>
<td>Initiate post-exposure</td>
<td>27</td>
<td>11.7</td>
</tr>
<tr>
<td>prophylaxis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood test for patient and</td>
<td>120</td>
<td>52.2</td>
</tr>
<tr>
<td>healthcare provider</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood test for patient only</td>
<td>42</td>
<td>18.3</td>
</tr>
<tr>
<td>No action</td>
<td>3</td>
<td>1.3</td>
</tr>
<tr>
<td>No response</td>
<td>8</td>
<td>3.5</td>
</tr>
<tr>
<td>Total</td>
<td>230</td>
<td>100</td>
</tr>
</tbody>
</table>

F-value 21.8 p-value < 0.001

5.4 Discussion

The KAP study assessed practices related to blood and body fluid exposures. The study explored the number of exposures to body fluid in the last 12 months, reporting rate, post-exposure management, and hepatitis immunisation status.

Knowledge

The majority of the healthcare providers were aware of the hospital’s policy for mandatory notification of a blood or body fluid exposure, in response to recent awareness sessions. The responses showed that healthcare providers were aware of the different treatment options available. For example, few healthcare providers selected the option of taking immunoglobulin in case of exposure to hepatitis C, as there is no recommended post-exposure protection for this pathogen. Jankovic et al. (2009) from Bosnia found that 25% of healthcare providers incorrectly believed that there was a vaccine for hepatitis C. In contrast
to Jankovic et al. (2009) where healthcare providers were asked about the use of a non-available pre-exposure vaccine, our study assessed the knowledge of healthcare providers for a non-recommended post-exposure management option.

In the case of exposure to HIV, less than 5% opted for immunoglobulin which is not available. These findings concur with those of Efetie and Salami (2009) who found that both the doctors and nurses had good knowledge of the availability of the post-exposure protection.

The variation of the knowledge base across healthcare providers can be argued to be due to one or more of the following reasons: sample size and professional group included in the sample, use of simple or complex questions, and the absence of a BBFE programme. A sampling method that is confined to or selectively includes physicians and nurses (who we know would have better knowledge compared to other staff) will report better knowledge than studies of all healthcare providers in the hospital. Questionnaire type and design may also affect the outcome of surveys involving complex or simple questions. A source of bias of particular interest to this study is the pre-existence of a BBFE programme in the hospital where the staff are assessed; the absence of an established programme predictably lowered reported knowledge.

**ATTITUDES**

An attitude is a hypothetical construct that represents an individual’s likes or dislikes about an event or situation ("Attitude (psychology)," 2011). Generally, attitudes are the result of either direct experience or observational learning from the environment. An attitude based upon direct experience appears to be more likely to have an impact on behaviour than one based upon indirect experience (Fazio et al., 1982). Attitudes can be modified by persuasion, awareness, knowledge and similar strategies. The hypothetical paired-cases scenarios were designed to elicit healthcare providers’ attitude to management of BBFE.

Surprisingly, despite knowing the need for a formal post-exposure risk assessment fewer healthcare providers opted for this when the patient was known to have an infection (hepatitis B, C or HIV) than when the patient was only suspected to be infected. An argument could be made that they relied on the history and examination findings instead of blood analysis for risk assessment. The implication of this is that they would start post-exposure prophylactic treatment without placing any reliance on the risk assessment process.
Similar attitudes were reported in Nigeria (Aisien & Shobowale, 2005) and Uganda (Mungherera, 1997). Future education and awareness training should focus on increasing understanding of the effectiveness of the hospital’s protocol. Moghimi et al. (2009) reported surgeons with proper knowledge of the risk of seroconversion performed safer practices. Reda et al. (2009) asserted the positive effect of work experience on reducing the frequency of needlestick injuries.

**Practices**

In the paired case studies, the theoretical responses of participating healthcare providers showed that a few healthcare providers had a preference for initiating self-directed treatment with antivirals or immunisation rather than complying with the hospital reporting and assessment protocol. These differences in post-exposure practice especially when the patient was known to have the disease were statistically significant in all three paired cases. Possible explanations suggested by other studies included:

- They are too busy;
- A lack of trust in the system;
- Avoidance of screening due to the fear that if they seroconvert they would be asked to leave the country;
- Fear;
- Stigma.

To explore this finding in more detail qualitative studies were performed which will be discussed later in the thesis.

The hospital staff had adequate knowledge of potential treatment options, but their responses to the scenarios were based on personal preference and a number of healthcare providers opted not to conduct risk assessment before starting post-exposure prophylaxis. Zhang et al. (2009) from China and Mehta et al. (2005) from India reported that a standard algorithm for post-exposure management improves participation. A standard protocol was developed in the intervention period to address this concern. Failure to test an infected source patient’s blood means that an adequate risk assessment and appropriate secondary prevention cannot be performed, and could reflect unwillingness to report the occupational exposure.

In terms of primary prevention, the majority of the respondents who were immunised for hepatitis B did not have their post-immunisation blood titres checked.
**Rates of Reporting**

The gap between knowledge and practice was indicated by 7 out of 17 healthcare providers occupationally exposed to body fluid in the last 12 months who did not report the incident (neither to their manager nor the Occupational Health and Safety Clinic), even though 90% of them were aware that it should be reported. These findings support the argument that there were a high number of exposures, only a small fraction of which were reported.

The finding of low reporting rates was in agreement with the literature which showed that there was a pattern of low reporting (Kennedy et al. 2009). Studies from different parts of the world found the number of needlestick injuries to vary from 17 to 30 per 100 beds annually (Jayanth et al., 2009; Motonaga et al., 2004; Perry et al., 2009). The trend of low BBFE reporting demonstrated in our study was consistent with studies of needlestick injury reporting published in Nepal (Gurubacharya et al., 2003) 21%; Saudi Arabia (Alam, 2002) 7%; Canada (McGeer et al., 1990) 5%; and Pakistan (Zafar et al., 2008) 53%. The majority of studies only assessed needlestick injuries, while our study recorded BBFE, therefore a direct comparison was not possible.

The results showed a trend that nurses were more likely to report occupational exposure than other professional groups. The finding was in concordance with the results of Zafar et al. (2008) and McCormick and Maki (1981).

**Limitations**

The limitations of this study were that, while convenience sampling was used to ensure a good response rate, we were not able to verify the information provided by the healthcare providers because the information was collected anonymously. The study sample comprised healthcare providers who visited the Occupational Health and Safety Clinic for a number of reasons: post-employment medical, medical exam every three years for visa renewal, immunisation, travel medicine, accidents, musculoskeletal pain due to lifting, and physical fitness after injury or illness.

We were neither able to adjust the study data to hospital data for age, gender and ethnicity nor develop a stratified representative sample of the hospital staff. While this was unsatisfactory, limitations on the ability to generalise from this sample had to be balanced...
against the alternative options. The lack of good HR data and an observed trend towards low response rates from survey questionnaires meant that this captured participant group was as good an indication of likely provider behaviour as we were likely to achieve.

5.5 Conclusion

This study indicated that while healthcare providers had basic knowledge of post-exposure management, actual compliance with the algorithm in practice was low. This reflected a preference for personal discretion in decisions on reporting, risk assessment, and post-exposure management. Surprisingly, this was even more apparent in the practices in the hypothetical scenario where the patient was known to be infected with a blood-borne pathogen. To further explore the reasons for low reporting and non-compliance with the hospital post-exposure management algorithm, barriers to participation were examined.
Chapter 6: Pre-post clinical audit of the blood and body fluid exposure programme

6.1 Introduction

The introduction of a formal blood and body fluid exposure programme at SKMC was evaluated by a clinical audit to examine the characteristics of the BBFE programme in a multinational healthcare facility in an emerging country. The hospital had a similar working environment to other hospitals within the UAE and the Middle East. The prior literature review of BBFE systems revealed very few research publications relating to occupational exposures and post-exposure management from the Middle East and not a single evaluation of an intervention study was reported from the UAE. It was important to study the impact of an intervention programme within the UAE to understand the complex working context of a multicultural, multinational workforce.

A multinational study by Mantel (2002) found that on average 1-9 needlestick injuries were reported annually per healthcare provider worldwide. The WHO EMRO reported an average of four needlestick injuries per year per healthcare provider in the region, which includes the Middle East (WHO, 2010b). Studies typically found high incidence rates of occupational exposure, proportionally low reporting rates, and post-exposure management that did not comply with accepted protocols. These characteristics were observed in our KAP study in Abu Dhabi, and by a study in Dubai (Jacob et al., 2010).

6.2 Methodology

A pre- and post-intervention clinical audit was designed to assess the impact of the implementation of a blood and body fluid exposure programme developed with the consensus of healthcare providers in accordance with evidence-based best practice guidelines. The pre-intervention clinical audit was conducted to benchmark the pre-intervention practices, reporting, management, and follow-up. The intervention consisted of policy and procedural changes, training and awareness sessions, improving laboratory services, developing a standard protocol for assessment and follow-up of body fluid exposure, maintaining a database and introducing safer devices. The study consisted of two clinical audits: the first
audit assessed data from January 2006 to December 2007 (pre-intervention clinical audit) and the second covered from January 2008 to December 2009.

**Pre-intervention Clinical Audit**

The pre-intervention clinical audit was performed on clinical records of occupational exposures reported to the Occupational Health and Safety Clinic. The clinic’s schedule was examined to identify visits by healthcare providers to report an occupational exposure to blood or body fluid from 1 January 2006 to 31 December 2007. The medical files of the identified healthcare providers were retrieved for a detailed review. The data were recorded in an Excel spreadsheet to record all available variables and demographic information. Only a few files documented the cause of the exposure. Therefore, to determine the cause of exposure, I reviewed the narrative description of the incident for each exposure so the cause could be classified. I verified 100% of the data in the hard copies to reduce transcription error. The Statistical Package for Social Sciences version 18 was used to perform descriptive statistics (Pallant, 2007).

**Post-intervention Clinical Audit**

The post-intervention clinical audit examined the development of the blood and body fluid exposure programme and evaluated the impact of the programme to identify the characteristics which could be responsible for an effective and culturally sensitive programme.

### 6.2.1 Sample population

The hospital had approximately 4,800 healthcare providers who were eligible to participate in the study along with approximately 500 subcontractors and volunteers working in different parts of the city (Sheikh Khalifa Medical City, 2005).

**Inclusion Criteria**

- Healthcare providers working in the hospital (employees, sub-contractors and volunteers);
- Healthcare providers who reported blood and body fluid exposure.
EXCLUSION CRITERION

- Patients or family members who were exposed to blood or body fluids while in the hospital.

SAMPLE SIZE

The study consisted of two clinical audits on the data collected by the Occupational Health and Safety Clinic. The first audit assessed data from January 2006 to December 2007 (pre-intervention clinical audit). The second covered from January 2008 to December 2009. The intervention started with major changes introduced in January 2008 (introduction of new policy, procedures); this was followed by continuous improvement during the two years, as improvement is a continuous process. At the end of two years a clinical audit was performed on the data collected by the Occupational Health and Safety Clinic to assess the cumulative impact of the organisational improvements.

The sample was composed of 376 healthcare providers working in the hospital who were exposed to blood or body fluids from 1 January 2006 to 31 December 2009. Concato and Harrell and their colleagues (Concato et al., 1993; Harrell et al., 1985) have suggested a minimum ratio of 10 (10:1) events per independent variable in a logistic model. Ratios less than that would increase the chances of type 2 errors (β-errors or false negatives). The study had 376 events and 13 independent variables, which results in a ratio of 29 (376:13) events per independent variable. The ratio for the study was well above the minimum standard of 10 events to an independent variable, providing adequate power to determine a significant relationship.

6.2.2 Data collection and management

A research instrument (attached in Appendix 4) was developed to record demographic, medical, management and follow-up information about the exposure. An electronic database using an Excel spreadsheet was developed to collate important information. It was maintained by the physicians and nurses working in the Occupational Health and Safety Clinic. A separate Excel spreadsheet was developed to record the immunisation status of all staff members working at SKMC. The demographic information was obtained from human resources and was updated on a monthly basis in order to remain accurate. The clinical co-
ordinators and nurses were responsible for maintaining and updating this data sheet. I monitored the data input and its accuracy on a monthly basis.

The data regarding the immunisation status of the healthcare providers, exposure to blood or body fluid, post-exposure prophylactic treatment, and analytical blood reports were kept on occupational health and safety computers. Analysis was performed on de-identified data. The client records were number coded.

**DATA CLEANING**

To ensure rigour in the data collection and management process, a 100% review of the information in the dataset was conducted in relation to the original employee health records annually.

**VARIABLES**

To determine the impact of the implementation of the blood and body fluid exposure programme a number of variables were selected. Details of the variables and their descriptions are given in table 6.1.
Table 6.1: Variables for the clinical audit

<table>
<thead>
<tr>
<th>Variables</th>
<th>Type of data</th>
<th>Type of variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff member’s follow-up at 6 months</td>
<td>Binary (0, 1)</td>
<td>Dependent Variable</td>
</tr>
<tr>
<td>(completed versus not completed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff member’s blood analysis (immediately after exposure)</td>
<td></td>
<td>Independent Variable</td>
</tr>
<tr>
<td>(performed versus not performed)</td>
<td>Binary (0, 1)</td>
<td></td>
</tr>
<tr>
<td>Staff member’s follow-up at 3 months</td>
<td>Binary (0, 1)</td>
<td>Independent Variable</td>
</tr>
<tr>
<td>(completed versus not completed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention (pre-intervention versus post-intervention)</td>
<td>Binary (0, 1)</td>
<td>Independent Variable</td>
</tr>
<tr>
<td>Initial assessment performed (at OHS Clinic versus ER)</td>
<td>Binary (0, 1)</td>
<td>Independent Variable</td>
</tr>
<tr>
<td>Department (Ward versus elsewhere)</td>
<td>Binary (0, 1)</td>
<td>Independent Variable</td>
</tr>
<tr>
<td>NSI (NSI versus other BBFE)</td>
<td>Binary (0, 1)</td>
<td>Independent Variable</td>
</tr>
<tr>
<td>Patient’s blood analysis (immediately after exposure)</td>
<td>Binary (0, 1)</td>
<td>Independent Variable</td>
</tr>
<tr>
<td>(performed versus not performed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Causes&lt;sup&gt;1&lt;/sup&gt; (5)</td>
<td></td>
<td>Independent Variable</td>
</tr>
<tr>
<td>• Manipulating versus other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Handling and passing versus other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Disposal-related versus other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Improper handling versus other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Splash versus other</td>
<td>Binary Series (0, 1)</td>
<td></td>
</tr>
<tr>
<td>Counselling and advice for safe practices provided (provided versus not provided)</td>
<td>Binary (0, 1)</td>
<td>Independent Variable</td>
</tr>
</tbody>
</table>

<sup>1</sup> Causes are analysed separately, each as a binary outcome variable.
6.2.3 Data analysis

The quantitative data were analysed by using Statistical Package for Social Sciences version 18. Descriptive and inferential statistics were generated; regression and non-parametric tests were applied.

A) Descriptive statistics: The data were summarised by using a number of descriptive measures appropriate to each class of variable. The analysis included proportions and associations. Chi square was performed to calculate an odds ratio; an alpha value of <0.05 was taken as the threshold for significance of the results.

B) Model building: The variables were binary, so logistic regression was chosen to develop the model to identify the variables which influenced the healthcare provider being followed up at 6 months after a blood and body fluid exposure (Hosmer & Lemeshow, 2000). The data set had 14 variables (13 independent variables and 1 dependent variable). The variables having an alpha value of <0.10 in the univariate analysis were eligible for inclusion in the multivariate analysis to be evaluated as predictors of the impact on the dependent variable (being seen at 6 months post-BBFE). Multivariate analysis was used to obtain a 95% Confidence Interval (CI) and determine the relationship described as an odds ratio between independent variables to the dependent variable.

6.2.4 Ethical considerations

The research proposal was approved by the Research and Ethics Committee of the hospital (attached in Appendix 5). The purpose of the research was to assess the impact of the blood and body fluid exposure programme the hospital had started. It did not include any additional medical examination, medication trial, blood investigation or radiological intervention, but utilised the medical information on file. Medical information regarding the health status of the healthcare providers, post-exposure prophylactic treatments, analytical blood reports, and follow-up were kept in an electronic database. The medical information was number coded; analysis was performed on de-identified data. The original data never left the hospital premises. To ensure the information was used strictly for research purposes, a confidentiality agreement was signed with the hospital.
6.2.5 Intervention and impact

The significant features of the blood and body fluid exposure programme and their impact will be discussed to provide a background of the strategies used to make the hospital a safe workplace.

Policy and procedure

A corporate policy was developed, with the consensus of the Occupational Health and Safety Committee, Infection Control Committee and Infectious Diseases Department, which stated “that it was mandatory to report all blood and body fluid exposures”. It was accompanied with a detailed list of steps to be taken after an exposure. The mandatory reporting intervention made it an official responsibility of the healthcare provider to report the exposure and complete the follow-up. The clinical co-ordinators reminded the healthcare providers to come for their follow-up blood test and, if they would not visit the clinic, their annual health clearance was withheld until the follow-up was completed.

Post-exposure management protocol

An algorithm was developed which outlined the post-exposure management to be followed by the treating physician in case of an exposure; this was developed after the review of guidelines and evidence-based best practices. It stated that the exposure should be reported to the Occupational Health and Safety Clinic or ER after hours. Blood tests would be performed for both the patient and staff member. If the patient was negative for hepatitis B, hepatitis C and HIV, no further follow-up would be required. In the event of an exposure to a hepatitis B-positive patient, if the staff member did not have antibodies for HBV, a combination of immunoglobulin and vaccine would be given and for non-respondents immunoglobulin would be provided. If the healthcare provider had antibody titres at or above 10 International Units no follow-up was required. If the patient proved to be positive for hepatitis C, the staff member would be followed for 6 months to assess whether there was any seroconversion. In cases where the healthcare provider was exposed to body fluid which was found to be HIV-positive, post-exposure prophylaxis and follow-up was to start as soon as possible (attached in Appendix 6).

Physicians working in the Occupational Health and Safety Clinic and the Emergency Room were trained in the use of the protocol. There was a formal reporting system and all those who were managed initially in the ER were advised to follow up with the Occupational Health and Safety Clinic the next working day.
In the pre-intervention period staff members waited until the next day to report the exposure and begin post-exposure management. After the training sessions for ER physicians, staff members were able to report the blood and body fluid exposure to ER in the after hours period and have post-exposure treatment started immediately if required.

**Infection Screening and Immunisation for Hepatitis B**

A policy was implemented which required all new staff members to be screened for hepatitis B, hepatitis C and HIV before they initiated clinical activity. Individuals who were immunised for hepatitis B and had antibody titres below 10 International Units were to be given a full course of the Engerix B vaccine (Mast et al., 2005). The antibody titre was checked 2 months post immunisation. Those found to be non-responders after two full courses of documented hepatitis B vaccination were advised that they would be given immunoglobulin after exposure to blood or body fluids infected with hepatitis B (Goncalves et al., 2004). A mass immunisation campaign was launched to assess the vaccination status of longstanding employees. A database was developed to record the immunisation status.

There were no records of immunisation coverage in the pre-intervention period; only the number of doses given per month of Engerix B was recorded. The mass immunisation campaign helped screen more than 4,000 employees, the majority of which did not have immunisation records for hepatitis B. If a healthcare provider could recall being immunised but did not recall having antibody titre assessed, their antibody titre was assessed. If it was below 10 International Units they were given a full course of three vaccinations. Documented hepatitis B immunisation coverage was raised to 95% across the working population of SKMC.

**Training Sessions**

Physicians working in the Departments of Emergency Medicine, Infectious Diseases, and Internal Medicine were given focused training sessions on the importance of a standardised approach and the newly developed hospital algorithm for blood and body fluid exposure. Emergency Department staff were provided with a laminated copy of the algorithm after the training session, to ensure that they would have the algorithm to refer to while treating blood and body fluid exposures.

**Champions of Change**

During the post-intervention period, the Occupational Health and Safety Committee trained approximately 125 staff members as “champions of change”. They were given training
on how to motivate other healthcare providers to report an exposure, a definition of exposure and the steps to follow after an exposure takes place. A few of them participated in sessions related to post-exposure counselling. The general awareness sessions were made mandatory for all healthcare providers once a year to make them realise the importance of reporting and taking universal precautions at all times. Special training sessions relating to safe techniques while handling sharps were given to healthcare providers.

The physicians, nurses, and paramedical staff trained as “champions of change” during the post-intervention period played a positive role in developing the culture of safety through being ambassadors of best practices. They encouraged and motivated their colleagues to report exposures, identified systemic changes to improve practices, and provided feedback on educational sessions. They helped in developing health promotion materials. In the monthly meeting they reported events and behaviours which were observed to be unsafe and how they politely reminded their colleagues of safe practices.

**IMPROVEMENTS IN LABORATORY REPORTING PROCESS**

The laboratory played a vital role in post-exposure management. Treatment could not be started until the source and staff member blood reports were reviewed. Close collaboration with the Laboratory Medicine Department ensured effective post-exposure management.

The laboratory performed the following tests after a blood and body fluid exposure: hepatitis B surface antigen (HBsAg), hepatitis B surface antibody (anti-HBs), hepatitis B core antibody (anti-HBc), hepatitis C antibody (anti-HCV), and HIV ELISA.

If there was a high suspicion of the patient (source) being HIV-positive a Rapid HIV test was performed. In the case of a patient or healthcare provider being positive for Hepatitis C antibody (anti-HCV) the following tests were performed: HCV recombinant immunoblot assay (RIBA) test, and HCV RNA test Qualitative. If the HIV ELISA was positive it was confirmed by Western blot.

The following improvements were made to facilitate prompt assessment after an exposure and if required initiate post-exposure prophylaxis:

- Reporting time was reduced;
- Modification to post-exposure blood test requests made it compulsory to identify both source and staff identification numbers to facilitate proper follow-up. After this modification there were seven blood and body fluid exposures which were tracked due
to this change. As soon as the clinic received the laboratory results the staff were contacted for follow-up;

- All blood and body fluid exposure reports were to be sent to the Occupational Health and Safety Clinic for review and follow-up. These changes affirmed that if an exposure had been investigated it would have proper management and follow-up; and
- All blood investigations demonstrating HIV infection were rechecked to confirm the findings.

**SAFER DEVICES AND PRACTICES**

The hospital introduced retractable needles, needle-free connectors, and blunt suture needles. The healthcare providers were trained in the use of the safe devices. All exposures were analysed to assess whether equipment or device failure was a reason for the exposure, in order to prevent future exposures.

**COUNSELLING AND ADVICE FOR SAFE PRACTICES**

Counselling, advice for safe practices in future, and confidentiality of the discussion were an integral part of the intervention. All medical information is confidential, but occupational exposure to body fluid infected with HIV and HBV could lead to deportation, therefore it was essential to ensure the event and counselling were confidential. Confidentiality was the cornerstone for the healthcare providers to trust the blood and body fluid exposure programme. They were able to voice concerns related to safety, work practices, equipment and devices. The information was used to improve safe work practices without using any name, professional group or department.

### 6.3 Results

The hospital was a multinational employer with employees from more than 40 countries (Sheikh Khalifa Medical City, 2005). The age group ranged from 23 to 60 years. The majority of the healthcare providers were expatriates; most of the physicians were trained in the West: USA, Canada, UK, Europe, Australia and NZ. On the other hand the majority of the nurses were from the Philippines, India and Arab countries. The male to female ratio was skewed towards females, due to the majority of the nurses, paramedical and administrative staff being females and in contrast most of the physicians were males.
The statistical analysis of the quantitative variables was performed to examine significance of association among the variables. The results section will conclude with logistic regression analysis and multivariate logistic regression.

6.3.1 Descriptive analysis of variables

The analytical findings of the variables will be presented in two categories: exposure and post-exposure.

Exposure:
- Reported exposures;
- Blood and body fluid exposure protocol and integrated management;
- Department;
- Type of exposure;
- Cause of exposure.

Post-exposure:
- Patient;
- Staff member;
- Counselling and safe practices.

Exposures: Reported exposures

The pre-post intervention clinical audits identified that 156 occupational exposures were reported in the pre-intervention period, whereas 220 exposures were reported in the post-intervention period. A comparison of the numbers of blood and body fluid exposures in the pre-intervention and post-intervention periods revealed that the programme had a positive impact. The intervention was successful in improving the reporting rates from 19.5/100 beds annually in 2006-7 to 27.7/100 beds annually in 2008-9 (this calculation is based on 400 beds; in 2010 there was an expansion and the total beds became 568). During the 4 years in which the two clinical audits were performed there was no major change in the number of beds, number of healthcare providers or clinical activities. In the intervention period a number of proactive measures were introduced to reduce occupational exposures including needle-free systems. Therefore it is more than likely that the number of BBFEs would have remained the same if not reduced and that the increase in reported exposures indicates an increase in proportion of the reported BBFE compared to the actual BBFE.
Figure 6.1: Blood and body fluid exposure cases reported in pre- and post-intervention periods

A detailed analysis of the data showed that reporting had improved among medical, nursing, radiology, and technical staff while for other professionals it remained the same and a decrease in the number of exposures was reported by laboratory staff. The chi-square value of the observed values was 11.70 with a p value of 0.019 (excluding radiology because it had none in the pre-intervention period).

Table 6.2: Blood and body fluid exposure reporting by profession

<table>
<thead>
<tr>
<th>Professional Group</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical</td>
<td>47</td>
<td>96</td>
</tr>
<tr>
<td>Nursing</td>
<td>117</td>
<td>175</td>
</tr>
<tr>
<td>Radiology</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Laboratory</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>Tech</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Others</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>
BLOOD AND BODY FLUID EXPOSURE PROTOCOL AND INTEGRATED MANAGEMENT

The majority of the exposures were initially assessed in the Occupational Health and Safety Clinic in both pre- and post-intervention periods, but in the post-intervention period 77 staff members were initially assessed in the ER which means that those exposures took place after hours and were reported within a few hours of exposure. In the pre-intervention period, this important link was missing and this alone could be the reason for missing a large number of exposures during the pre-intervention period.

Table 6.3: Initial assessment after exposure

<table>
<thead>
<tr>
<th>Location</th>
<th>Occupational Health &amp; Safety Clinic</th>
<th>Emergency Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-intervention</td>
<td>143</td>
<td>77</td>
</tr>
<tr>
<td>Pre-intervention</td>
<td>156</td>
<td>0</td>
</tr>
</tbody>
</table>

The results show that involving the ER in post-exposure management and having a formal reporting system reduced the time from exposure to initial contact. The data were collected for date of initial assessment which was then compared with the date of the event and the description of the event to calculate the time from injury to time of initial assessment provided. Descriptive analysis showed that both the mean and median assessment delay was 1 day or less, 93% reported on the same day, and 7% on the next day. This information could not be compared with the pre-intervention period, as the time of exposure was not recorded.

DEPARTMENT

A comparison of departmental reporting rates showed that a number of departments reported more exposures in the post-intervention period, whereas there were a few departments (5/18) where the post-intervention reporting rate was lower than the pre-intervention rate.
Table 6.4: Blood and body fluid exposure reported by department

<table>
<thead>
<tr>
<th>Department</th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wards</td>
<td>64</td>
<td>83</td>
</tr>
<tr>
<td>Operation Room &amp; Recovery Room</td>
<td>12</td>
<td>34</td>
</tr>
<tr>
<td>Emergency Room</td>
<td>18</td>
<td>33</td>
</tr>
<tr>
<td>Laboratory</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Outpatient Speciality Clinic</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>Primary Healthcare Centre</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Radiology</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Preventive Medicine</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Dialysis</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Cleanco (subcontractor)</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Dental Clinic</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Behaviour Sciences</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Sterilisation Department</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Rehabilitation Centre</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Home Care</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Diabetic Centre</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Health Authority Abu Dhabi</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

An important finding was that the exposures reported to have occurred in the Emergency Room and Operation Room doubled, as illustrated in table 6.4.

Types of exposures were analysed in relation to the departments from which they were reported. The analysis helped in identifying high risk practices, and planning educational sessions for staff members. As a result of the analysis, focused training and educational
sessions were provided to the staff working in the wards, Emergency Room, and Operation Room on safe techniques of giving an injection, the use of safe devices, proper disposal and wearing proper personal protective equipment to prevent splash exposure.

**TYPE OF EXPOSURE**

Blood and body fluid exposures are not restricted to needlestick injuries. Needlestick injuries formed the majority of the reported exposures, both in pre-intervention and post-intervention periods. When needlestick injuries were compared with the other types of blood or body fluid exposures (including splashes, laceration, puncture wound, and bites), the chi-square results were statistically non-significant (odds ratio of 1.19 and p value of 0.49).

Table 6.5: Type of exposures: needlestick injuries versus other types of blood and body fluid exposure

<table>
<thead>
<tr>
<th>Type of exposure</th>
<th>NSI</th>
<th>Other types of BBFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-intervention</td>
<td>177</td>
<td>43</td>
</tr>
<tr>
<td>Pre-intervention</td>
<td>121</td>
<td>35</td>
</tr>
</tbody>
</table>

A detailed comparative analysis of types of exposure is illustrated in figure 6.2 which shows that needlestick injury and splashes were reported more frequently in the post-intervention period, compared to laceration, puncture, and bite which were more frequently reported in the pre-intervention period.

![Figure 6.2: Types of exposures compared in pre- and post-intervention audits](image-url)
CAUSE OF BLOOD AND BODY FLUID EXPOSURE

Cause was an important variable of the study, as only once the cause was identified, was it possible to develop a preventive strategy. A narrative of the incidents was taken from the healthcare providers and coded to the most appropriate group of causes for BBFEs.

Figure 6.3: Causes of blood and body fluid exposure

The majority of the blood and body fluid exposure occurred while handling and passing devices during or after procedures as illustrated in figure 6.3, followed by manipulating needles. These two made up more than 50% of the exposures. The second most frequent set of causes comprised exposures related to improper disposal, disposal-related causes and recapping. Splashes with blood or other body fluids were the third most important group of exposures to healthcare providers.

EXPOSURE: PATIENT

The algorithm required that, if a healthcare provider was exposed to a patient’s body fluid, the patient’s blood was to be tested. In cases where a healthcare provider was exposed
to body fluid which could not be traced back to a patient, it was reported that the patient was "unknown". In cases where staff were exposed to unknown sources the option to test the patient was not possible; hence all those exposures were considered as infective or high risk and followed for 6 months. Table 6.6a provides a detailed breakdown of pre- and post-intervention groups related to blood tests.

The intention was to assess missed opportunities where a patient should have had a blood test and the opportunity was missed in the post-exposure versus pre-exposure period. The results were statistically significant (odds ratio of 3.37 and p value of <0.0001); the odds ratio was calculated on the results shown in table 6.6b. Opportunities not missed included blood test performed and unknown compared to opportunity missed which comprised those not performed.

This showed that there were fewer missed opportunities of immediate blood analyses of patients in the post-intervention period.

Table 6.6a: Patients’ blood analysis (immediately after exposure)

<table>
<thead>
<tr>
<th>Blood analysis</th>
<th>Performed</th>
<th>Unknown</th>
<th>Not performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-intervention</td>
<td>174</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td>Pre-intervention</td>
<td>99</td>
<td>16</td>
<td>41</td>
</tr>
</tbody>
</table>

Table 6.6b: Patients’ blood analysis (immediately after exposure)

<table>
<thead>
<tr>
<th>Blood analysis</th>
<th>Opportunity not missed</th>
<th>Opportunity missed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-intervention</td>
<td>199</td>
<td>21</td>
</tr>
<tr>
<td>Pre-intervention</td>
<td>115</td>
<td>41</td>
</tr>
</tbody>
</table>

A 4-year cumulative analysis of patients’ blood analysis in the study showed that the seroprevalence was highest for hepatitis C which was 11%, followed by hepatitis B at 4%, and HIV at 2%, as illustrated in figure 6.4.
Exposure: Staff

In the post-intervention period only 1 staff member out of 220 (0.45%) did not have a blood test at the time of exposure compared to 7 out of 156 (4.48%) in the pre-intervention period as shown in table 6.7. The relationship of blood analyses performed for staff members immediately after an exposure in the pre- and post-intervention periods was found to be statistically significant using chi-square (odds ratio of 7.13 and a p value of 0.0075. This showed improvement in management and the quality of services provided.

Table 6.7: Staff blood analysis performed (immediately after exposure)

<table>
<thead>
<tr>
<th>Blood analysis</th>
<th>Performed</th>
<th>Not performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-intervention</td>
<td>219</td>
<td>1</td>
</tr>
<tr>
<td>Pre-intervention</td>
<td>149</td>
<td>7</td>
</tr>
</tbody>
</table>

An accumulation of 4 years of staff blood results showed that only 2 out of 376 staff members had hepatitis B. None of them apparently had hepatitis C or HIV. The results revealed that healthcare providers had much lower prevalence of these diseases compared to the patient population.

Two staff members, who were found to be positive for hepatitis B, were exposed to non-infected sources and therefore did not require further follow-up post exposure. They were
not involved in exposure-prone procedures; according to the hospital policy they were allowed to perform their tasks without any risk to the safety of the patients.

**Staff Blood Analysis at 3 Months**

The pre-intervention period did not have a standard protocol; hence different physicians were following different treatment protocols and follow-up plans. There were a few physicians who informed the staff that they did not require 3 and 6 month follow-up because the patient’s blood tests for hepatitis B, hepatitis C, and HIV were negative (categorised as not applicable), compared to others who followed all staff who were exposed for 6 months. Healthcare providers were not reminded if the healthcare provider missed the follow-up appointment.

In contrast, the post-intervention period had a standard treatment and follow-up regimen (algorithm), and all healthcare providers were reminded if they did not come for their follow-up visit to the clinic. According to the blood and body fluid exposure algorithm 3 and 6 month follow-up were not recommended (applicable) if the source (patient) was negative for all of the three diseases of concern or the staff member had left the organisation in the post-intervention period. Hence there were more cases where the follow-up was not applicable in the post-intervention period, where a standard protocol was followed. The category “unknown” represented exposure which took place by a needlestick or sharp which was not tracked to the source; these cases were followed for 6 months as the exposure was considered high risk.

In the post-intervention period 68 staff members were followed; 28 patients were positive for one of the three infectious diseases, 25 were of unknown disease status, and 21 were not tested. That brought the group to be followed up to 74, out of which two were locum physicians and four healthcare providers had left the organisation; they were therefore kept in the not applicable group, which reduced the total to 68.

According to the algorithm only three staff members did not come for the 3 month follow-up compared to 28 in the pre-intervention period. A detailed breakdown is provided in table 6.8.

To assess how many healthcare providers were missed in follow-up at 3 months, those who had “Follow-up completed as per algorithm” which included follow-up completed and not applicable were compared to “Follow-up not completed as per algorithm” which included
those who were missed in follow-up. The results were statistically significant (odds ratio of 15.82 and p value of <0.0001); the odds ratio was calculated on the results shown in table 6.8b.

Table 6.8a: Staff follow-up at 3 months

<table>
<thead>
<tr>
<th>Blood analysis</th>
<th>Follow-up completed</th>
<th>Not applicable</th>
<th>Follow-up not completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-intervention</td>
<td>65</td>
<td>152</td>
<td>3</td>
</tr>
<tr>
<td>Pre-intervention</td>
<td>116</td>
<td>12</td>
<td>28</td>
</tr>
</tbody>
</table>

Table 6.8b: Staff follow-up at 3 months

<table>
<thead>
<tr>
<th>Blood analysis</th>
<th>Follow-up completed as per algorithm</th>
<th>Follow-up not completed as per algorithm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-intervention</td>
<td>217</td>
<td>3</td>
</tr>
<tr>
<td>Pre-intervention</td>
<td>128</td>
<td>28</td>
</tr>
</tbody>
</table>

**Staff Members' Blood Analysis at 6 Months**

The difference in the number of staff members that completed the required follow-up was more evident in the 6 month follow-up, as 42.3% (66/156) of the staff in the pre-intervention period did not come for the final medical assessment compared to only 2.2% (5/220) in the post-intervention period.

To assess how many healthcare providers were missed in follow-up at 6 months, those who had “Follow-up completed as per algorithm” which included follow-up completed and not applicable were compared to “Follow-up not completed as per algorithm” which included those who were missed in follow-up. The results were statistically significant (odds ratio of 31.53 and p value of <0.0001); the odds ratio was calculated on the results shown in table 6.9b.
Table 6.9a: Staff follow-up at 6 months

<table>
<thead>
<tr>
<th>Blood analysis</th>
<th>Follow-up completed</th>
<th>Not applicable</th>
<th>Follow-up not completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-intervention</td>
<td>63</td>
<td>152</td>
<td>5</td>
</tr>
<tr>
<td>Pre-intervention</td>
<td>78</td>
<td>12</td>
<td>66</td>
</tr>
</tbody>
</table>

Table 6.9b: Staff follow-up at 6 months

<table>
<thead>
<tr>
<th>Blood analysis</th>
<th>Follow-up completed as per algorithm</th>
<th>Follow-up not completed as per algorithm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-intervention</td>
<td>215</td>
<td>5</td>
</tr>
<tr>
<td>Pre-intervention</td>
<td>90</td>
<td>66</td>
</tr>
</tbody>
</table>

**SEROCONVERSION**

The analysis of the 6 month follow-up visit to the Occupational Health and Safety Clinic in the pre-intervention period showed that, of the 18 staff exposed to infected blood, only 6 individuals were followed up for 6 months. By contrast in the post-exposure period all staff who were exposed to infected blood completed the 6 month follow-up.

**COUNSELLING AND ADVICE FOR SAFE PRACTICES**

The post-intervention period involved formal counselling, confidentiality, and advice on safe practice to prevent future exposures. In the post-intervention period 99.6% of the cases were provided with counselling and advice for safe practices compared to only 33.3% in the pre-intervention period.
6.3.2 Logistic regression

The results in table 6.10 show that, when univariate logistic regression was performed, the factors most likely responsible for the follow-up of the staff at 6 months were:

- Being in the intervention group; and
- Staff member's blood analysis (immediately after exposure); and
- Patient's blood analysis (immediately after exposure); and
- Initial assessment performed (at OHS Clinic versus ER); and
- Counselling and advice for safe practices provided.

Multivariate logistic regression (table 6.11) was performed on statistically significant exposure variables (excluding the staff blood test at 3 months which was not included in the model to avoid co-linearity) and being seen at 6 months. The results showed that being in the intervention group had the most significant relationship with completing clinical follow-up at 6 months (OR 25.41, 95% CI 11.24-57.49, p<0.001). This indicates that being in the intervention group was the most important factor for the outcome variable.
The odds ratio for the main exposure variable (being in the intervention programme) doubled in the multivariate logistic regression (OR 49.67, 95% CI 14.00-176.23), compared with the univariate odds ratio (OR 25.41, 95% CI 11.24-57.49). The strength of this association dominated results for other variables included in the model, to the point that no other variables achieved statistical significance when regressed with being in the intervention programme. Decreases were seen for the associations between having a staff member’s or patient’s blood analysis completed immediately following the blood or body fluid exposure (OR 3.97 and 2.16, respectively), to 1.78 and 1.48, respectively. Having an initial assessment performed and receiving counselling advice were highly significant in their association with being seen at 6 months in the univariate analysis, but these two variables both reversed direction with being seen at 6 months in the multivariate analysis. The overwhelmingly positive relationship between being in the intervention programme and being seen at 6 months was more clearly demonstrated by conducting a multivariate analysis.
Table 6.10: Univariate logistic regression of staff follow-up completed at 6 months

<table>
<thead>
<tr>
<th>Staff follow-up at 6 months</th>
<th>Logistic regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow-up completed</td>
<td>Follow-up not completed</td>
</tr>
<tr>
<td>Post intervention</td>
<td>Pre intervention</td>
</tr>
<tr>
<td>215/220 (97.7%)</td>
<td>90/156 (57.7%)</td>
</tr>
<tr>
<td>Staff member’s blood analysis (immediately after exposure) performed</td>
<td>Staff member’s blood analysis (immediately after exposure) not performed</td>
</tr>
<tr>
<td>294/368 (79.9%)</td>
<td>4/8 (50.0%)</td>
</tr>
<tr>
<td>Staff follow-up at 3 months (Follow-up completed)</td>
<td>Staff follow-up at 3 months (Follow-up not completed)</td>
</tr>
<tr>
<td>295/345 (85.5%)</td>
<td>5/31 (16.1%)</td>
</tr>
<tr>
<td>Patient’s blood analysis (immediately after exposure) performed</td>
<td>Patient’s blood analysis (immediately after exposure) not performed</td>
</tr>
<tr>
<td>264/325 (81.2%)</td>
<td>34/51 (66.6%)</td>
</tr>
<tr>
<td>Departmental reporting:</td>
<td>Other departments</td>
</tr>
<tr>
<td>Wards</td>
<td></td>
</tr>
<tr>
<td>121/147 (82.3%)</td>
<td>175/230 (76.1%)</td>
</tr>
<tr>
<td>NIS</td>
<td>Other BBFE</td>
</tr>
<tr>
<td>234/298 (78.5%)</td>
<td>64/78 (82.1%)</td>
</tr>
<tr>
<td>Initial assessment</td>
<td>Initial assessment performed at OHS Clinic</td>
</tr>
<tr>
<td>performed at ER</td>
<td></td>
</tr>
<tr>
<td>73/77 (94.8%)</td>
<td>225/299 (75.3%)</td>
</tr>
<tr>
<td>Manipulating</td>
<td>versus others causes</td>
</tr>
<tr>
<td>74/90 (82.2%)</td>
<td>224/286 (78.3%)</td>
</tr>
<tr>
<td>Handling and passing</td>
<td>versus others causes</td>
</tr>
<tr>
<td>82/110 (74.5%)</td>
<td>216/266 (81.2%)</td>
</tr>
<tr>
<td>Disposal related</td>
<td>versus others causes</td>
</tr>
<tr>
<td>31/44 (70.5%)</td>
<td>267/332 (80.4%)</td>
</tr>
<tr>
<td>Improper handling</td>
<td>versus others causes</td>
</tr>
<tr>
<td>37/45 (82.2%)</td>
<td>261/331 (78.9%)</td>
</tr>
<tr>
<td>Splash</td>
<td>versus others causes</td>
</tr>
<tr>
<td>45/45 (100%)</td>
<td>253/331 (76.4%)</td>
</tr>
<tr>
<td>Counselling and advice for safe practices provided</td>
<td>Counselling and advice for safe practices not provided</td>
</tr>
<tr>
<td>237/271 (78.5%)</td>
<td>61/105 (58.1%)</td>
</tr>
</tbody>
</table>

Note: (*) odds ratio not calculated due to a zero cell
Table 6.11: Multivariate logistic regression of blood analysis performed at 6 months

<table>
<thead>
<tr>
<th>Variable</th>
<th>Univariate logistic regression</th>
<th>Multivariate logistic regression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odds ratio (95% CI)</td>
<td>P Value</td>
</tr>
<tr>
<td></td>
<td>Staff follow-up at 6 months</td>
<td></td>
</tr>
<tr>
<td>Intervention group follow-up completed</td>
<td>25.41 (11.24-57.49)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Staff member’s blood analysis completed (immediately after exposure)</td>
<td>3.97 (0.97-16.25)</td>
<td>0.055</td>
</tr>
<tr>
<td>Patient’s blood analysis completed (immediately after exposure)</td>
<td>2.16 (1.14-4.13)</td>
<td>0.019</td>
</tr>
<tr>
<td>Initial assessment performed (at OHS Clinic versus ER)</td>
<td>6.00 (2.12-16.99)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Counselling and advice for safe practices provided</td>
<td>0.19 (0.12-0.34)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Note: Adjusted for other variables

6.4 Discussion

There were a few studies from Pakistan and India but none from the Middle East which discussed the results of the implementation of a blood and body fluid exposure programme in their hospitals (Mehta et al., 2005, 2010; Zafar et al., 2009).

Policy and Procedure

The corporate policy for mandatory reporting of blood and body fluid exposures helped in removing systemic barriers by providing a clear pathway of reporting an exposure and procedure for post-exposure management. It showed that management was committed to the programme and wanted to make the hospital a safer workplace. A similar approach of developing a corporate policy for reporting had been used in India by Mehta who reported its benefits (Mehta et al., 2005). In the absence of national or provincial legislature mandating exposure reporting, corporate policy gives the programme formal recognition.
**POST-EXPOSURE MANAGEMENT**

The results show that a comprehensive blood and body fluid exposure programme with an algorithm for post-exposure management can increase reporting and improve post-exposure management. The major difference between pre- and post-intervention periods was a change in the organisational culture in that the healthcare providers knew what to do, the process was user friendly, there was collegial support to report an exposure, and there was a standard post-exposure management algorithm. Mehta et al. (2005) reported the benefits of developing a hospital protocol to improve occupational exposure management in their surveillance study.

**REPORTING**

In the post-intervention period the number of exposures reported increased compared to the previous two years. There was an increase in reporting from the physicians, nurses, and radiology staff, although there was a decrease in the number of reported exposures by the laboratory staff. This finding required further study to assess whether this change was because the laboratory staff did not report exposure or if there were in fact reduced exposures due to the introduction of needle-free systems.

The blood and body fluid exposure programme was successful in bringing the body fluid exposure reporting rates to 27/100 beds/year (based on a calculation for 400 hospital beds during 2008-2009) reflecting an increase in the proportion of body fluid exposures being reported. Most of the international data related to blood and body fluid exposure is limited to needlestick injuries only, therefore, if for comparison only needlestick injuries were calculated, it would be 21.6/100 beds/year. These rates were greater than those published by McCormick and Maki (1981b) who reported 14/100 beds/year over a period of almost 4 years, and Memish et al. (2002) who reported 15/100 beds/year in a 4 year study of a tertiary care hospital with 600 beds (McCormick & Maki, 1981b; Memish et al., 2002). The rates were lower than those found by Mehta et al. (2010) who reported 24/100 beds/year in a 4 year study in a tertiary care hospital with 342 beds, and Ruben et al. (1983) who reported a higher exposure reporting rate of 32/100 beds/year, over a period of 4 years in a 450 bed hospital (Mehta et al., 2010; Ruben et al., 1983). Information from EPINet reports suggests that an overall percutaneous injury rate of 27.97NSI/100 beds/year is reported from (a few) hospitals in the US (Perry et al., 2009). If we compare the numbers from our study to EPINet data as a
benchmark it shows that the hospital’s rate was comparable to the reporting rate published by EPINet.

**CHAMPIONS OF CHANGE**

The published literature has demonstrated that nurses are more likely to report an exposure than other healthcare providers (McCormick & Maki, 1981; Zafar et al., 2008); the KAP study performed in the hospital concurred with those findings. In our hospital we formed a group of motivated and trained nurses and other healthcare providers that led by example and inspired their colleagues to adopt safe practices as “champions of change”. The strategy could be used by other programmes to improve reporting. The impact of their role was discussed in the safety committee meetings but was not assessed in our quantitative study. A qualitative approach would be helpful in a future study assessing their role.

**CONSEQUENTIAL CHANGES TO THE SYSTEM**

Modifications in the laboratory medicine reporting process ensured that all post-exposure blood analysis requests were reported to the Occupational Health and Safety Clinic. Studies from Scotland and the Kingdom of Saudi Arabia have reported that physicians anecdotally self-assess the infection risks associated with an exposure. This practice could have been prevalent in our hospital as well (Jahan, 2005; NHS Scotland, 2000). The Occupational Health and Safety Clinic followed the blood tests which were not reported to the clinic directly. Seven additional occupational exposures were identified due to this intervention; this was a unique approach not mentioned in other studies.

A number of the departments reported more exposures in the post-intervention period. Wards reported the majority of the reported exposures (37.7%). Exposure reporting from the Emergency Room increased from 18 to 33, and in the Operation Room from 12 to 34. The findings were comparable to data published by Scotland’s National Health Service where 53% of the exposures were reported in the wards followed by 16% in the Operation Room and 3% in the Emergency Room (NHS Scotland, 2000) and Jahan who reported 42.5% of exposures in the wards, 16.9% in the Operation Room and 19.2% in the Emergency Room (Jahan, 2005). These were different from the findings of an Australian study which reported that almost half of the exposures were reported from the Emergency Room, Peri-operative

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and Surgical Departments with no changes in reporting trends in the 6 years assessed (Bi et al., 2006).

The proportion of reported exposures involving needlestick injuries was in concurrence with those found by Mehta et al. (45%), Bi et al. (63%), Tarantola et al. (63%), and Lee et al. (70%), i.e. they comprised the majority of the blood and body fluid exposures (Bi et al., 2006; Lee et al., 1999; Mehta et al., 2005; Tarantola et al., 2003). To reduce needlestick injuries, safe devices were introduced and educational sessions were provided to staff members on improved techniques of giving injections, how to handle an aggressive patient, the use of safer devices, proper disposal and wearing proper personal protective equipment to prevent splash exposure. The reduction in bites and lacerations could be attributed to effective training on “how to handle an aggressive patient” and better surgical practices. These findings require further research to identify the reasons for comparatively lower reporting.

The results suggest that the patient population had 16-18% seroprevalence of being infected by either hepatitis B, hepatitis C or HIV; these results were similar to the seroprevalence of 20% in the patient group reported by Mehta et al. (Mehta et al., 2005). In the absence of any published study reporting seroprevalence of these diseases in UAE, these results could be interpreted as showing the presence of these diseases in the patient population.

Almost all the employees, except one, in the post-intervention period had their blood analysed immediately after an exposure compared to seven in the pre-intervention period. This indicates improvement in post-exposure management. The results of blood and body fluid exposure follow-up were comparable to those reported by Mehta et al. (2010): 96.8%, and Bi et al. (2005): 94%. Jayanth et al. (2009) in India reported a slightly better follow-up of 98.9%.

The majority of the blood and body fluid exposures occurred while handling and passing devices during or after procedures, followed by manipulating needles. These two procedures made up more than 50% of the exposures. These findings were in concordance with those of Jayanth et al. (2009) who reported that blood collection and surgical procedures were responsible for 81% of the exposures, whereas Mehta et al. (2005) reported improper disposal, blood collection, intravenous line insertion/manipulation and recapping comprised 71% of the exposures.

The second group comprised those related to improper disposal and recapping. Unfortunately, after years of international recommendations to avoid recapping of used
needles and ensure proper disposal, these practices are still being cited as a cause of body fluid exposure. Recapping was found to cause 5% of blood and body fluid exposures in an Australian study, 8.5% and 9.5% in two studies reported from India, and 5.6% in a study from China; it remains a highly contentious practice (Bi et al., 2006; Jayanth et al., 2009; Mehta et al., 2005; Zhang et al., 2009). A few researchers have questioned the risk involved in handling an exposed needle (Ng et al., 2002); they have supported safety needles with retractable needles or re-sheathing devices (Gershon et al., 1999) to eliminate the risk of both recapping and improper disposal.

Splashes with blood or other body fluids were the third most common type of exposures to healthcare providers. More splashes were reported in the post-intervention period which could be inferred to indicate that healthcare providers were taking splashes more seriously. The risk of transmission of hepatitis B and C is low, although risk of transmission of HIV is reported to range from 0.09% to 0.1% after a muco-cutaneous exposure with infected body fluid (Collins & Kennedy, 1997; Ippolito et al., 1993; Sartori et al., 1993). Splashes were reported to be an important cause of transmission of HIV; the 20 year US national surveillance report indicated that 14% of HIV infections acquired at work involved muco-cutaneous exposure (Do et al., 2003).

The hospital ensured that appropriate post-exposure management and counselling would be provided and the process would be confidential for all purposes. It gave the healthcare providers an opportunity to enquire about the risk of transmission after the exposure, management options and follow-up. Counselling was also available for the spouse or family members to reduce post-exposure stress. The impact of counselling was reported by the treating physicians to be positive, but was not scientifically assessed. It was therefore not possible to examine the influence of counselling.

In the pre-intervention period only 33% of the infective cases were followed properly. In contrast, in the post-intervention period all of the infective cases were followed according to the protocol for 6 months and the findings were properly documented. The results show that there was no serological conversion in the post-intervention period. Studies by Bi et al. (2006) and Mehta et al. (2005; 2010) showed that in a small number of exposures there was no seroconversion. In a 5 year surveillance study, Marcus (1988) reported that 4 out of 963 healthcare workers were found positive for HIV on blood analysis at 180 days post exposure to HIV-infected body fluid.
6.5 Conclusions

This was the first study which examined the impact of a BBFE programme in the UAE. The pre- and post-intervention clinical audits of the BBFE programme were able to identify the strategies which were successful in improving exposure reporting, management and follow-up. The significant strategies were:

- Development of a “hospital blood and body fluid exposure protocol”;
- Corporate policy for mandatory reporting;
- Modifications in laboratory reporting; and
- Counselling and confidentiality.

The evaluation was not able to address the severity of post-exposure stress due to issues related to culture, religion, and legal impact. These features were specific to the working context of UAE and the Middle East and required examination. Therefore, a qualitative study was designed to explore these issues, which will be discussed in the following chapter.
Chapter 7: Lived experiences of healthcare providers after an exposure to HIV or hepatitis C

7.1 Introduction

The clinical audit was successful in identifying the systemic barriers to compliance with the policies and procedures of the programme but was unable to characterise the impact of culture, religion and law on participation. The hospital had a multinational workforce but the working context was significantly influenced by the culture and religion of UAE. In addition the UAE residence regulations made HIV infection a deportable disease. Therefore, it was essential to assess the impact of stigma associated with HIV, the influence of religion, and the deportation law on a healthcare provider after an exposure to blood or body fluid infected by HIV or hepatitis C.

Therefore, a qualitative study was designed to explore the responses of healthcare providers after an occupational exposure to blood or body fluid infected with HIV or hepatitis C. Chan and colleagues stressed the significance of examining this association, stating that there is “a scarcity of studies that have explored the relationship between the social stigmatisation of high-risk behaviour and fear of accidental occupational exposure from the perspectives of healthcare workers” (Chan et al., 2009, p. 355). Chan et al. (2009) studied Thai nurses’ perspectives on issues related to HIV exposure. They found that the nurses’ perceptions of the social consequences of occupational exposure to HIV greatly influenced their attitudes and behaviour towards people living with HIV infection. Their study focused on nurses speculating about what it might be like to be exposed to HIV, rather than examining the lived experience and social response to a real occupational exposure to HIV. This study was important because virtually no data exists on the experience of healthcare providers regarding such an occupational exposure (Chan & Reidpath, 2007) and because there was scant research being conducted on the prevention, management and treatment of HIV infection in UAE (Bars, 2009). Our study was the first published article from UAE reporting the lived experiences of healthcare providers after an exposure to HIV or hepatitis C (attached in Appendix 12) (Zaidi et al., 2012).
7.2 Method

A qualitative study applying an abbreviated version of grounded theory was used to explore the effect of stigma and culture on reporting by healthcare providers following occupational exposure to HIV and hepatitis C (Charmaz, 2006; Willig, 2008). Abbreviated grounded theory is an approach to grounded theory where study data is analysed “following the principles of grounded theory (i.e. the processes of coding and constant comparative analysis); [but where] theoretical sensitivity, theoretical saturation and negative case analysis can only be implemented within the texts that are being analysed” (Willig, 2008, p. 39). Such an approach was necessary in this study because (as is described below) the number of participants was insufficient for a full grounded theory investigation. Few could be recruited due to the nature of the research question (i.e. the eligible population of potential participants was very small).

Ethical approval for the study was provided by the Research and Ethics Committee of the hospital. Healthcare providers were eligible to participate in the qualitative study if they had experienced occupational exposure to HIV or hepatitis C. During the 2 years of the interventional study only three healthcare providers were reported to have been exposed to HIV and 21 healthcare providers as having been exposed to hepatitis C as a consequence of blood and body fluid exposure. A purposive sampling method was used, whereby all eligible participants exposed to HIV were recruited to the qualitative study. One additional participant, a surgeon, who had been exposed to hepatitis C, was selected to be a part of the study so that we could compare his experience of the threat to his right to perform surgery in UAE arising from a possible infection with hepatitis C to similar threats experienced by the healthcare providers exposed to HIV.

Data collection involved semi-structured interviews (Boyce & Neale, 2006; Payne, 1999) conducted with the participants on the hospital campus within the first 3 days of the exposure. The interview questions were kept open-ended to facilitate an interactive approach (attached in Appendix 7) (Strauss & Corbin, 1998). I designed the interview schedule and included questions regarding the participants’ perspectives on the factors and events that contributed to their blood and body fluid exposure; the impact of prior knowledge (or lack thereof) of the patients’ infectious status on their activities leading up to the blood and body fluid exposure; their reaction to the blood and body fluid exposure in terms of their thoughts and feelings; their behavioural response in terms of their actions within the hospital as well as at home and in the community following blood and body fluid exposure; and their perceptions
of the potential impact of the blood and body fluid exposure on their lives. I am trained in qualitative research methods, including in-depth and focus group interviews; I conducted the interviews (Smith, 2003).

I was working as an occupational health physician within the hospital at the time of the study. This provided me with an “insider” perspective of the world of the participants and the research topic. There are advantages and disadvantages of approaching qualitative research from an insider perspective (Conneeley, 2002). It is possible for instance that the participants might have been less forthcoming with their opinions. However, it seemed in the case of this research, that the pre-existing relationship meant that the participants felt more assured that their data would be managed ethically and appropriately, and so were more candid than perhaps they might have been with an “outsider” researcher who they did not know. Having “insider status” also contributed to my theoretical sensitivity when analysing the data. The dual roles of physician and researcher also raised ethical issues however. I was therefore very careful at all times with the participants about when I was working as a physician and when I was working as a researcher and gathering data for this study.

Informed consent was provided orally before each interview (the participants did not wish to provide written consent which would have required them to record their name). The participants were assured that the interview was for research purposes, and that their data would be treated as confidential and anonymous. All data for this study was stored electronically in private, password-protected computers, kept separate from all clinical records associated with the participants, and only accessible to the researchers involved in this study. The interviews were each 30-40 minutes in duration, and intentionally not audio-recorded due to the sensitivity of the subject matter. While the participants consented to have their comments written down verbatim, they did not want their voices recorded. I took in-depth notes during each interview, including verbatim quotes for particularly pertinent comments, and these notes formed the written transcripts for analysis.

The written transcripts from each interview were analysed using grounded theory methods (Charmaz, 2006). This involved coding and categorisation of data following the constant comparison approach, whereby each transcript was initially read and then coded, with subsequent rereading and coding taking into account the concepts and ideas emerging from all interviews. All transcripts were individually coded by myself and the supervisor (MZ and WL) using NVivo 8 software. Initial coding was undertaken on a line-by-line basis. The relationships between and within concepts emerging from this coding were explored with
increasingly higher levels of conceptualisation. Then the coders discussed the codes and themes and mutually agreed on the final interpretation of the data.

Several strategies were employed to ensure the credibility and trustworthiness of the emerging theory. The researchers undertook independent coding of the interview data before comparing findings to ensure that the themes highlighted in the analysis did in fact arise out of the data instead of being imposed on it. Opportunities for the field researcher (MZ) to debrief with the other researcher were sought in order to check the other researcher’s understandings and interpretations of the data. Negative case analysis was used within individual cases to challenge and enrich the themes and concepts which arose from the data. Finally, extracts from the data are presented to support the findings described below.

7.3 Findings

The exposure to infection was viewed by the participants as threatening every aspect of their lives: their health, their standing in society and among peers, their family life, their professional life and employment, and their residence in the country. The five main themes arose from analysis of the interview data that reflected the participants’ thoughts and experiences. These were labelled 1) experiencing the unexpected, 2) inevitability and finality, 3) impact of stigma, 4) responsibility and risk, and 5) legal and financial implications. Each of these is discussed below along with extracts from the interview transcripts.

7.3.1 Participant characteristics

The participants comprised two males and two females, from medical, nursing and allied healthcare provider backgrounds. All four of the participants were expatriates: three from Asian countries, and one from Europe. They had been working in their respective fields for more than 5 years. The events resulting in blood and body fluid exposure for these participants were needlestick injuries and blood splashes.

7.3.2 Experiencing the unexpected

The healthcare providers participating in this study were clearly aware that blood and body fluid exposure was an occupational hazard of their work, and took this risk seriously,
but nevertheless, when exposure occurred the experience was unexpected and shocking. The participants described having performed the same procedures many times without any exposure or concern; knowledge of the patient’s disease status also tended to make them more cautious. In the case of one of the healthcare providers, a whole surgical procedure involving a patient known to have HIV had been successfully completed before he pricked himself with the suture needle finishing up.

“I don’t know how I got pricked. I just can’t believe it; I was so cautious throughout the surgery.” (HCP A)

The other participants also reported shock and surprise about their sudden exposure to infection. Indeed, the hospital had an infection control policy which the staff had followed appropriately. Some of the participants described having been particularly cautious prior to exposure, either because of the patient’s known infectious status or because of factors that made the situation appear more risky, i.e. an irritable, severely injured or bleeding patient where the chances of exposure to blood and body fluid are higher than in normal healthcare activities.

“I was not distracted; I was more cautious than ever. But I had this bad feeling that this will go wrong.” (HCP A)

“This accident was totally unexpected … how could I even think that the instrument would slip from my hand and the sample would be splashed onto my face… I never thought that this could happen.” (HCP B)

The Emergency Room was described as being one of the most vulnerable locations for exposure as work in this environment was stressful and occasionally events needed to occur without significant prior planning. Patients were also described as more likely to behave in an unpredictable manner in the Emergency Room. One participant for instance was expecting to be pushed or kicked by the patient, and so was being particularly attentive to the potential for needlestick injury. However, she was splashed with blood when her patient unexpectedly pulled on his intravenous line.
“In this case I was just drawing blood and did not expect that he would remove the IV line and I would get a splash of blood.” (HCP C)

The participants’ first reaction to these unexpected events was surprise followed by feelings of anger or incredulity at being the subject of what was felt to be an unfair or undeserved outcome. All of the participants wondered why they had been the one who had become exposed.

“Nobody in the laboratory has been exposed. Why only me? … never had a needlestick injury. Why did I get exposed to infected blood?” (HCP B)

These emotional responses to blood and body fluid exposure, which are discussed in more detail below, thus appeared to both reflect and reinforce the stigma that the participants perceived to be associated with the disease.

7.3.3 Inevitability and finality

The emotional impact of an exposure from a patient known to have HIV was so significant that some of the healthcare providers described feeling as if they had lost everything, even before the outcome of exposure could be determined. The healthcare providers experienced many adverse psychological feelings, such as nervousness, anxiety, and depression following exposure.

“My partner [a co-worker] had seen this [the exposure], he took over, I immediately went out and took off my gloves hoping it did not reach the skin but when I saw the blood … it was over. [Here the participant took a deep breath, shaking his head, and stopped speaking for a while].” (HCP A)
Through his use of the words “it was over” and his body language this participant expressed a sense of finality: an irreversible ending, not just regarding the surgery, but also his career and lifestyle. Later in the interview, this participant stated:

“What could I do? There was nothing left to do... it was like the world came to a sudden end.” (HCP A)

Other participants also expressed similar intense emotions associated with blood and body fluid exposure and a similar sense of finality despite, of course, the consequences of their exposure not yet being fully known. One female participant described how her experience of blood and body fluid exposure had affected not only her career, but also her home life, her relationships, and her whole worldview. These were changes which were perceived to be irrevocable, contributing to this sense of finality.

“What do you mean impact? This event has changed everything for me: my confidence, my view of life and relationship with my family and colleagues...If I would’ve wore it [a face mask] I would not have been exposed and not going through this traumatic experience. It cannot be changed.” (HCP B)

Knowledge of the infectious status of the source of exposure contributed further to a feeling of impending disaster. This knowledge appeared to play an important role in the participants’ immediate reaction to exposure and to their sense of loss or irreversibility of the event.

“The sample was rechecked and it’s positive. They are all saying nothing would happen and I have been transferred from that section now but... now it’s too late.” (HCP B)

“It’s amazing how a single event can change one’s life.” (HCP C)

Interestingly, in contrast to reports of shock and surprise upon being exposed to infection, the participants equally expressed a strong sense of the inevitability of their
exposure. This sense of inevitability was closely related to the experience of finality: that an event had occurred which could not be changed.

“But there was no way that I could have prevented it. Some things are just meant to happen.” (HCP D)

“I think there will always be the chance of getting pricked during surgery or while performing procedures. Especially the chances of prick increase when you are working under stress and in the chaotic environment of the ER.” (HCP B)

### 7.3.4 Impact of stigma

While many events have an impact on the course of one’s life, some events have a more serious impact than others. Similarly many diseases can influence our health and social activities, but diseases which have an associated stigma can have a more serious impact. Two of the three individuals who were exposed to HIV-infected blood expressed far more concern about the cultural impact of the disease than the physical or biological consequences.

“You can understand the stigma attached to it, and who would believe that it had [occurred as a result of] a needlestick injury, and [there will be] those who will/would say it's still my fault when I knew that the patient was HIV-positive [so] why didn't I take precautions? It was entirely my fault.” (HCP A)

“I do not want to get HIV or AIDS. A girl getting this disease! Do you understand what that will mean? Everyone will start talking. Not just me, my family will be ruined. Our entire family lives in this country. If the disease won’t, the gossip will kill me.” (HCP B)

These quotes provide an indication of the social pressure the participants were under and the kinds of problems they believed they were likely to face. They were not only concerned for themselves but also about the possibility that their family name would be marred.
“This is not a simple disease like cancer. It has a stigma to it. You need to live but you live with people. This disease is more a social problem to me than the health concern. If it would be hepatitis B or C or cancer only I would die but in this my whole family will be ruined. Everyone will see them like they have done something wrong ... and my whole family is terrified.” (HCP B)

The stigma of infection was so strong that these two participants feared their lives were utterly ruined. Even prophylactic treatment for possible exposure to HIV was stigmatising.

“I can still remember the look on the face of the pharmacist when she was giving me the HIV medication, like I had HIV already. My God it's hard to live.” (HCP A)

It was evident from healthcare provider A’s interview that he felt he would be judged negatively by others were he to contract HIV because of the stigma associated with the disease. HIV was linked to social and sexual activities that healthcare provider A believed to be forbidden by his religion, and he therefore would become associated with these activities and lifestyles were he to contract HIV, regardless of the method of transmission of the disease. Consequentially he feared he was at risk of being barred from his usual religious activities, and as a result contracting HIV was considered “worse than dying”.

“I was thinking if people knew that I have HIV would they like to pray with me ... You cannot feel what I am going through these days. It's worse than dying. Because I am alive and do not know what will happen.” (HCP A)

Furthermore, healthcare provider A had been unable to face informing his family. Nevertheless, due to his possible exposure to HIV, healthcare provider A had significantly restricted his relationships with his wife and his children. This was a burden he felt unable to share, so he suffered in silence.

“I just did not have the courage to tell her [my wife]. She asked me why I was so quiet and taking this medication. I told her this is a precaution that I am taking like a vaccine.
She is thinking something is wrong but she does not know what is wrong. I just can’t tell her ... I am not having any close contact with my wife till I know what my fate is. I am not even kissing my kids either. I cannot tell them and I cannot go near them. God this should not happen with anyone.” (HCP A)

For other participants however, the social stigma associated with HIV was less feared. For example, healthcare provider C was less concerned about the impact of infection on her religion and relationships. This seemed to be because healthcare provider C considered her home country to be relatively understanding about the possible mechanisms by which someone could become exposed to HIV. Nevertheless, the stigma of HIV was still considered significant enough to affect her future employability, and therefore of concern from an economic perspective.

“The disease is known to have sexual transmission as a way of getting it, but I think people are aware of the occupational link and home is different than this place. I do not see religion being involved in it. But getting a job as a nurse with HIV will not be possible. I do not think any hospital will take me. So I am more concerned of the social and financial aspect, but I am hopeful it will all be OK.” (HCP C)

Healthcare provider D, who was exposed to hepatitis C rather than HIV, expressed similar concern regarding the impact of stigma associated with infectious disease on his future employment. He expressed frustration about the influence of political and religious views on what he viewed to be entirely a clinical issue.

“I am a surgeon, not a politician. I do not think science and politics should be mixed. Disease is a disease: it should not be stigmatised or politicised. Whatever evidence-based medicine has proved, we should follow, and to my knowledge in Europe surgeons with hepatitis C can still practice.” (HCP D)
The range of beliefs expressed by the participants regarding the stigma of these infectious diseases demonstrated how different cultures can influence priorities and perspectives, and how these can have an impact on quality of life.

7.3.5 Responsibility and risk

The participants' stories of blood and body fluid exposure highlighted a tension between responsibility and risk – responsibility to provide care according to one's professional calling and risk of coming to harm as a result. The ethics of balancing responsibility with risk became more complex when the burden of risk was not perceived as being equally shared by the clinical team. In healthcare provider A's case, a colleague responsible for a surgical procedure had not reported in for work on a day when a patient, known to have HIV, was scheduled for surgery. Healthcare provider A stated that he therefore felt as if he was then in a situation of having to choose whether or not to take responsibility (and thus taking the "risk") for the operation.

"I had to decide to perform surgery or refuse and I decided it's my professional responsibility to perform the surgery. All was going well; all of us were very careful and the surgery went well. It was just at the end that when I was stitching that my hand slipped and the finger got pricked." (HCP A)

The surgeon in this case took the responsibility for undertaking the surgery which he could have refused. Events like this made the participants question the risks they had been previously prepared to take. Thus, the participants came to question their continued involvement in their profession. However most, once they had time to accept that exposure had occurred, moved from anger onto feeling that the risk was worth the professional satisfaction they achieved by serving others.

"At times I do think of changing my profession. In our profession we will always be exposed to these diseases. If not HIV, something else, but this is the worst – it just does not kill you, it brings shame for you and your family in our society." (HCP B)
"I do think at times that this could happen again, why not change the profession? But then there are so many nurses which work all their life and nothing happens to them." (HCP C)

7.3.6 Legal and financial implications

Every country has a legal system which has to be respected and followed. In the Middle East and most of the Gulf countries there are a few diseases which are deportable, including HIV and hepatitis B. These two diseases are significant for the healthcare community because they can be transmitted to the healthcare provider while they are performing their duties. Surgeons are also not allowed to continue to operate if infected with hepatitis C; hence all four people involved in this study faced possible legal implications in terms of their employment, residency in UAE, or both. Of note in this study, those participants who were from communities where HIV was stigmatised tended to be more concerned about the cultural consequences of the disease rather than the legal or financial consequences.

"At present I am not thinking of where to stay. My priority is what is going to happen with me and what will my future be. Will I live or die with such a stigma. I don’t care where I would live. Does it make a difference?" (HCP A)

In comparison, those individuals who perceived their cultural communities to be less judgmental about HIV were far more concerned with the legal and financial impact of the disease.

"I will be deported and the treatment is too expensive at home. I will lose my job and get a disease which is very expensive to be treated." (HCP C)

"This kind of stress is horrible when I am performing my duty. I do not ask if the patient has any of these diseases and if it does would I not treat it; then how can I lose everything if I get it as a result of my occupational exposure." (HCP D)

In addition to the legal and medical consequences of infection, the participants were also very concerned about the financial aspect of a diagnosis of HIV or hepatitis. The
participants were aware that if they became HIV-positive they would lose their job at the hospital and residence in the country which would then influence their economic status. Furthermore, it would be hard to find another job in the healthcare industry.

"I am stressed because if I seroconvert I could lose my rights to practice surgery and the job. At this stage in my professional life it’s not that easy to go back and establish your practice. As far as family life is concerned I do not see any problem." (HCP D)

All of the participants stated that they believed both the cultural and legal impact (and thus the secondary impact on their financial status) would be considerably different if they had acquired an infection via blood and body fluid exposure in another country. The participants believed that in Western countries healthcare providers are insured by the state for such occupational exposures and in most cases the exposed individual would still retain a job in the same or in a different capacity, with treatment being provided by the hospital. All of the participants in the study were expatriates and had worked in other countries. One of the healthcare providers said:

"If this would have happened there [in Europe] my concerns would be totally different. I would be thinking of my health, not my financial future. The latter would be protected and I would still be allowed to perform surgery. That is a fear you have to live with when you are practicing in this part of the world because the rules are so that if something happens to you, you are sent home without any insurance or treatment.” (HCP D)

"Definitely if something had gone wrong I would be insured, they would be responsible for my treatment and keeping me employed: it would be totally different. I have read of nurses who got a disease after occupational exposure; they were given full treatment and were cared for along with ensuring their employment.” (HCP C)

Therefore it was very evident that an occupational exposure to these diseases could potentially have very significant legal and financial implications for the participants involved.
7.4 Discussion

An important finding in our study was that all four of the exposed healthcare providers reported the incident immediately afterwards, demonstrating that they were aware of the importance of early reporting and treatment.

Only one healthcare provider thought that her exposure could have been prevented. This event changed her practice; she started to wear a face shield while working in the laboratory. The other three healthcare providers however were certain that they had taken all protective measures possible and that these types of incidents were an inevitable part of their job. Healthcare providers in China (Lin et al., 2008), India (Mehta et al., 2005), Thailand (Chan et al., 2009), and South Africa (Ncama & Uys, 2003) have also expressed similar beliefs that needlestick injuries and other blood and body fluid exposures are a sometimes unavoidable risk that healthcare providers have to take – a risk that can be ameliorated but not removed entirely from their work. The dilemma for healthcare providers is therefore whether to choose to place the patients’ wellbeing and interests before their own (i.e. an altruistic response) or to place their own safety before the clinical needs of the patient (i.e. an avoidance response) (Chan et al., 2009). In our study, when the healthcare providers were faced with the question of treating people with HIV infection or avoiding treating them, they opted to treat. In this regard, our findings were similar to the study reported by Chan et al. (2009). However, this finding is in contrast to some other studies where healthcare providers were suggested to have avoidant attitudes towards people with HIV infection (Chan et al., 2008; Chan & Reidpath, 2007).

For our study participants, exposure was followed by a strong emotional response. The first thought which came to the participants’ minds was that they had suffered a dreadful and irreversible event. Our findings were in concordance with those of Lin and colleagues who reported that healthcare providers experienced adverse psychological consequences after an exposure to HIV including nervousness, desperation, and anxiety (Lin et al., 2008). Similarly, Kennedy and colleagues showed that 35% of healthcare providers reported that they had moderate or significant anxiety after blood and body fluid exposure (Kennedy et al., 2009). Ncama and Uys likewise described healthcare providers in South Africa as experiencing shock, confusion and apprehension after such occupational exposure (Ncama & Uys, 2003). Nurses in a study conducted in South Africa reported to fear acquiring HIV when they treat a person with HIV infection, even without experiencing actual blood and body fluid exposure (Ncama & Uys, 2003).
The most important concerns for the healthcare providers in our study were related to the social implications (i.e. stigma, legal and financial penalties etc.) rather than the biological consequences of the disease. It was evident from the case studies that stigma played a significant role in stress after body fluid exposure. Weiss and colleagues defined health-related stigma as “a social process, experienced or anticipated, characterized by exclusion, rejection, blame or devaluation that results from experience, perception or reasonable anticipation of an adverse social judgment about a person or group” (Weiss et al., 2006, p. 280). Goffman (1963) referred to stigma as “an attribute that is deeply discrediting” (p. 3). This was exactly what the participants felt that the exposure to HIV’s influence on their lives and those of their families could be like. All of the participants were healthcare providers and had a respectable position in the society because their “actual social identity” was closely related to the “virtual social identity” that their society had preconceived for them. Sustaining an HIV infection was considered, by the participants, as a “deeply discrediting attribute”, and more so if their personal infection status became public knowledge.

The healthcare providers experienced stress responses because they anticipated that they would not be able to cope with the societal consequences of acquiring an HIV-infected status, should this eventuate. They showed three forms of stigma, as characterised by Goffman (1963): felt stigma, courtesy stigma and enacted stigma. According to Goffman’s (1963) model, these experiences were likely to be due to the healthcare providers’ prior societal experience. Goffman (1963) proposed that when an individual faces or acquires an attribute that is stigmatising in the later stages of their life, they are likely to develop self-disapproval. “Such an individual has thoroughly learned about the normal and the stigmatized long before he must see himself as deficient. Presumably he (sic) will have a special problem in redefining himself, and a special likelihood of developing disapproval of self” (Goffman, 1963, p. 34). This was particularly evident in the participants’ reported feeling that their ability to take part in communal activities would be impeded (felt stigma) and their feeling that the negative impact of this disease would not be limited just to them, but also that their family would be ostracised as well (courtesy stigma, stigma by association). Both felt stigma and courtesy stigma were a response from the individuals to protect themselves and their families from the possibility of enacted stigma. Enacted stigma is the discrimination which takes place at the institutional level (hospital, workplace, and school) when individuals are denied access to services or are exposed to discrimination within personal interaction. Yang et al. (2005) reported that discrimination is still the major cause of stigma preventing people
with HIV infection from access to healthcare, even when strong legislative protection is present.

Stigma and peer pressure related to HIV were factors which influenced a healthcare provider's reaction to blood and body fluid exposure (Genberg et al., 2009). Similarly, the Thai nurses in Chan and colleagues' study reported that fear of acquiring HIV through occupational exposure was associated primarily with the anticipated social rejection arising from the disease (Chan et al., 2009). Lin et al. (2008) reported that healthcare providers had four main concerns after blood and body fluid exposure: family, support from the employing institution, future career, and societal discrimination. Laws governing residence in the country were identified as an influencing factor because they affected the continuity of employment and the ability to reside in the country, and hence could be seen to affect the healthcare provider's decision to report a suspicious exposure.

Our study suggests that blood and body fluid exposure reporting is not merely an organisational issue – it needs to be addressed at a societal level. Public awareness campaigns and advocacy are required to increase awareness of different modes by which HIV can be transmitted and the availability of post-exposure treatment. Others have also highlighted the importance of reducing stigma associated with HIV as a means of reducing the psychological stress experienced by exposed healthcare providers (Lin et al., 2008). The issue of HIV prevention and stigma is complex in Muslim countries and requires a multifaceted approach that is sensitive to cultural norms (Hasnain, 2005).

**LIMITATIONS**

One limitation of our study was the small sample size, which may have restricted the generalisability of the study findings; however that was not the intention of the study. Moreover, the study's sample size reflects the low number of healthcare providers being exposed to HIV, with only three reported occupational exposures to HIV in the hospital during the 2-year period of the study. Another limitation could be that I had dual roles as the principal investigator for this study and as the occupational health physician for the hospital in which the study was conducted. It was possible that healthcare providers would not openly discuss the events which led to the exposure or the post-exposure stress to avoid documentation of their feelings on the sensitive issue of exposures to HIV-infected blood. To counter this feeling I showed them the approval of the study from the SKMC Ethics Committee and assured them that the interview was for research purposes only and their
identity would be kept confidential. Fortunately because I had worked in the hospital for a few years the healthcare providers trusted me and shared their views to help me in my research leading to a PhD.

Another possible criticism of this study might be that we relied on hand-written notes to record data from participant interviews rather than transcripts of audio-recordings. This could be perceived as undermining the trustworthiness of the data. However, it should be noted that not all qualitative researchers require interview data to be audio-recorded. Glaser, for instance, one of the two co-creators of grounded theory methods, is reported to advocate against audio-recording interviews, with the suggestion that “if you have a lot of detail, that just interrupts your thinking, and you can get side-tracked and derailed” (Puddephatt, 2006, p. 8). While this was not the reason why we chose to avoid using recording devices for this study (participant preference was the primary reason), it is certainly true that at least some leading qualitative researchers believe credible qualitative research is not dependent on the use of audio-recorders to collect data.

The strength of the study was that we were able to interview all three healthcare providers exposed to HIV, providing data on an otherwise seldom discussed experience. Given the sensitive nature of this topic, any data on the views of healthcare providers who find themselves in this position is valuable and can be learnt from.

7.5 Conclusion

This study has shown that, due to cultural and religious differences, individuals exposed to the same disease in the same legal system can have different concerns. Stigma attached to HIV exists in all societies, although it is perhaps more pronounced in the Middle East and so, even if an infection results from occupational exposure, the healthcare providers may be shunned (or feel at risk of being shunned) by their community.

These were real concerns of real people which need to be addressed in future interventions, training sessions and advocacy campaigns at the hospital and national level in the UAE. The medical, personal and social consequences of blood and body fluid exposure is not just an organisational issue, but needs to also be addressed at a societal level if the protection of healthcare providers, who cannot ethically avoid placing themselves at risk of
exposure, is to be fully implemented. More in-depth research is required, particularly in the Middle East, to explore the mechanisms and factors influencing cultural pressures on healthcare providers.
Chapter 8: Perspectives of healthcare providers on stigma, culture and law after occupational exposure to HIV and hepatitis C: A cross-cultural comparison

8.1 Introduction

To determine the characteristics of an effective blood and body fluid exposure programme responsive to the specific work context of a multinational emerging hospital in UAE it was essential to appreciate and understand the influence of culture, religion, and the legal system on the working environment. The study outlined in chapter 7, involving healthcare providers who had experienced occupational exposure involving infected body fluids, demonstrated that healthcare providers working in the same medical and legal system had different concerns, and severity of stress seemed to be related to the perceived stigma associated with HIV. The study highlighted the importance of social factors (i.e. stigma, legal consequences, and financial costs) compared to the biological consequences of the disease. The findings suggested that for an occupational exposure programme to be effective in the UAE, it would have to address these concerns to win the trust of the healthcare providers.

This chapter will describe the findings of a second qualitative study which further examined the attitudes and possible behaviours of healthcare providers regarding blood and body fluid exposure involving HIV and how these were influenced by social, cultural and political factors. To do this I undertook a cross-cultural comparison of the beliefs and perspectives of healthcare providers working in two different countries: UAE and NZ. Also for the purpose of comparison, we explored the beliefs and perspectives of these healthcare providers regarding a second disease transferable by occupational exposure to body fluid that was comparable from a medical perspective, but which we assumed would be less stigmatised: hepatitis C.

UAE and NZ were selected for this comparison because both countries are reported to have a broadly similar incidence of HIV. UAE had 49 cases in 2009 (in UAE Nationals) and NZ had approximately 184 cases in 2008 (UAE, 2010; Hughes & Saxton, 2009; “HIV and AIDS In New Zealand,” 2009). Regarding prevalence of hepatitis C in both countries, UAE had 479 cases in one of UAE’s seven emirates while in NZ there was estimated to be 50,000
cases (Disease Statistics, 2012; Hep C Resources Centre, 2010). The two countries have roughly comparable sized populations: UAE has 8.2 million people while NZ has 4.4 million ("Dubai Information Site," 2010; Statistics New Zealand, 2012; UAE Interact, 2011).

There are a few important differences between the two countries. Immigrant healthcare providers working in NZ have the option of eventually becoming citizens, whereas those working in UAE permanently remain as expatriates and are required to complete a medical examination every 3 years to maintain their work visa. The second difference is that NZ allows a limited number of refugees with HIV infection to be admitted to the country each year, and allows people with HIV infection to become permanent residents if they are otherwise eligible (Immigration New Zealand, 2012). In comparison UAE does not allow individuals with HIV to become a resident of their country.

The UAE is a Muslim state and its official national language is Arabic, although English is widely spoken and understood (National Media Council, 2009). The majority of the inhabitants are Muslims and they share similar cultural beliefs. Individuals from the Arab countries and South Asian countries such as Pakistan and India form the majority of the population. These communities share a lot of values and traditions which form their unwritten social values system. With thousands of years of history and rich cultural heritage the community has a fixed set of ideas on many issues. The ones important to our study were those related to HIV infection and hepatitis.

NZ has a population of 4.4 million people (Statistics New Zealand, 2012). English, Māori, and New Zealand Sign Language are recognised as official languages. The largest religious denominations are Christian (Anglican, Catholic, and Presbyterian), whereas 1/3 of the population is not affiliated with any religion (Statistics New Zealand, 2012). NZ is a multicultural country; the population is mostly composed of people of European descent (67.6%) and Māori, the indigenous group (14.6%) (Statistics New Zealand, 2012). Most of the social norms are influenced by European culture, with some aspects of Māori beliefs and practices crossing into mainstream culture. Hence UAE and NZ have many similarities including: a multicultural population, having very low prevalence of HIV, low prevalence of hepatitis C, having a health workforce comprising a significant number of internationally trained healthcare providers, but having two very distinct prevailing cultures and religious denominations. This gave us an opportunity to explore the impact of HIV's stigma in these two cultures.
This study was important for two reasons. Firstly, there is scant research being published on the prevention, management and treatment of occupational exposure to HIV in UAE and NZ (Barss, 2009). Secondly, this is the first study to our knowledge which has undertaken a cross-cultural comparison of relationships between the socio-political context of healthcare work, the attitudes of healthcare providers to risk of occupational exposure to HIV, and the subsequent influence on management of blood and body fluid exposure in hospital settings.

8.2 Method

8.2.1 Research design

This study employed constructivist grounded theory (Charmaz, 2006) to explore the beliefs and perspectives of healthcare providers regarding the effect of stigma, culture, and law on the reporting and experience of hypothetical occupational exposure to HIV or hepatitis C. Participants were recruited from hospitals in both UAE and NZ in order to compare the beliefs and experiences across these two countries. Ethical approval for the study was provided by both a Regional Ethics Committee in NZ (attached in Appendix 8) and a Research and Ethics Committee at the hospital in UAE in which the study was conducted.

8.2.2 Participant selection and recruitment

Participants were included in the study if they were either a doctor or a nurse who was actively involved in treating patients and if they had more than 5 years’ work experience. Purposeful sampling was used to select participants to ensure that the study groups in both countries included men and women, people from different cultural and ethnic backgrounds, and representatives from both medical and nursing professions. The purposeful sampling strategy was designed to characterise the perspectives of individuals from a range of different backgrounds to help understand their worldviews. The aim was to examine the role of HIV stigma across different cultures and ethnicities, and the influence of law regulating blood and body fluid exposure reporting and post-exposure consequences in these two countries. Purposive sampling was selected because it was fundamental to the quality of the study to gather data from an informed and representative group of participants (Tongco, 2007). A limitation of using this purposeful sampling method is that the results could not be generalised as it was not a representative sample, but it was not the intention of the study to generalise the
results. Written consent was obtained prior to data collection from all participants in NZ and verbal consent was taken and recorded from all those who were interviewed in UAE (sample of information and consent form attached in Appendix 9).

8.2.3 Data collection

Data collection primarily involved a semi-structured interview (sample questionnaire attached in Appendix 10), either in person (for NZ participants) or by videoconference (for UAE participants) (Boyce & Neale, 2006; Payne, 1999). Individual interviews were conducted for 45-60 minutes at the location convenient for the NZ participants and by videoconference for UAE participants. All interviews, except three (see below), were recorded and transcribed verbatim. The interview questions were kept open-ended to facilitate an interactive approach (Strauss & Corbin, 1998). An iterative approach was taken in the selection of interview topics, with analysis of initial data influencing the choice of questions in subsequent interviews. The interviews included questions related to blood and body fluid exposure. A scenario was provided in which the participants were to imagine that they had been exposed to blood of a patient positive for HIV and a series of questions were asked to assess their perspectives regarding their possible emotional response and the factors contributing to their subsequent thoughts and actions. By way of comparison, the participants were asked similar questions involving a hypothetical scenario where the exposure involved blood infected by hepatitis C rather than HIV. The interview explored their perceptions related to post-exposure stress – what would be the first thing that comes to mind; their primary concern; what would they do; would they report; the value of counselling; perceived stigma of HIV; the role of stigma in post-exposure stress – and then compared the emotional and physical responses to a similar scenario where the exposure is to hepatitis C instead of HIV.

The participants were assured that the interview was for research purposes, that their data would be treated as confidential, their names would be replaced by pseudonyms and all other forms of identifying data would be removed from the interview transcripts. Three nurses from UAE however declined to participate in a recorded interview due to the sensitivity of the information being requested. Instead these participants offered to provide anonymous written responses to the interview questions, and these data were treated in the same way as interview data for the purposes of analysis.
8.2.4 Data analysis

Data collection and data analysis occurred concurrently. Coding and categorisation of data followed the constant comparative method of grounded theory (Charmaz, 2006). All transcripts were individually coded by myself and a supervisor (MZ and WL), with NVivo 8 software used to assist with data management. Initial coding was undertaken on a line-by-line basis. The relationships between and within concepts emerging from this coding were explored with increasingly higher levels of conceptualisation. Discussion of the findings within the research team after sets of interviews as well as negative case analysis – the purposeful exploration of “instances that do not fit the emerging model” (Morse & Richards, 2002) – were used to establish the credibility and trustworthiness of the emerging theory. The final results from this analysis are presented below with extracts from the interviews to illustrate the key findings.

8.3 Findings

8.3.1 Participant characteristics

Two groups of 12 healthcare providers from UAE and NZ participated in this study (24 participants in total). Each group comprised six physicians and six nurses. Fourteen of the participants were male (12 physicians and 2 nurses) and 10 female (all nurses). All of the participants from UAE were expatriates from the following countries: Canada (three), India (two), NZ (one), Pakistan (one), Palestine (one), UK (three), and USA (one). The participants from NZ were all citizens of NZ, and were trained in the following countries: five from South Africa, two from NZ, two from Ireland, and one each from India, Sir Lanka and Germany. All participants had been living and working in their respective countries for at least 5 years. Overseas-trained professionals account for 41.5% of NZ’s total healthcare workforce, according to the 2011 Medical Council survey (Cullen & Whiteford, 2011).

8.3.2 Overview of findings

The two groups of healthcare providers had many similar views regarding blood and body fluid exposure involving HIV or hepatitis C. They appreciated that hepatitis C had a 10-fold higher transmission rate compared to HIV after an exposure and knew that a post-exposure prophylactic existed for HIV but not for hepatitis C. Nevertheless, the majority of
the participants reported that HIV was of much more personal concern due to the non-biological consequences of the disease, such as the social or cultural impact. The two groups differed however regarding their perceptions of stigma associated with HIV in their country of residence and regarding their views on the probable impact of such an infection on their ongoing employment and residency status. The substantive theory which emerged from this research explained how the socio-political context of healthcare work and perception of disease-related stigma could influence the thoughts and behaviour of healthcare providers (including reporting behaviour) regarding occupational exposure to HIV. There were six main themes emerging from the interviews on which this substantive theory was based: 1) principal concerns and stress, 2) trust in the system, 3) fear of the unknown, 4) the impact of stigma, 5) social acceptance or denial, and 6) medical and financial impact.

8.3.3 Principal concerns and stress

The participants in both UAE and NZ unanimously agreed that the principal concern would be their health. Health was given primary importance because if the blood and body fluid exposure did not result in actual infection there would be no secondary consequences to worry about. Similarly, if they were to become HIV-positive they thought that their response would depend on the impact of the infection on their physical health.

“I suppose my own health being very selfish, but yes certainly looking at protecting both family and people you’re dealing with, any patients.” (Dr. 3, NZ)

“First of all [my concern] would be my own life.” (Mr. 2, UAE)

A few healthcare providers however voiced concerns about the social consequences associated with HIV in addition to biological ones.

“I think that illness as such would be the most important one, and especially other people knowing about it because of the stigma associated with it.” (Dr. 4, UAE)

Concerns for personal health were followed in the majority of the responses by concerns regarding the social impact on family members; this was one instance where the participants
in UAE felt that stigma and social issues would be a significant additional cause of stress. On the other hand, participants in NZ were concerned more about the risk of family members becoming infected and the financial impact on their family.

"I suppose my first thought would be what if I did contract HIV and then my thoughts would be for future health, like I've got a daughter and I wouldn't want to die and have her being left alone." (Ms. 3, NZ)

"I would be concerned about my family. I would probably take extra precautions in protecting my family because they would be the first on my mind." (Ms. 1, UAE)

"Family first; I always put my family first. Then you would have to think about ability to earn an income to support that family." (Dr. 1, NZ)

The impact on practicing privileges was reported to be third in this sequence of concerns, with this being raised as a consideration in 10 out of the 24 interviews. Practitioners in both UAE and NZ were concerned about this possible consequence.

"The primary concern would be the risk that I would get HIV and therefore the restrictions that would be put on me in terms of my practice." (Dr. 4, NZ)

Healthcare providers in UAE knew that if they did seroconvert to HIV-positive they would be required by law to leave UAE. This, of course, was a major difference between the two groups: in NZ such termination of residence would occur due to the healthcare providers having citizenship status. However this possible end to residency was not an immediate concern for the healthcare providers in UAE as, from their perspective, they had accepted that limitation on their residential status when they began work in the country. Consequences for physical health and social reactions due to stigma were far more concerning than loss of residency in UAE.

"For me it is the stigma to HIV more than deportation." (Dr. 6, UAE)

"Personally you ask me this question, I would be much more concerned about the disease, I would not really care about whatever their policy is." (Dr. 2, UAE)
Nevertheless, the majority of healthcare providers from both countries perceived that the stress associated with occupational exposure to HIV would be moderate to high.

“I don’t think anything in my life would have caused this much stress than having a needlestick injury from an HIV patient.” (Mr. 3, UAE)

“Ultimate terror I suppose really. At least for a short time until you got yourself under control, talked to the local infectious diseases specialist, looked at the real risks of actually having contracted the disease. The official jargon would be concern.” (Dr. 1, NZ)

By comparison, the healthcare providers felt that they would experience less stress after BBFE to a source infected with hepatitis C. This opinion however was not universal. One physician in UAE and two in NZ felt that they would not be highly concerned because the available evidence shows that the chance of getting HIV following such exposure is very low. They argued that they would be more concerned if they had a BBFE involving blood infected with hepatitis C, because the transmission risk of hepatitis C is 10-fold higher compared to HIV.

“So getting HIV is not of much immediate concern. Hepatitis C would be more likely to be transferred than HIV but the implication of the diagnosis is less, so the risk is higher but the consequences are lower.” (Dr. 4, NZ)

When speculating about the possible impact of HIV infection on their colleagues, it was suggested by some interview participants in UAE that the risks and consequences might be higher for younger, female healthcare providers in comparison to older, male healthcare providers. It was felt that these healthcare providers would therefore be under more stress in case of an exposure.

“I mean if somebody was 55 plus [there would be] probably not very much [gender difference in terms of stress, but...] at 25 you’re looking forward to a very prosperous
social and domestic life especially if you have worked hard to become a physician or a nurse and at that point there is a threat that can ruin all that, the stress levels are going to be hugely excessive.” (Dr. 3, UAE)

Others however disputed that there would be any difference in terms of stress associated with such an exposure in terms of gender; gender or age differences were not considered significant in the interviews with NZ participants.

“I think she would be concerned about the social stigma. I think social stigma would probably be the same.” (Dr. 6, UAE)

Hence healthcare providers in both countries perceived that stigma was associated with HIV, although the stress due to this association was much more evident in the group of respondents in UAE. The difference in legal and administrative conditions in UAE compared to NZ was not immediately perceived as a major concern from the perspective of the expected experience of stress.

8.3.4 Trust in the system

One of the major differences between the UAE and NZ participants regarding their attitudes towards HIV-related BBFE was a consequence of their status as expatriates versus citizens of the countries they resided in, and the legal requirements surrounding their residential status. While if the NZ participants were to seroconvert to HIV-positive as a result of occupational BBFE, they would receive ongoing state-funded health and financial support, the participants working in UAE would receive no such support beyond prophylactic treatment and would be required to leave UAE if they seroconvert.

Alternatively if the UAE participants chose not to report a BBFE involving HIV-positive blood, they would potentially lose the chance to get prophylactic treatment that might prevent a seroconversion. In fact for this reason, all of those interviewed in UAE stated that they would in all likelihood opt to immediately report a BBFE involving HIV-positive blood and follow the hospital policy.
“Yes I think within the hour, as soon as possible.” (Dr. 6, UAE)

“I would report it immediately to the Infectious Disease or the Preventative Medicine Department.” (Dr. 5, UAE)

However, some of the UAE respondents expressed concern that other healthcare providers in the same position might not necessarily report the exposure due to legal concerns.

“My biggest fear would be that they (other healthcare providers) would not report it. They really would not report it. And the stress levels because of that would be huge.” (Ms. 1, UAE)

Furthermore, a few of the UAE-based healthcare providers questioned the exact benefit of reporting such an exposure if they knew it could be used against them. They felt that the system might discriminate against them in this context, and concerns were voiced that, if reporting could lead to losing a job and residence status, it would be a tough decision.

“Because if you record that and somehow you contract HIV then you get deported from here. I’m not sure, this is a difficult one.” (Mr. 2, UAE)

“... consequence of me reporting is being deported then seriously why would you report?” (Mr. 1, UAE)

The need to take post-exposure prophylactic treatment was the main reason the participants in UAE believed that they would opt to report an incident of this nature. The participants were also somewhat reassured by the belief that they would be able to continue to work as a healthcare provider in their home country, should they be forced to leave UAE.

“...I am seeing for example if you are in UK or any other country no one can say to you I’m not giving you the job, this job because you have this status”. (Dr. 3, UAE)
Interestingly, one of the healthcare providers from UAE considered the possibility that they would go to their home country for investigation and prophylactic treatment, as this would give them greatest control of identification and management of the infection, should it arise.

“I may think or maybe urgently going to my home country, and get the treatment there quickly” (Dr. 6, UAE)

By comparison, for NZ participants, if an exposure of this nature was not reported, they then risked losing all the benefits of appropriate management of the event. It was in the best interest of the healthcare providers to report the exposure immediately, and the system was trusted to protect their medical and financial interests.

“Absolutely we still have to go through the procedure; a third party takes the blood test from the patient if they consent. Another person takes my blood and it gets sent off to our own laboratory through a process, it’s through the Occupational Health. If it was a known source of any communicable diseases the duty managers are meant to be informed and the Occupation Health on-call are informed but this person had no known communicable disease, we still had to go through the process.” (Ms. 1, NZ)

“I’d probably go and see the local health – whoever the person is at the DHB Infection Control Officer, and have a full and frank discussion with him and be guided by what he said.” (Dr. 1, NZ)

“If it was a needlestick injury and I think this country’s great, you would have ACC and you would be supported for a reasonable length of time with them.” (Dr. 2, NZ)

This illustrated the impact of trust in the system on healthcare providers’ decision-making and behaviour. Healthcare providers from NZ felt fully confident that the system would protect their interests, and so were inclined to disclose an occupational exposure to HIV immediately and fully. In comparison healthcare providers from UAE did not trust that their personal interests (i.e. health, financial, and residential interests) would be protected if they reported an exposure, so were more circumspect about doing so. They knew that due to
legal restrictions in UAE, if they were to acquire an HIV infection, they would lose their job and have to leave the country. Therefore, some of the healthcare providers from UAE found such disclosure troubling, and thus considered alternatives to disclosure within the hospital, such as seeking prophylactic treatment in another country.

8.3.5 Fear of unknown: Insecurity

While exploring the emotional stages a healthcare provider would go through after a BBFE involving HIV-infected blood, the feeling of fear of the unknown consequences was commonly suggested by both UAE and NZ healthcare providers.

“People may say that they don’t have any concerns but privately I think those concerns would come through because we don’t get a lot of exposure to people who have got it.” (Dr. 2, NZ)

“No I don’t think it’s the stigma about it; I think it’s unknown.” (Ms. 1, NZ)

“Community-wise I think there’s fear and we all react to fear.” (Dr. 1, NZ)

The participants in both UAE and NZ felt that despite the international media attention on HIV, their respective communities had very little education regarding the clinical aspects of HIV. In UAE, HIV was considered primarily linked to sexual orientation and to stigmatised sexual practices such as extra-marital affairs and visiting sex workers, whereas in NZ it seemed associated almost entirely with the gay community. In fact, even the participants in this study lack confidence in their knowledge of HIV and its management (in comparison to other infectious diseases that they had worked with) and reported a feeling of anxiety associated with a scenario involving a hypothetical occupational exposure to the disease.

“I’ve worked in leper colonies and things like that and no problem. Sanitoria, TB no problem. I was running an infectious diseases unit in my earlier years, no problem. It’s just because I don’t know enough about this and I think a lot of the media as usual cause a lot of harm.” (Dr. 1, NZ)
It was suggested that if members of the general public knew that they could not contract HIV until they had an exchange of blood or body fluid, they might interact with those who have HIV in a much more accepting manner. Commenting on the reaction of the community to a healthcare provider or any individual with HIV infected by a cause other than sexual or drug-related behaviour, most of the respondents felt that there would be greater acceptance in the community.

“I would think that if one explains how it occurred there would be acceptance. But it could still be difficult for people to associate with you because of the fear of the condition and getting in contact with it.” (Dr. 2, NZ)

“For sure, in Pakistan. When you tell the people why I got it, it won’t be difficult.” (Dr. 1, UAE)

This feeling of probable acceptance was shared by healthcare providers in both the countries. However, one of the respondents suggested that the reaction of their community would be unpredictable, because they were not familiar with the disease.

“They don’t know what to do. They don’t know how to react.” (Ms. 5, NZ)

Healthcare providers thought their feeling of fear or stress would probably be greater after an exposure to HIV versus hepatitis C, because of the uncertainty in prognosis of HIV. They felt that medical science was much more familiar with the disease prognosis and complications of hepatitis C than HIV/AIDS.

“I think the reaction would be a bit less because visually I can physically see what they’re doing for people with hep. C in terms of needing liver transplants, okay it’s a bit more visual, whereas the HIV it’s just keeping things controllable, it’s not cure. So yes I think it is different.” (Ms. 1, NZ)

“Ultimate terror I suppose really.” (Dr. 1, NZ)
Healthcare providers felt that the risk of seroconversion was low but if seroconversion was to happen it would have a severe impact on the healthcare provider. Most of the healthcare providers were not familiar with the quality of life and efficacy of treatment available.

"Hepatitis C would be more likely to be transferred than HIV but the implication of the diagnosis is less, so the risk is higher but the consequences are lower." (Dr. 4, NZ)

Healthcare providers in UAE and NZ shared similar levels of fear and insecurity after an occupational exposure to BBFE infected with HIV.

**8.3.6 Impact of stigma**

The study explored the association of stigma with HIV in UAE and NZ. Healthcare providers in UAE agreed that the community associated stigma with HIV. The respondents felt HIV was seen to be primarily, if not solely, a disease resulting from lifestyle choice, due to either drug addiction or sexual practices, and that this made it different from other type of diseases or illnesses.

"I mean of course the culture plays a role, at this part of the world they think that if you’re having HIV you’re more than likely either a drug addict having needle abuse or you’re running around on your wife and it’s a lot about your character. They start to judge you." (Mr. 2, UAE)

The majority of the healthcare providers in NZ shared the feeling of stigma associated with HIV, but the severity of stigma was comparatively quite low. The view that there was no stigma to HIV in NZ was argued by one healthcare provider who felt that at least he did not associate stigma with HIV:

"Not for me, no. In general I wouldn’t see that in New Zealand but it certainly wouldn’t for me, no." (Dr. 4, NZ)
Some of the healthcare providers in NZ felt that it was not stigma but lack of knowledge in the community that was more of a problem.

“I think it might be a little bit different because here HIV’s not very common and there’s less education involved.” (Dr. 6, NZ)

However some healthcare providers thought that the reason stigma was associated with HIV in NZ was its association with the gay community:

“Stigma is mainly because it’s been transmitted by gays and it seems to have been mainly a male homosexual disease.” (Dr. 3, NZ)

The majority of respondents in UAE and a few physicians in NZ shared the view that stigma associated with HIV was a greater concern for them than the health effects.

“Health concern would be less than stigma, stigma is more in HIV. Over here we’re not exposed to HIV.” (Dr. 5, NZ)

We explored the amount of stress a healthcare worker would feel after an exposure due to the stigma. Healthcare providers in UAE and NZ concurred that there would be stress related to stigma, but the severity of this varied both inter-group and intra-group. The majority of the healthcare providers in UAE felt that stigma would be the cause of severe anxiety and fear:

“I would rather have any other disease in the medical dictionary than have AIDS, especially the family can be ruined, my spouse is going to leave me, family’s going to look bad at me and I’m going to lose my importance in the society.” (Mr. 2, UAE)
"I think it has a very strong cultural and religious colour to it because most people, the general message for HIV that if you stick to your partner and if you don’t engage in unprotected sex then the chances are very low.” (Dr. 4, UAE)

When exploring the reasons for this stress it was evident that it was caused by the society having a fixed view that this was a sexually transmitted disease and it would be hard to make a point that it was a result of needlestick injury.

"HIV, it’s sort of a pre-given thing that he had sex outside, it’s a sexually transmitted disease and they are not aware of the needlestick injuries.” (Mr. 2, UAE)

The impact of stigma was felt to be so significant by one UAE participant that it was suggested that it could even lead to suicide.

"In the human society it’s obviously the stigma attached to this is strong enough to push someone over the line and may even make them commit suicide. Stigma is worse than having the disease itself and it’s simply because of unawareness about the disease, not accepting in the society.” (Dr. 2, UAE)

Healthcare providers in NZ shared the feeling that stigma would be a cause of concern to them, but not to the extent expressed by the UAE participants. None of the healthcare providers in NZ felt that this stigma would cause them severe stress.

"I think it would yeah because you wouldn’t be human if you didn’t worry about what other people think and how you got it. Even if it was from no fault of your own, I mean I can remember a child who’d got it in the early days, he was a haemophiliac and got it because of the blood transfusion.” (Ms. 5, NZ)

“Yes it would. I think it would slowly eat away but then again I think it’s important whom you tell and what it is that you say.” (Ms. 1, NZ)
All healthcare providers in UAE and NZ shared the concept that HIV and hepatitis C are comparably dangerous from a biological point of view, but that stigma associated with HIV was thought to cause greater anxiety with that disease.

"I think quite ironically there will be more stress related with HIV because of the notoriety that it carries with it, whilst we know that hepatitis C is possibly a more dangerous disease now." (Dr. 3, UAE)

"Think they’re just as bad as each other almost really, even though I say I’d rather have hepatitis C than HIV. But I think that is, and I’m saying there wasn’t really a difference but I think it’s probably the stigma is more with HIV.” (Ms. 3, NZ)

"This is simply because of the social stigma attached to it (HIV). It’s not the perception of one single person. Hepatitis C can also be transmitted as HIV can be transmitted but in the society the acceptance of society in which we live for HIV is very different from hepatitis, so dying from heart disease is much more acceptable and vogue rather than dying from syphilis.” (Dr. 2, UAE)

The stigma attached to HIV would evidently cause more stress than hepatitis C to the extent that one of the healthcare providers stated:

"If I would have to choose between the two evils I would go for hepatitis C.” (Mr. 3, UAE)

It was evident from the study that stigma was associated with HIV in both the cultures. Healthcare providers in UAE felt severe stress because of the expected community response to them and their family. In comparison the healthcare providers in NZ did acknowledge the stigma but the emphasis was on how people may feel about you as an individual, and how it might therefore affect your practice. The healthcare providers in NZ did not express any concern about how it might affect their family, and did not feel that this would be a cause of severe stress.
Respondents from UAE felt that post-exposure stress was higher in UAE compared to their country of origin because of the societal reaction to HIV infection (stigma) and national policy in UAE that anyone with HIV would be sent back to their home country.

"I would feel oh my God. What did I do to deserve to get it and if that's true that I've got HIV then my world is at an end. I know that there are treatments, there's medication but I think it would be a disaster, no one would believe it's a needlestick injury. There's a huge stigma in society... people would stop socialising with me because I would be a social taboo". (Mr. 1, UAE)

"This is simply due to the social stigma attached to it (HIV). It's not the perception of one single person". (Dr. 1, UAE)

"Well there's a sort of cultural stigma here that if you have contracted HIV you have been running around on your wife having an affair or something and then people look down at you". (Mr. 2, UAE)

The healthcare providers in UAE felt that they would still be able to work in the health sector if they were to return to their country of origin, as their own countries did not stigmatise or discriminate against people with HIV to the same extent as in UAE.

"As far as job is concerned I can go back to Canada and work". (Mr. 2, UAE)

"I think in Pakistan one can still practise, I think you need to make sure that you do not cause any exposure to your patients". (Dr. 5, UAE)

"Of course in my workplace for sure in Pakistan when you tell the people why I got it, it won't be difficult". (Dr. 3, UAE)

"Well depends on the country you are in, here I think you will get deported from UAE I think, but elsewhere, back in the US you can still practice ... in US people are aware of the problem and they are aware of the risks". (Dr. 6, UAE)

These reported views suggested that the post-exposure stress due to stigma was closely related to the severity of stigma (individual and institutional; felt, courtesy, and enacted) in
the society/community; because of this the healthcare providers felt more stressed due to stigma in UAE than their country of origin.

### 8.3.7 Social acceptance or denial

While exploring the perspectives of the healthcare providers, an important factor in post-exposure stress was how the community/society treated people who had HIV. The perceived social acceptance of HIV in UAE and NZ was quite different. In UAE it was felt that there would be no acceptance of an individual with HIV. HIV is a deportable illness and even if you were a citizen your activities would be limited; hence the perception is that HIV is not present in the community (denial) except for in visitors who are not screened. Due to tourism there is always a large number of visitors in the Emirates; healthcare providers felt that HIV was present in the patient population.

“As a physician working in this part of the world it is stressful for many doctors to be concerned about things like this. This can affect the career, it can affect the family life so there are two aspects of this – having the fear of the disease acquisition as well as what are the repercussions socially.” (Dr. 2, UAE)

“I truly believe if I’m in Canada they would understand and I won’t face huge consequences at my work, people won’t stop talking to me and there won’t be any reprehension at my workplace”. (Mr. 1, UAE)

Healthcare providers practicing in UAE perceived that HIV was more accepted as a disease in their country of origin, and that healthcare providers with HIV were allowed to practice medicine in certain disciplines.

“Oh I know somebody that the system has accepted. It’s not in the same job lines, you can’t necessarily work with patients or in a high risk area, but there are HIV workers within the UK that have been unfortunate enough to be exposed and have contracted HIV or hepatitis and they do go back to work even if it’s in an admin or as I say a very low risk area.” (Ms. 1, UAE)
“I truly believe if I’m in Canada they would understand and I won’t face huge consequences at my work, people won’t stop talking to me and there won’t be any reprehension at my workplace. I would still be able to work after declaring that I have AIDS, whereas I think if I declare that in the Middle East there would be a huge social reaction.” (Mr. 2, UAE)

Healthcare providers in NZ had mixed feelings of acceptance and denial or disassociation regarding HIV; they thought it was not present in NZ and a few cases which have been publicised were in new immigrants. HIV in NZ was felt to be restricted to the gay community or new immigrants. This gave a feeling of denial, that since we do not have this disease, it is not our problem.

“I think there would be some people who would be like oh no, not here.” (Ms. 2, NZ)

“You don’t hear much about it these days which I think most people when they think of it think about it back into the 80s and 90s from the homosexual community, from the drug addicts, now it’s more what’s happening in Africa in that sort of undeveloped world and I don’t think they think it affects them as much and it’s going to touch them… It’s foreign to them, it’s away from them – I don’t mix with that sort of people.” (Ms. 5, NZ)

Healthcare providers felt that people would be judgmental in deciding how it was transmitted and react differently. They thought because it is so rare for somebody to have HIV in NZ that people would think he/she was in one of the two groups (gays or drug users). People do not consider that healthcare workers or police officers could experience occupational exposure to this disease and become infected.

“Well they wouldn’t think that he may have contracted that disease in the course of his practice. They’d more likely think and I think fuelled by the media ‘oh is he a druggie?’ because you get GPs or specialists who get done for drug abuse and things like that.” (Dr. 1, NZ)
"In personal life in terms of say clubs, golf club, would other people look at you in a different way – yes I think they would." (Dr. 4, NZ)

The majority of respondents felt that people in the community would not like to visit a healthcare provider who is known to have HIV or hepatitis C:

"I think if it got out that you had either of those two diseases you could pack your bags and leave town because your practice would just go poof." (Dr. 1, NZ)

There were 2 out of 6 physicians in NZ who were optimistic that the people would differentiate between individuals who became HIV-positive because of lifestyle compared to a healthcare worker who had occupational exposure. Therefore, they thought that if a healthcare provider was HIV-positive it would not affect their clinical practice.

"I would think that if one explains how it occurred there would be acceptance." (Dr. 2, NZ)

"I would not expect it to impact on a large part of my clinical practice. I would have to stop procedures which are a small part of my practice anyway." (Dr. 4, NZ)

Healthcare providers in UAE felt that stigma would have a great impact which would not be limited to them as a person but would influence their family; the community would not like to associate with them.

"So actually this is not a dilemma for one person, it becomes a dilemma for the whole family." (Dr. 5, UAE)

In NZ the healthcare providers were confident that their family would be supportive. They did not feel that their family would face any stigma in the community, a concern which was felt by the healthcare providers in UAE.
“I don’t know what other people are like. I don’t think my family would treat me any differently.” (Ms. 3, NZ)

“My father – ‘I told you no good would come of this. You should have stayed at home and did baking’. He’s a bit of strict black is black and white is white. There’s no bending with him. But my mother, my brother, my sister – fine.” (Ms. 1, NZ)

Healthcare providers in UAE felt that the community would exclude any individual known to have HIV. In NZ the majority of the healthcare providers felt that HIV was associated with the gay community and people would not like to visit a healthcare provider known to be HIV-positive. There were some healthcare providers who agreed that there is stigma and people are biased against those who have HIV but were confident that their practice would not be affected as the community would differentiate between an individual who became positive due to occupational exposure versus someone with a known high-risk sexual orientation. This was a major difference between the two cultures: in UAE there was exclusion from the society while in NZ there was acceptance of an individual with HIV in the society though some members may be judgmental.

8.3.8 Medical and financial aspects

Medical and financial issues were a very important aspect of our comparison as the expatriate healthcare providers in UAE were not provided with medical or income insurance and in case of a seroconversion to HIV would be sent back home, while healthcare providers in NZ had medical and financial cover. It was interesting that even in such a different scenario, treatment and financial concerns were not priorities for the healthcare providers in UAE, as they had a premeditated strategy for insuring their health and financial interests. Most of the healthcare providers in UAE felt that they could go back to their home country where they would be given treatment and be able to practice; hence they were not worried about the medical or economic aspects of the exposure.

“So being a physician, the job will not be a problem for me. I can still go back to my country, I can work there and I can make sufficient life there.” (Dr. 5, UAE)

“In England where I come from, there are options but as I would understand it where I’m working at the present that would be the end of my career and that would have a
huge impact on me, because if I can’t work in the profession that I’m in then that really cuts down my options and the joy of the profession that I work in.” (Ms. 1, UAE)

The healthcare providers in UAE felt that the major difference between being in their home country and being an expatriate in UAE was the availability of a support system which would take care of a healthcare provider in case of a seroconversion.

"[In my home country] you may not be able to stay in the work that you’re in but you know that you would be protected money-wise, compensation-wise, counselling-wise, so there would be a support network there for you which there is nothing like that here.” (Ms. 1, UAE)

In NZ the healthcare providers knew that their treatment and financial wellbeing would be looked after by the state, and most of them had also taken out private insurance policies.

“For whatever reason you can’t practise, I’ve got health insurance that would come into place.” (Dr. 2, NZ)

“Now if you’d been prudent and taken out health insurance you probably would be reasonably well off there. If it was a needlestick injury and I think this country’s great, you would have ACC and you would be supported for a reasonable length of time with them.” (Dr. 1, NZ)

NZ has a no-fault 24-hour insurance system which is managed by a crown entity called Accident Compensation Corporation (ACC).

8.4 Discussion

The study highlighted the similarities and differences between the viewpoints of the two groups of healthcare providers – one group from UAE and the other from NZ. The main themes will be discussed below.
8.4.1 Religion

Both groups of participants (from UAE and NZ) felt that religion was not an important factor in post-exposure stress. They perceived the impact of stigma to be associated with culture, but not religion. This was in contrast to the findings of the lived experiences of healthcare providers (from chapter 7) in which one of the participants experienced significant spiritual distress associated with an occupational BBFE involving blood from a patient known to be HIV-positive. In particular, that participant was concerned about his ability to engage in his usual religious activities with others if they knew he had become infected with HIV. This finding might suggest that the theory of HIV exposure and the reality of a BBFE are two different things – or it might be that the participant from chapter 7 was more sensitive in his religious concerns following such exposure.

Perceptions regarding the impact of stigma on spiritual practices were explored with the participants in this study and all of them felt that due to confidentiality, such stigma should not be an issue. Even if HIV status was known they felt that it would not prevent them from praying in their usual communities. Supporting this view, past studies have demonstrated that religion and spirituality have, in some communities, been used as successful coping strategies by individuals with HIV. Studies from Tanzania and Bangladesh for instance have demonstrated that religious leaders can play a significant role in successful HIV intervention programmes (Koshuma & Jordan-Harder, 2004; Rashid, 2011). Pargament (1997), in his book “The Psychology of Religion and Coping: Theory, Research, Practice”, discussed a number of religious coping methods to help individuals who are going through a difficult time in life which could be used by people with HIV (Pargament, 1997). Folkman (1997) reported that religious coping methods are frequently used by people living with HIV to overcome the loss of their loved one and sense of guilt.

8.4.2 Concerns

The majority of healthcare providers reported that their most significant concern would be their own health followed by family and financial concerns. The participants in UAE were concerned for their family due to the social consequences, whereas for NZ participants, these concerns were expressed in terms of infectiousness or failing to meet their family obligations due to death or infirmity. Lin et al. (2008) reported similar concerns but in a different
sequence: family, support from the hospital, practising privileges and social discrimination. In the previous study, healthcare providers reported that they were more concerned about the social impact of the disease than the physical health consequences; it could be argued that those participants felt as if they had seroconverted. When the healthcare providers in this study were asked if they became seropositive to HIV, what would be their primary concern, the participants in UAE voiced concerns which were focused on the cultural aspects of the disease, which was similar to the findings of the previous study.

8.4.3 Stress

The immediate reaction to an exposure to HIV-infected body fluid was moderate to severe stress, similar to the previous study. The reason for stress in the UAE group was the stigma associated with the disease, whereas participants in NZ were concerned about the biological consequences of the disease. The findings were in agreement with those of Kennedy et al. (2009) who found that 35% of healthcare providers reported that they had moderate or significant anxiety post exposure to HIV. Similar findings were reported by Ncama and Uys (2003) in South Africa: that healthcare providers experienced shock, confusion and apprehension after being exposed to HIV-positive body fluid.

Healthcare providers from both countries agreed that, medically-speaking, hepatitis C would be more of an occupational hazard as it has a higher transmission rate and does not have a vaccine or post-exposure prophylaxis. Nevertheless, they perceived exposure to blood or body fluid infected by HIV to be more stressful due to cultural and social implications, and due to the stigma associated with HIV. This finding was in concordance with the findings of the lived experience of healthcare providers by the author and Chan and colleagues. In a study conducted in Thailand Chan et al. (2009) asked a group of nurses whether, given the choice, they would prefer to live with leukaemia or HIV. All of them selected leukaemia because it did not have the same stigma.

8.4.4 Stigma

When comparing the two groups of healthcare providers, those in UAE appeared to perceive greater potential for severe stress because of the stigma associated with HIV in their country of work. These respondents felt that their society would discredit them if they became HIV-positive. Their fear was that most of the people would not understand that an individual
could get HIV infection without an intimate relationship. The expression of “felt stigma” varied between the healthcare providers. Some viewed it just as a major source of stress in UAE, where HIV was significantly stigmatised, but considered themselves to have the option of returning to their home country where stigma and discrimination would be less of a concern. However, extreme views of “felt stigma” were also expressed, with one respondent suggesting that the stress due to the stigma of HIV could be severe enough for them to consider suicide.

Thoughts of self-harm following HIV infection are, in fact, not uncommon. Carrico et al. (2007) reported that 1 out of every 5 people with HIV reported having suicidal thoughts within 1 week prior to their involvement in that study. Kelly et al. (1998) also reported suicidal intentions in individuals with HIV.

This variation in anticipated stress showed how the individuals perceived they could cope or respond to the pressure from society or their community. Dodds reported that this variation in response to stigma tends to be due to the capacity of individuals to exercise power (Dodds, 2006). In our study this aspect of power and social position was slightly visible as all the physicians from UAE reported that they would report the exposure and were sure they could get a job in their country of origin, whereas the nurses opted to report the exposure but felt that this could be a hard choice and thought others would not report such an exposure. This may be because they felt that getting another job would not be as easy as for the physicians.

The healthcare providers in UAE were also concerned about how the stigma of HIV would affect their families. They believed that their families were at risk of being ostracised and their integrity would be questioned if the participant became infected. Courtesy stigma was an added stress for the participants from UAE, unlike NZ where this was not considered a factor in post-exposure stress. Fulton (1999) argued that due to courtesy stigma, family and friends may attempt to distance themselves in an attempt to identify themselves as normal. The feeling that the family may want to distance themselves was mentioned as a concern by the participants in this study, although most of them felt that their family would be supportive of them.

It has been argued that the severity of stigma in Eastern countries is based in part on the value that these societies place on collective identity, where an individual is seen as a part of the family and, reciprocally, the acts of the individual have significant bearing on the status of the rest of the family (Foreman et al., 2009). Hence instead of ostracising an individual, the
family is shunned, because they are all held responsible for the individual’s actions (Foreman et al., 2009). This exclusion was based on the assumption that this disease was a consequence of lifestyle choice.

In the Middle East and most Asian countries it is assumed (at least from the point of view of the participants in this study) that all HIV infections are transmitted only through intravenous drug use, extramarital relationships, or same-gender sexual activities. The community tends not to recognise that HIV can be transmitted through other means, such as mother-to-child transmission or by occupational incidents such as body fluid exposure in the case of healthcare providers (Hasnain, 2005). These ingrained and pre-determined concepts have to be addressed. Because of these social stressors HIV infection is much more than a medical or biological problem (Hasnain & Levy, 2005). These concerns were voiced by Khatib, the regional UN director, who stated in an interview:

“It’s stigma. Stigma and discrimination. People are afraid. I mean, I think that knowing how HIV basically gets transmitted is something that people are afraid, that people know that they have had extra-marital sex – the whole concept of men who have sex with other men – it’s a big taboo, and the region does not want to admit that we have these groups. They don’t want to admit to a lot of extra-marital activities” (Hilleary, 2010).

In comparison, the healthcare providers in NZ did acknowledge the possibility of stigma, but this stigma centred on the individual and was considered unlikely to affect the extended family, or be a cause of severe stress. Kegeles et al. (1989) have argued that the difference in society’s response to stigma in the West is based on the perception that an individual is responsible for his actions, as the culture values individualism. The majority of the NZ healthcare providers felt that HIV was associated with the gay community, and that people would not like to visit a healthcare provider known to be HIV-positive. They voiced the concern that there were groups which would not like to associate with an individual known to have HIV because they would consider him/her either a drug user or gay. This strengthens the argument that social stigma associated with HIV is present in every society (Hasnain, 2005).
8.4.5 Trust in the system

The study illustrated the importance of trust in the system; healthcare providers would only report exposure if they believed that their interests would be protected. Healthcare providers were more motivated to report an exposure in NZ where the national health system was seen to be responsible for looking after their medical and financial needs if they were to seroconvert. In comparison, healthcare providers in UAE knew that if they seroconvert they will lose their job and residence in that country. It could be argued that although they knew that they might suffer financial loss if they seroconvert they reported the incidents because they trusted the BBFE programme, which had assured them that it provided the best prophylactic treatment available which gave them the opportunity to prevent the disease; hence healthcare providers opted to report the exposure because of their trust in the programme. Musa et al. (2009) reported that improving trust of the healthcare providers is likely to increase use of preventive services.

8.4.6 Medical and financial aspects

The medical and financial impacts of a seroconversion for the two groups were considerably different. In UAE if they seroconverted, they would have to leave the country and lose their job (Ahmed, 2010). This meant that the cost of the medical treatment for HIV and not having a job would be the financial implications. In the previous study the two participants from the Middle East or Asia were more concerned about the social and cultural impact than the financial impact (Zaidi et al., 2012) (see chapter 7). In this study the participants in UAE shared the same perceptions. Healthcare providers from countries other than UAE believed that they would be allowed to practise in their country of origin; hence the financial impact would not be a major concern. Many countries allow healthcare providers to practise medicine in a capacity where they do not perform exposure-prone procedures. The UK Department of Health says that healthcare providers are not allowed to carry out exposure-prone procedures as defined below (Department of Health UK, 2005, p. 4):

"...those invasive procedures where there is a risk that injury to the worker could result in the exposure of a patient’s open tissue to the blood of the worker (bleed-back). These include procedures where the worker’s gloved hands may be in contact with sharp instruments, needle tips, or sharp tissues inside the patient’s open body cavity, wound or confined anatomical space where the fingertips may not be completely visible at all times.”
Due to belief in their continuing employability in their home country, healthcare providers did not consider the financial impact to be a significant concern. Review of the treatment cost demonstrated that it is not a funded treatment in many countries. Schackman et al. (2006) reported the treatment cost of an HIV patient with a life expectancy of 24 years in the US is expected to be $618,900 for adults, which comes to a monthly expense of $4,700. This represents the financial impact of medical treatment alone on a healthcare provider whose treatment is not funded, even if they are able to secure employment.

In contrast in NZ, if they seroconverted the government would look after their medical needs and provide 80% of their pre-injury salary. It is the only country in the world which has comprehensive no-fault personal injury cover for all residents and visitors to NZ. The ACC is the government entity which provides this insurance cover; blood and body fluid exposure is covered as it is an occupational accident (Accident Compensation Corporation, 2012).

8.5 Conclusion

This study has shown that post-exposure stress after an exposure to blood or body fluid infected by HIV is closely related to the severity of stigma associated with HIV in that community. Reporting of an occupational exposure was also influenced by the trust healthcare providers had in the system. The cross-cultural comparison demonstrated that healthcare providers working in UAE were exposed to a higher level of stress due to the cultural context. The legal and administrative system was said to be a concern in reporting, but the respondents felt that they would be more concerned about the social aspects of the disease at that stage compared to residency. Healthcare providers did refer to that absence of a support network which made them plan a strategy for insuring their health and financial interests.

The healthcare providers perceived similar stress that an individual would feel while coming forward for an HIV test or to start treatment. The first threat is that he/she may be infected (the feeling of being discreditable) and the second threat is that once tested and confirmed to be HIV-positive this information would not stay confidential and he/she would become discredited. As the healthcare providers suggested, others may not report and they would face severe stress. At an institutional level confidentiality could be assured, but the societal response must be addressed at a societal level. Advocacy campaigns and general awareness of how occupational exposures to HIV are possible, to shift the paradigm of stigma, are important. More in-depth research is required, particularly in the Middle East and South East Asia, to explore the mechanisms and factors influencing cultural pressures on the healthcare providers.
Chapter 9: Discussion

9.1 Introduction

Blood and body fluid pose a not infrequent occupational health and safety hazard for healthcare providers, and their sequelae are life limiting and life changing. In developing and emerging countries, because of the high prevalence of hepatitis B and C in the general population, and inadequate primary preventive measures, there are relatively frequent occupational exposures to blood-borne pathogens. Due to lower reporting of the exposures, there are also many missed opportunities for participation in effective post-exposure management systems. Therefore the need for enhancing primary prevention and secondary health protection programmes in developing countries is extremely compelling, more so than in the developed world, where the risks are lower and participation higher.

Our initial intention was to study the effectiveness of a BBFE programme developed at SKMC because it was set in a multicultural setting in an emerging country. It is our belief that the successful implementation of programmes of this type and in this setting could be generalisable to increase the effectiveness of BBFE programmes in many countries around the developing world.

The study of lived experiences of healthcare providers led us to realise that there were much wider issues that need to be addressed that are of relevance and importance to many hospitals with similar settings around the Middle East.

In Western countries, elements of the programme such as policy, procedures, post-exposure management protocols, and education appeared to be the most important elements essential for adequate primary prevention and disease prevention programme participation. In emerging countries, it seemed plausible to us that non-organisational barriers play an equal or more important role than the elements of the programme and, therefore, the solutions to address these barriers lie in communication and public policy responses rather than organisational responses alone.

This chapter will present the findings of the reported four studies and compare them with published literature. It will discuss how mixed methods research helped us in understanding the holistic view of organisational and non-organisational factors influencing participation in a BBFE programme. A visual representation of the research findings will be presented and discussed with emphasis on how this research was able to voice participants'
concerns relating to non-organisational issues. These issues have a different impact on the healthcare providers in the Middle East compared to their colleagues in the Western world. We also report on the limitations of the studies and finally, recommendations and future research opportunities will be discussed.

9.1.1 Magnitude of the problem

At first evaluation, exposure to blood-borne pathogens appeared to pose the most significant risk to the health and safety of the healthcare providers. While musculoskeletal injuries and minor respiratory diseases acquired from patients may have a higher incidence, they are usually a cause of morbidity rather than mortality. In contrast, occupationally acquired infections such as hepatitis C or HIV after a BBFE not only lead to morbidity, but result in the premature death of the healthcare provider. Prüss-Ustün et al. (2005) reported that “These infections are estimated to result in 145 (53-766) early deaths from HCV between the years 2000 and 2030, 261 (86-923) deaths from HBV and about 736 (129-3,578) healthcare workers would die prematurely from HIV infections” (p. 485).

Studies show that the prevalence of hepatitis B and C is much higher in the Middle East compared to the Western countries (Khayriyyah et al., 2013; WHO, 2013a). Reports indicate a growing presence of HIV in the region; while it appears to be comparatively lower than in Western countries, that may be due to suppression of reporting.

Healthcare providers in the Middle East region experience a higher incidence of needlestick injuries when compared to those in Western countries. Prüss-Ustun et al. (2003) reported that in the US, Europe and Australasian countries, the mean number of “sharps” injuries per healthcare provider per year ranged from 0.18 to 0.74, compared to the Middle East and South Asia where it ranged from 1.06 to 4.68 (Prüss-Ustün et al., 2003). They suggested that the relatively low number of sharps injuries in the US could be due to the presence of primary prevention policies, raised awareness of safety, universal precautions and regulatory controls on hazardous activities (Prüss-Ustün et al., 2003).

Given the high prevalence of blood-borne pathogens (HBV and HCV), a high number of sharps injuries per healthcare provider per year, the absence of corporate policy for reporting exposures, and a lack of structured preventive measures to prevent sharps injuries, it was important to present a locally developed successful BBFE programme.
Vaccination or confirming immunity to hepatitis B on appointment to clinical hospital employment is an effective proactive measure to protect healthcare providers. Vaccines for hepatitis C and HIV have not yet been developed. Not all occupational infections are preventable, and neither is elimination of infection risk following non-occupational exposure.

Although primary preventive measures can reduce the rate of BBFE incidents, they are unlikely to eliminate the risk of occupational exposure altogether; therefore, secondary prevention measures are required. Post-exposure prophylaxis has been reported to be effective in reducing disease infection following occupational transmission. Studies report that the effectiveness of post-exposure treatment with hepatitis B immune globulin ranges from 90 to 95% (AIDS Institute, 2008; Grady & Lee, 1975; Weinbaum et al., 2003). Meanwhile evidence suggested that antiretroviral therapy can reduce the risk of HIV infection following occupational transmission by as much as 86% (McLeod & Montaner, 2009).

9.1.2 Appropriateness of current blood and body fluid exposure programmes in the Middle East

It is a common practice in the Middle East to contract overseas Western healthcare services to manage and staff their hospitals. These healthcare management organisations bring with them protocols of hospital management, patient treatment and occupational health and safety. When adopted in the Middle East, this has improved the management of BBFE in the few tertiary hospitals, but even these protocols lack the important feature of being culturally sensitive to the working context or other determinants of participation in the Middle East.

We were aware that one of the major threats to healthcare providers' health and safety was related to low participation rates in post-exposure management programmes. Participation was lowest in countries where the risk appeared to be the highest, which seemed paradoxical, given that 90% of the occupational exposures to infected sources take place in the developing world (Wilburn & Eijkemans, 2004). We needed to understand the barriers to participation; without this understanding the implementation of the protocols and provision of infrastructure could not be effective.

9.1.3 Choice of mixed methodology

The first two studies were quantitative; the first study helped in understanding the knowledge and attitudes of healthcare providers, and the second study compared exposure
reporting and post-exposure management through pre- and post-intervention clinical audits. The studies helped in quantifying the impact of factors, mainly organisational, which we knew about prior to the study. The KAP study suggested low reporting rates amongst hospital staff and that few staff considered risk assessment prior to starting post-exposure management in cases of a patient known to be positive for one of the three diseases of concern. The clinical audits showed an increase in reporting and improved post-exposure management, but we were not sure whether that showed a low level of BBFE exposures and a high rate of reporting, or vice versa.

Therefore, we explored participation in a BBFE programme, using qualitative research methods to understand the worldview of the healthcare providers working in a hospital in the Middle East. The first qualitative study of lived experiences identified the role of non-organisational factors: culture, stigma and economic loss. These factors had not hitherto been understood to affect participation in health protection programmes. A comparative study was performed to examine how cultural factors influenced the behaviours of healthcare providers in the Middle East compared to those in Western society. Therefore, by the use of mixed method research we were able to take a comprehensive approach to understand participation in a BBFE programme regarding both organisational and non-organisational factors such as culture, stigma, religion, morality, and public policy.

## 9.2 Organisational factors

The pre- and post-intervention clinical audits showed the importance of the organisational changes we observed in the implementation programme in our hospital. Chapter 6 discussed these in detail; in this chapter we will only comment on the interventions which would be of importance for other hospitals in similar settings intending to develop a BBFE programme. Due to participation of healthcare providers in the development of the BBFE programme, they took ownership of the programme. Corporate policy implementation also provided formal recognition of the programme and some regulatory or coercive powers: healthcare providers felt obliged to report, and if they did not complete follow-up the clinic was allowed to hold their annual clearance. The hospital-approved algorithm helped in raising awareness of the availability of a standard treatment and follow-up regimen. Involving Emergency Room physicians for after hours reporting and management of the exposure ensured that if a healthcare provider was exposed in the after hours period they were able to report the event and, if required, start the post-exposure management as soon as possible
instead of waiting for the next day or the next shift when they were on day duty. This study did not assess the impact of primary preventive measures which included engineering controls and procedural best practices.

The influence of knowledge and perception of risk on participation in a BBFE programme has been strongly debated. There are articles which report that those surgeons who had proper knowledge of the risk of seroconversion had safer practices (Moghimi et al., 2009). In contrast, there are also articles in which healthcare providers' knowledge was found to be sufficient, and not to be a barrier to participation, but they still had low reporting rates (Gurubacharya et al., 2003). On balance, it is plausible to conclude that safe clinical practices are only partially driven by knowledge about BBFE programme content and availability.

In addition to knowledge and availability of a BBFE programme, the qualitative review showed that peer pressure created a culture of either safe or unsafe practice which could result in exposure to body fluids. Positive encouragement from peers was shown to play a positive role in improving behaviours and practices. Lymer et al. (2004) reported that junior nurses felt obliged to follow the practices of senior colleagues and if they followed best practices it formed the culture for that ward. Ward (2012) reported that nurses demonstrated better practices when the infection control practitioner was present. Therefore, a group of motivated healthcare providers could form a peer group for safe work practices and help in developing a culture of behaviour-based safety. In our study the champions of change played a positive role in motivating their colleagues to participate in the BBFE programme.

9.3 Non-organisational factors

Addressing a number of organisational factors helped in improving reporting and management of occupational exposure to body fluids in our hospital. Post-intervention reporting rates were comparable with those reported internationally (Mehta et al., 2010). The systematic review of reporting of BBFE showed that even in studies which reported comparatively higher BBFE reporting rates (60% to 77%), there was a discussion of causes of under-reporting (Smith & Leggat, 2005; Tabak et al., 2006). It was our belief, just as Tabak et al. (2006) suggested, that despite the increase in BBFE reporting rates in fact there was still major incident under-reporting in our study population. We felt that there was potential for
more improvement, which is why we explored non-organisational factors influencing participation further.

Our qualitative research confirmed that there were particular barriers such as culture, financial loss impacts, and stigma that were factors outside of the organisational aspects of the programme. These factors play a role in all cultures and societies, but their role in Western culture appears to have a lesser impact compared to the Middle East where the influence was more visible because it affected reporting negatively (as voiced by the healthcare providers in our qualitative studies).

**Emerging Themes**

A focus group\(^2\) discussed the findings of the four studies and agreed on a number of themes which were derived from these studies. An important outcome of the group's review of the literature and study evidence was that non-organisational factors affect healthcare provider behaviour differently in Western societies from their influences on healthcare providers in emerging countries. A visual representation as illustrated in figure 9.1 evolved from the discussion to show the complex relationships of these factors. In the figure, the influence of organisational and non-organisational factors is illustrated as circles of influence on practices, attitudes and behaviours of healthcare providers. The concept of circles of influence was developed to represent the impact of factors in both groups, and to more clearly illustrate the different impact of those factors in different cultural contexts. The core and first circle represent organisational factors, which have a positive impact in both the Western and emerging countries. In contrast, non-organisational factors act positively in Western countries (except stigma) but have a negative influence in the emerging countries, as shown by the direction of the arrows. These themes are in concordance with the published literature, with respect to the influence of all such factors on the attitude and behaviour of the healthcare providers.

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\(^2\) The focus group was made up of clinicians who had not participated in programme implementation or any other aspect of the programme, but who had reviewed the findings of each of the four studies included in the research programme. The Terms of Reference for the group were to establish a unifying model to explain or illustrate the differing influences exerted by non-organisational factors on participation.
Figure 9.1: Visual representation of the research findings as circles of influence

Note: *Core and first circle represent the circles of influence of the organisational factors. **Third circle represents influence of non-organisational factors.

The majority of the published research on occupational exposure to blood and body fluid has focused on the core activities in the figure: policy, procedure, training, knowledge, and advocacy (as discussed in the literature review and consistent with the published literature). Our research concurred with the international findings that addressing the organisational factors is important to provide a structure for reporting and post-exposure management. These factors help develop an organisational culture of safety. These organisational factors were found to have a similar effect on improving reporting in the Middle East as in any Western society.

In the qualitative studies, the healthcare providers expressed the view that their decision to report an exposure, complete post-exposure management, and post-exposure stress were affected by the following factors: stigma associated with HIV, culture, religion, morality,
public policy, and financial losses. The figure presents these as a circle of influence over the practices and behaviours of the healthcare providers related to participation in the BBFE programme.

An important factor to consider is the division of the circle between Western countries and emerging countries (UAE more specifically) which shows opposite impacts from the non-organisational circle of influence. The same factors which could be considered as acting negatively on the decisions of some healthcare providers to participate in a BBFE programme in the Middle East are considered to be the motivators for healthcare providers in the West; except for stigma. The following sections will discuss each of the non-organisational factors from the circle of influence in detail.

9.4 Effects of culture on participation

As discussed in chapter 3, the complex system of attitudes, beliefs, and behaviours that determine what we know as “culture” forms the fabric of our society, and sets the wider norms for our practices. It can affect the utilisation of health services both positively and negatively. Russell and Jewell (1992) reported that cultural beliefs were a stronger determinant of health practices than level of education or economic status.

In chapter 3, we explored a range of definitions of culture; however in this context it would appear that a more specific definition could be derived in that it is the characteristics of that person’s membership in the society that determine their attitudes. This is actually shaped by a number of factors: country of origin, country where he/she is resident, ethnicity, religion, age, gender, educational level, and past experience. While all these factors of culture influence an individual’s participation in healthcare services, we were not able to identify data on how these factors specifically influenced participation in a BBFE programme. Themes that came out of the review of literature and our qualitative studies included stigma, stress, religion, legislation and public policy. These appeared to be the major factors that determine participation by healthcare providers in a hospital BBFE programme.

Our study of the lived experience of healthcare providers identified that the participants were more concerned about stigma associated with HIV infection than the medical implications. Our findings were in concordance with those of Chan and Reidpath (2007) who reported HIV to be highly stigmatising and Lin et al. (2008) who reported severe post-exposure stress and anxiety after an occupational exposure to HIV-infected body fluid. The
immediacy of the threat from stigma and the effect on the family may explain why paradoxically healthcare providers did not place more priority on the medical aspects of a potentially fatal disease.

9.5 Impact of stigma

Stigma associated with HIV was voiced by the healthcare providers to be an important source of not only post-exposure stress, but also to influence reporting and participation in a blood and body fluid exposure programme. Healthcare providers were of the view that they would report an exposure incident, but felt that many would not because of the stigma associated with HIV and financial loss implications.

Goffman described stigma as a societal reaction, as it might vary from one society to another. Stress due to stigma associated with HIV was higher and more widespread in Asian countries compared to Western countries, because of concern about how the community will treat the family members of infected individuals (Deacon et al., 2005). Stigma in non-Western countries was “heightened because it is layered upon pre-existing stigmas associated with gender, homosexuality, drug use, promiscuity etc.” (Lee et al., 2002, p. 310).

When the culture of the Middle East is examined from the perspective of the arguments presented by Lee, it explains why stigma related to HIV is more severe than in other cultures. Middle Eastern cultures typically place higher prohibitions on same-sex relationships, sexual promiscuity, and intravenous drug use, thus intensifying the stigma associated with HIV-infected individuals and their families. Therefore, it is very important for the general public to understand the role of cultural and social variables affecting, and different modes of, HIV transmission in Muslim countries (Hasnain, 2005). While of course it is not the intent of this thesis to pass comment on such views, the issue highlighted in these qualitative studies is that such views do influence the way healthcare providers perceive the risks and consequences of exposure to HIV. The healthcare providers in question do not even need to necessarily share such views in order to be concerned that this is what other people might be thinking; it is the perceptions of the community and authorities that are of greater concern.

In comparison, in Western countries, because of comparatively less condemning attitudes to sexuality, there is room for consideration of different exposure contexts of acquiring such disease, and people with occupational HIV are generally considered to be innocent. While blood and body fluid exposure programmes in Western countries can ignore
the relatively low risk of stigma, managers of comparable programmes in other cultures such as the Middle East and Asia have to respond to significantly higher effects of stigma as a barrier to participation by healthcare providers.

Stigma associated with HIV has proven to be counterproductive in reducing the morbidity and mortality due to HIV. Individuals do not come forward for testing and treatment due to this negative cultural response. In 2010, UNAIDS reported that 71% of countries now have some form of legislation in place to protect people living with HIV from discrimination (UNAIDS, 2010). However, Ban Ki-moon, Secretary-General of the United Nations, believes that “almost all permit at least some form of discrimination” (Sanwar, 2011).

A number of authors have shared the same view that most cultures still have some form of stigma associated with HIV (Chan et al., 2009; Klunklin & Greenwood, 2005). This issue is more complex in Muslim culture due to layering of stigmas such as HIV and intravenous drug users or HIV and commercial sex workers or HIV and sexual practices; the impact of laying of stigmas has also been reported in Thai culture (Chan & Reidpath, 2007; Hasnain, 2005). However there are a number of success stories which have broken this vicious cycle. Uganda, Tanzania and Iran are examples of countries that have attempted to address stigma associated with HIV at a societal level. They have acknowledged the fact that this disease cannot be treated by medicine and health intervention alone; it needs cultural change – a “social vaccine” as described by policy makers in Uganda (Green et al., 2002, p. 11). By way of explanation, the successes in reducing stigma and the reduction in the incidence of new HIV cases went hand in hand in the Uganda case study. It was achieved by a comprehensive societal behavioural change made possible by a combination of high-level political and community commitment. A few important strategies used to achieve the change were: political commitment, behavioural change using communication campaigns, interventions addressing stigma and discrimination, the role of religious leaders, confidential voluntary counselling, and a reduction in multiple sexual partnerships (Green et al., 2002).

Tanzania and Iran have also treated the epidemic of HIV at the societal level; they used the religious leaders from all faiths. Muslim religious leaders were trained to spearhead the HIV prevention and treatment campaign. They played an important role in breaking the silence on issues related to HIV and reducing stigma (Azimi, 2006; Koshuma & Jordan-Harter, 2004).
Similar strategies are required in the UAE and other countries to reduce the stigma of HIV.

9.6 Morality and religion

The religious texts have a number of social laws which contain principles of good public health policy. Religion has been associated with numerous social benefits including charity, forgiveness, and reduced crime (Barro & McCleary, 2003; Evans et al., 1995; Iannaccone, 1998). According to Leege and Kellstedt (1993) religion stipulates beliefs and provides a guideline for actions: “Religion specifies what action to take, and religious beliefs (and religious institutions) create the obligation to act” (p. 10): a clear distinction between religious teaching and the actions of religious institutions.

Religion and culture have a symbiotic relationship: they reinforce each other, and when they combine they establish moral order (Geertz, 1973). One of the functions of morality norms is to promote sustainability of the society. Moral norms that discourage promiscuity are likely to increase societal stability. However, where moral norms also create stigma, they can negatively affect public health with respect to apparent HIV prevention strategies. This could then hinder public health measures, as in the case of HIV. Religious opprobrium and stigmatisation associated with HIV infection, even if occupationally acquired, have been a hindrance to efforts to increase participation in prevention, screening and treatment campaigns as discussed earlier.

Moral judgments are being made by the community about the healthcare provider in the event that they seroconvert. There needs to be an intentional effort to disassociate stigma associated with occupational exposure from that of HIV from sexually transmitted diseases. Minkenberg (2002) reported that there is a visible influence of religion on current public policies. This influence could be channelled to be positive as in the examples from Uganda, Tanzania and Iran (which will be discussed in detail in the next section) (Green et al., 2002; Azimi, 2006; Koshuma & Jordan-Harder, 2004).

9.7 Public policy: recommendations for change

It is well recognised that public policies outside the health sector have an impact on the health of the community. Therefore Health Impact Assessment has become a popular tool to
gauge the influence of public policies on health, both in NZ and internationally (Signal & Durham, 2000). CDC supports the use of health impact assessment as it identifies the health impact of the policy, programme, or project on the community (CDC, 2013).

Lowering the wider prevalence of hepatitis B, C and HIV in the general population is an important measure for reducing the occupational risk of a healthcare provider being infected with any of these diseases after an exposure to body fluid. This is possible by lowering the risk of sexually transmitted HIV and hepatitis B (in addition to strategies to reduce stigma) as the occupational contribution to the overall population risk. Hepatitis C requires a more focused strategy: one of the major causes of hepatitis C infection in the developing and emerging countries is the re-use of surgical instruments without proper sterilisation by healthcare providers, in addition to intravenous drug use. Therefore, the interventions need to be targeted to healthcare providers to improve their practices, especially in smaller hospitals and clinics. This will protect the healthcare providers and the community.

Governments need to implement a comprehensive and coherent strategy to reduce the incidence of these diseases in the community and encourage people to come forward for screening. The following are a few strategies:

- Change in public policy to stop deporting people infected with hepatitis B and HIV;
- Advocacy campaigns to encourage people to take preventive measures and treatment for hepatitis B and HIV infections;
- Publicly funded education to increase awareness about occupational and non-occupational transmission of hepatitis B, C, and HIV;
- Focused awareness campaign for sex workers;
- Blood-borne pathogens and risk of blood and body fluid exposure should be given more importance in the undergraduate curriculum;
- Publicly funded education to increase awareness about transmission of hepatitis B, C and HIV;
- Political commitment and multi-sectoral response to change public opinion and behaviour towards people living with HIV infection;
- Societal compliance; and
- Workers’ compensation to assist exposed healthcare workers unable to work as the result of occupational exposure to blood-borne pathogens.
CHANGE IN POLICY TO AVOID DEPORTATION

The present policy of deporting all expatriates who test positive for hepatitis B or HIV is counterproductive, as people try to avoid screening and delay treatment in order to stay in the country. Hence people deliberately delay disclosure of their infectivity status, and due to ignorance may potentially spread the disease to others. In the interest of public health, the deportation policy should be replaced by a more liberal policy encouraging people to come forward for testing and treatment without loss of their rights to remain in the community.

ADVOCACY CAMPAIGNS

Countries which have been successful in reducing the incidence of these diseases have used mass media to help people understand those diseases, their modes of transmission and prevention. Opinion leaders have played a major role in changing the community perspectives. In the Middle East, members of the royal family are highly respected. It would be important for one of them to make public statements to encourage screening for hepatitis B and HIV infections which lead to proper treatment and management. This would be similar to the approach used in NZ where a former rugby player, Sir John Kirwan, has helped in raising awareness of depression. Publicly respected individuals can help in breaking the public silence and increase awareness of health conditions which are usually under-estimated (Woodcock, 2012).

PUBLICLY FUNDED SCREENING AND TREATMENT CAMPAIGNS

Publicly funded screening will encourage people to participate in screening programmes once they are sure that if they test positive, instead of being deported, the government would provide appropriate treatment. Publicly funded treatment will allow people from all socio-economic groups to start treatment earlier which would improve the quality of life of individuals living with HIV infection so they would be able to contribute to the development of the society.

EDUCATION TO INCREASE AWARENESS

It is important to empower the youth with proper knowledge of transmission and prevention of these diseases, to encourage discussion of these diseases at school and
university level. This involves making people aware of how such diseases are acquired and that some people, especially healthcare providers who are widely respected, may acquire the same disease occupationally as they could in a sexual or drug-using setting.

**FOCUSED AWARENESS CAMPAIGN FOR SEX WORKERS**

Sex workers are at high risk of contracting these diseases; thus, focused awareness campaigns are required to teach them preventive measures, signs of the diseases, and encourage them to receive regular health assessments. They should be provided with counselling on how to motivate the clients to use protective measures to reduce sexually transmitted infection. It is important to recognise that this industry is present and provide protection for these workers.

**MEDICAL CURRICULUM**

Blood-borne pathogens and risk of blood and body fluid exposure should be given more importance in the undergraduate curriculum to make students realise the importance of universal precautions and best practices. Opportunities for continuing medical education should be provided to the healthcare providers to discuss the importance of universal precautions, proper sterilisation, reporting, prevalence of disease in the community, and efficacy of post-exposure prophylaxis.

The intention should be to encourage doctors and nurses to use universal precautions, proper sterilisation of surgical instruments, and benefit from post-exposure management. Once the healthcare providers are convinced of the benefits, there is more potential to change the behaviours of the general public.

**POLITICAL COMMITMENT AND MULTI-SECTORAL RESPONSE**

The success stories from Uganda, Tanzania, and Iran showed that when there was political commitment with a concerted multi-sectoral public policy response, it set the scene for change in public opinions and behaviours. Opinion leaders (political, religious, medical, and educational) played a major part in delivering the correct message to the general public and high risk groups. In addition to aggressive public media campaigns, face to face interaction by grass-root workers from the non-governmental organisations played an
important role in reducing stigma, increasing preventive behaviour, and being sympathetic to people living with HIV infection or AIDS. Delayed commencement of sexual activity, use of condoms, staying with one partner, pre-marriage counselling and screening for STDs played an important role in reducing the incidence of new cases (Green et al., 2002; Koshuma & Jordan-Harder, 2004).

Involving multi-sectoral stakeholders in planning and implementation improved their participation in the programme; different community groups took ownership of the campaigns. At SKMC, we benefited from a similar strategy; the blood and body fluid exposure programme was developed with the participation of the healthcare providers.

Empowering women should be a strong component of these campaigns. It will provide them with awareness of the sexually transmitted diseases, preventive methods, signs and symptoms, counselling, and screening facilities. The programme in Uganda gave women a political voice about sexuality even though women made up one third of the members of the parliament. There are a few examples of this in the Middle East, where high profile females are presently in leading positions. Qatar is a good example where the first lady Her Highness Sheikha Moza developed the Qatar Foundation which has played a crucial role in the development of the country under her leadership.

**Societal Compliance**

Societal compliance is the conformity of individuals and groups of people as a society to the cultural and legislative requirements. In countries such as Iran where the religious leaders and state are close, an advocacy campaign supported by both of them is likely to bring a change in public opinion and behaviour. In comparison, in states where members of the royal family are the most important opinion leaders, they should be leading the campaign. To change public behaviour it is important that they believe in the new information because it may require changing the way they view things especially in the case where a number of layers of stigmas are involved such as changing behaviour towards infections such as HIV/AIDS. Campaigns in which all or as many as possible opinion leaders support the same message are likely to increase societal compliance. A single approach would not work in different socio-economic conditions; each country has to be addressed differently.

Rules and regulations can be used to increase compliance but it is more likely that societal change would occur when people are engaged in the process instead of mandating them to comply.
WORKERS' COMPENSATION

Despite the best preventive measures, there is still the possibility of healthcare providers and other professional groups (police, support services) being exposed to these blood-borne pathogens while at work. In the event of seroconversion it is important that the workers are compensated for their financial losses and that their medical needs are provided for. This requires the formation of a workers’ compensation board to protect the rights of the workers. In the UAE, labour law regulates work-related accidents and compensation, but a formal workers’ compensation board would be more effective in ensuring that the workers are being protected and compensated.

9.8 Financial implications

The participants in UAE felt that healthcare providers who become infected because of occupational exposure (while serving the community) should be treated differently than people who acquired these diseases through non-occupational means. The participants stressed that when they performed their duties they did not discriminate between their patients on the basis of these diseases and, therefore, this qualified them for some extra privileges. As a result of awareness of occupational hazards, especially those after exposure to infected blood, this issue has been discussed with the Ministry of Health in UAE and dialogues are underway.

Sagoe-Moses et al. voiced the same concerns that reporting would not improve until appropriate treatment and compensation is ensured:

“It is unlikely that surveillance and reporting of occupational exposure to infected blood will be undertaken in places where post-exposure prophylaxis, treatment, and workers’ compensation are lacking” (Sagoe-Moses et al., 2001, p. 538).

As long as the healthcare provider is not assured that the system will support him/her in any outcome of the exposure, the reporting issue will remain. The Health Belief Model which was originally developed in the 1950s, focused on the individual’s willingness to change their health behaviour based on four factors: perceived susceptibility, perceived severity, perceived benefits, and cue to action (Green, 2002). The model stressed that perceived benefit is
essential in order to bring about behavioural change. Therefore, to further improve participation it is important that both organisational and non-organisational factors reassure the healthcare providers that their interests will be protected.

The ILO in the Workers Compensation Act, 2008 outlines how a workers' compensation fund should be established (Workers Compensation Act, 2008). In most of the Western countries, there is a workers' compensation system in one form or another (Accident Compensation Corporation, 2012; "Safe Work Australia," 2012; "WSIB Ontario," 2013). The new UAE Labour Law 2013 has a clause on workers' compensation for occupational diseases, penalties and employment-related accidents, labour inspections, injuries and fatalities, (UAE Labour Law, 2013), but there needs to be lobbying for a complete workers' compensation system to protect the workers' rights.

9.9 Generalisability

The first two studies were quantitative and the findings were comparable with the published literature. The pre-post intervention clinical audits reported salient features of a blood and body fluid exposure programme developed in the UAE, which could be replicated in hospitals in the Middle East and other Muslim regions with similar working conditions and cultural contexts.

Because qualitative research is not intended to provide findings which could be generalised, the findings of the two qualitative studies could not necessarily be generalised but nonetheless provide important lessons for other healthcare systems. The studies were able to add the concerns of healthcare providers from the Middle East to the published literature. The overarching findings of the four studies appear to show the relative importance of organisational and non-organisational factors in the effectiveness and participation of healthcare providers in a blood and body fluid exposure programme that are generalisable because of the consistency of the findings with those of similar studies. The studies identified a number of organisational and non-organisational factors such as culture, stigma, and financial insecurity which influence reporting and participation in a BBFE programme. These issues would be present to some extent in other countries with similar cultures. The latter two studies help form a working hypothesis that non-organisational factors influence the decision to participate in the BBFE programme in UAE. Researchers and healthcare providers in
similar cultural contexts may be inclined to examine the impact of these non-organisational factors on participation in their hospitals.

9.10 Scientific rigour (consistency between the study findings and other research)

The pre-intervention clinical audit revealed that the BBFE reporting rate of exposures per occupied bed annually was consistent with other studies published from the Middle East and Asia which demonstrated low BBFE reporting rates: Saudi Arabia, Nepal, and Pakistan were found to have reporting rates of 7%, 21%, and 53% respectively (Alam, 2002; Gurubacharya et al., 2003; Zafar et al., 2008). Jacob et al. (2010) published a study from UAE in which only 18% of healthcare providers reported BBFE exposures. These results demonstrated that the pre-intervention practices related to occupational exposure to BBFE in SKMC were similar to the practices in other tertiary care hospitals in UAE and the region.

The post-intervention clinical audit established that the implementation of a comprehensive BBFE programme addressing organisational factors could improve programme participation. These findings are supported by studies from Pakistan and India which reported success in improving participation after addressing the organisations’ systemic issues (Mehta et al., 2005, 2010; Zafar et al., 2009). The post-intervention period had more occupational exposures reported annually than those published by McCormick (1981) and Memish (2002), but less than reported by Ruben (1983). In the post-intervention period, 99.5% (219/220) of all staff members who had been exposed to patient blood or body fluids had blood investigation at the time of exposure compared to 95.5% (149/156) in the pre-intervention period. The post-exposure follow-up results were comparable to those reported by Mehta et al. (2005), who reported the achievement of follow-up with 96% of all healthcare providers exposed to blood and body fluid exposure within 6 months of exposure, and better than those reported by Mehta et al. in a later study (2010), who reported follow-up for 77% of those exposed to HIV, and Osborn et al. (1999), who reported that less than 50% of students had follow-up blood tests after exposure. In our study all of the healthcare providers exposed to infectious body fluid were followed for 6 months and none of them seroconverted to hepatitis B, hepatitis C or HIV. This finding was in concordance with studies by Bi et al.
(2006), Roberts et al. (1999), Osborn et al. (1999), and Mehta et al. (2005) who found that in a small number of exposures seroconversion was not reported.

The qualitative studies showed that, due to variations in the effects of culture and stigma, individuals exposed to the same disease in the same legal system could have different types of stress responses and personal concerns. These findings were in agreement with those reported by Chan et al. (2009) from Thailand who found that anticipated social rejection arising from HIV was reported by Thai nurses as the primary fear regarding acquiring HIV through occupational exposure. Similar post-exposure concerns were identified by Lin et al. (2008) who reported that healthcare providers in their study perceived societal discrimination as a major concern.

9.11 Limitations of the studies

Each methodology has some strengths and some weaknesses. One needs to be aware of why the specific methodology was selected and to acknowledge the limitations of each method. Limitations of studies do not merely involve how well a study was conducted, but also how far in the quest for knowledge certain research methodologies can take us.

The thesis is composed of four studies. The first study was a cross-sectional observational study utilising survey research methodology and the convenience sampling method. Data were collected through questionnaires to examine the knowledge, attitudes and practices of healthcare providers in the hospital. The limitation of the study due to the convenience sampling method was that data were not verifiable. Steps taken to minimise these limitations are discussed in section 5.2 of chapter 5.

In the second study, a pre-post intervention clinical audit observational methodology was applied. The study consisted of two clinical audits: the first audit assessed data from January 2006 to December 2007 (pre-intervention clinical audit) and the second covered from January 2008 to December 2009. This methodology could be criticised for resulting in overestimation of the impact of the intervention. In the absence of a control group, it is not possible to reach any firm conclusions regarding causal association. However, in the case of this study, it would not have been ethically possible to withhold proper post-exposure management from a healthcare provider who had an exposure. Therefore, having a control group was not a feasible study design to consider.
The qualitative research paradigm was used in the third and fourth studies. The third study utilised a qualitative study design, applying an abbreviated version of grounded theory to explore the effect of non-organisational factors on healthcare providers. Only four participants qualified, according to the sampling criteria, using purposive sampling. A limitation of the study was the small sample size due to which the findings could not be generalised to the hospital or the region. Another limitation of the study was that interviews were not recorded because of the sensitivity of the topic. However, generalisability was not the intention of this study. The study was instead designed to explore the post-exposure stress of the healthcare provider as it was considered important to know what healthcare providers felt and why. These findings were important to develop an understanding of the issue. Once the factors leading to post-exposure stress were recognised, they could be further studied using quantitative survey research methods to generalise the results in future studies.

The findings of the third study were further explored in a cross-cultural comparison using principles of grounded theory. The study achieved saturation with 24 participants; Guest et al. found that saturation occurs in qualitative studies after 12-15 interviews if the population is homogenous but a few more if they are heterogeneous (Guest et al., 2006). The study was not designed to generalise the findings but they could be extrapolated to other similar conditions (Tracy, 2010). The intention was to explore perspectives and form new theories using the inductive method, not to test hypotheses.

Therefore, although the results from the observational studies are not as compelling as those from randomised control trials and the findings from the qualitative studies were not generalisable, they accomplished what the research aimed to achieve. The quantitative studies were successful in examining the reporting rate of blood and body fluid exposure, assessing the knowledge of healthcare providers and the impact of the blood and body fluid exposure programme on participation. The qualitative studies were successful in exploring the non-organisational factors and their impact on the healthcare providers. Then they compared the perceptions of healthcare providers from two distinct cultures on stigma and occupational exposure to HIV. The studies helped in forming a hypothesis of association.
9.12 Conclusion

Occupational health and safety is normally the responsibility of the employer, but it is clear that many factors determining participation are societal rather than organisational. Strategies which involve community, religious, and professional leaders could lead a change at the societal level which would reduce stigma and prevalence of these diseases in the community. This will result in reduced risk of contracting these diseases after an occupational exposure and increased participation in the blood and body fluid exposure programmes.

This may apply to other health strategies where the problem is for a small particular group but the solution is at a societal level.

9.13 Recommendations

As a result of this research I make the following recommendations:

1. The WHO should encourage all countries which do not have adequate protection for their healthcare providers to develop effective, adequately resourced and appropriate BBFE programmes that take account of the effects of culture, religion, and their contextual factors.

2. School education programmes and programmes for youth should raise the awareness of risks associated with transmission of diseases through risky behaviours such as sharing needles, intravenous drugs, and unprotected sexual contact as a means of trying to reduce prevalence of non-healthcare related blood-borne pathogen transmission.

3. Community leaders should try to address issues of discrimination and stigma in perceptions of HIV- and hepatitis-infected individuals and their families. Policies such as deportation and loss of employment should be abolished.

4. Hospitals in UAE and the Middle East could benefit by implementing a similar BBFE programme to that developed at SKMC.

5. UAE and other countries in the region could benefit from the experiences of successful projects in Uganda, Tanzania and Iran which have been successful in reducing stigma in their society. The following strategies could be used to reduce stigma: political commitment to increase awareness, involving the religious leaders to break the silence, providing confidential counselling and screening services, and advocacy campaigns targeting behaviour change.
6. Similar research needs to be replicated in other countries to identify the barriers to reporting in those countries.

9.14 Future research needs

In order to further explore the issues highlighted by this research I would recommend future research on the following issues:

1. The prevalence of hepatitis B, hepatitis C and HIV infection in the UAE, as no robust empirical data currently exist on this important topic.
2. The epidemiology of occupational BBFE in the UAE and in other Middle Eastern countries.
3. The role of primary prevention in reducing occupational exposures to BBFE in the Middle East
4. Further qualitative exploration of reasons for non-participation in occupational BBFE programmes.
5. The public’s perceptions of risks associated with healthcare providers with hepatitis B, hepatitis C and HIV infection.
References:


André, F. (2000). Hepatitis B epidemiology in Asia, the Middle East and Africa. *Vaccine, 18*, Supplement 1(0), S20-S22.


Covey, H. C. (2005). Western Christianity’s two historical treatments of people with disabilities or mental illness. *Social Science Journal, 42*, 107-114.


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Gamede, P. S. (2012). The perceptions of occupational health nurses regarding needle stick injuries for health care workers in the eThekwini district health facilities. Master of Philosophy, Stellenbosch University, South Africa.


The Health Act, The National Archives (2006) (UK)


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Naidoo, M. (2010). Experiences of the University of the Western Cape student nurses who sustain needle-stick injuries during their clinical placement. Magister Curationis, University of the Western Cape, South Africa.


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Appendix 1: Historical events of blood and body fluid exposures
BBFF HISTORICAL EVENTS

A few significant events which influenced the formation of legislation related to blood and body fluid exposure and best practices are discussed as follows:

- 1976: In November, a laboratory worker in Salisbury, United Kingdom was infected with Ebola-Sudan strain after an accidental needlestick injury. Fortunately, he fully recovered from the condition and was sent home (Matua & Locsin, 2005);

- 1978: A medical technician at the University of Wisconsin Hospital seroconverted to hepatitis B after occupational exposure to hepatitis B from an accidental needlestick injury. This sentinel event led Dr. Dennis Maki and Ms. Rita McCormick to perform ground breaking research that brought hazards of needlestick injury to the attention of the medical community (Holding et al., 1998; McCormick & Maki, 1981);

- 1983: In May an orthopaedic surgeon who had been vaccinated against hepatitis B, and was tested negative for hepatitis C, had no history of sexually transmitted diseases. He reported a needlestick injury in May 1983, while operating on a patient who had received multiple transfusions and was not found to be HIV-negative. The surgeon was later found to be HIV-positive (Lot et al., 1999);

- 1984: Attention to exposure to biologic and infectious agents was heightened when a new era of concern about occupational hazards for healthcare providers started with the first report of HIV transmitted by “needlestick injury” (Anon., 1984);

- 1987: Health and Welfare Canada published the first set of Canadian recommendations to prevent the transmission of HIV in healthcare facilities (LCDC, 1987);

- 1987: The Center for Disease Control (CDC) from the United States released “Recommendations for Prevention of HIV Transmission on Health-care Settings” (CDC, 1987);

- 1989: In December a 29 year old nurse while taking care of a HCV patient got a needlestick injury, and on the first blood test she was negative. After 3 months she converted positive for HCV (Vento et al., 1997);
1992: On September 9, Mrs. Lynda Arnold, a 23 years old nurse, suffered a "needlestick" injury while working in the intensive care unit (ICU) of the Community Hospital of Lancaster. The patient was found to be in the terminal stages of AIDS and died 2 weeks later. She was diagnosed HIV-positive on her 6 month blood test on April 7, 1993 (Arnold, 2013);

1997: In October, Black sustained a needlestick injury at a northern Nevada hospital. The patient had AIDS, and Black subsequently tested positive for HIV and hepatitis C. Before the injury, she was a healthy mother of two girls (Hopkins, 2000);

2000: In September, two instances of life-threatening hepato-toxicity were reported in healthcare workers taking Nevirapine (NVP) for post-exposure prophylaxis after occupational human immunodeficiency virus (HIV) exposure. The first case was of a 43-year-old female healthcare worker who required liver transplantation after developing fulminate hepatitis and end-stage hepatic failure while taking NVP, Zidovudine, and Lamivudine as PEP following a needlestick injury. The second case was a 38-year-old male physician with life-threatening fulminate hepatitis (CDC, 2001a);

2001: Research showed that an estimated $750 million to $1 billion was spent each year in the testing and treatment of needlestick injuries, to which the US Congress responded by enacting the Needlestick Safety and Prevention Act, effective April 2001;

2004: On September 15 new figures presented on the last day of the Health Protection Agency's annual conference revealed that six healthcare workers were infected with hepatitis C through the course of their work, in the last year. This compares to three in the previous five years, all contracted through needlestick injuries. (Medical News Today, 2004).
Appendix 2: Detailed tables from Chapter 2

Table 1: BBFE guideline systematic review
Table 2: Comparison of the significant results of effectiveness of reporting
Table 3: Comparison of the significant results of barriers to participation
Table 4: Search strategies for qualitative structured review
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<th>Year</th>
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<th>Comments</th>
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<tbody>
<tr>
<td>2001</td>
<td>US Public Health Services – CDC</td>
<td>Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Post-exposure Prophylaxis</td>
<td>This was the most detailed guideline for post-exposure management. It advocated that all HCPs should be vaccinated for hepatitis B; other guidelines and programmes fell short of making vaccination mandatory. It also recommended that every hospital should have a BBFE programme which showed that only keeping the guideline as a process document was not enough. This illustrated the importance of a comprehensive BBFE programme in which the guideline was only one component; this advice was followed in our interventional study.</td>
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<tr>
<td>2007</td>
<td>WHO / ILO</td>
<td>Post-exposure Prophylaxis to Prevent HIV infection: Joint WHO/ILO Guidelines on Post-Exposure Prophylaxis (PEP) to Prevent HIV Infection</td>
<td>The guideline described in detail the post-exposure management and has provided best practices and medical evidence in support of their conclusion. It restricted the discussion to HIV. It could be used to update and strengthen a BBFE programme.</td>
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<tr>
<td>2005</td>
<td>WHO / ILO</td>
<td>Joint ILO/WHO Guidelines on Health Services and HIV/AIDS</td>
<td>The guidelines were targeted to HIV, hence have focused on the need to make the hospital a friendly place for people with HIV and a safe workplace for the HCPs. It has detailed sections on the steps to make the hospital safe, covering occupational safety, infection control and assessment of exposure. It covers post-exposure management of HIV in detail with assessment, counselling, employee rights to best treatment and job security, and touches on BBFE to hepatitis B &amp; C. It referred to US PHS report of 2001 for post-exposure treatment. It recommended having a response system for BBFE for every country but did not advise a BBFE programme which would be more comprehensive; this could be due to the fact that it is an international document and many countries have nothing in place at present.</td>
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<tr>
<td>1997</td>
<td>Laboratory Centre for Disease Control</td>
<td>Infection Control Guidelines: Preventing the Transmission of Blood-borne Pathogens in Health Care and Public Health Settings</td>
<td>The document extensively explored the risk of transmission and referred to studies showing transmission and those which refer to prevention. It is primarily an infection control guideline hence does not discuss assessment and post-exposure management in detail. Healthcare facilities can use it to improve preventive measures but would require a detailed post-exposure plan to complete a BBFE programme.</td>
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<tr>
<td>2002</td>
<td>Australian EBFE</td>
<td>Management of Exposure to Blood/Body Fluid in a Healthcare Setting</td>
<td>The guideline was brief but precise; they start with definitions to avoid confusion and made it very clear what would be an exposure and what is not considered an exposure. They advocate the same PEP treatment as US PHS CDC guidelines. The guidelines emphasise counselling which is different from other guidelines. The follow-up is lenient: they recommend performing testing for HIV at 3 months and at 6 months for HBV and HCV only.</td>
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<tr>
<td>1998</td>
<td>UK Health Department</td>
<td>Guidance for Clinical Health Care Workers: Protection Against Infection with Blood-borne Viruses</td>
<td>The guideline has a detailed description of infective viruses HBV, HCV and HIV. It discusses preventive measures to avoid a BBFE. It has post-exposure management for HBV but did not provide details of PEP for HIV. The guidelines are more than 14 years old; there have been advances in PEP for HIV, hence there is a need to update that part.</td>
</tr>
<tr>
<td>2009</td>
<td>CDC British Columbia</td>
<td>BBFE Management Guidelines</td>
<td>The guidelines comprehensively explore the post-exposure measures but do not discuss the preventive measures which may be addressed separately. It advises that all individuals exposed to BBFE should be assessed but does not require mandatory reporting. It explores risk assessment and treatment options in detail. It advocates assessment to be completed by a healthcare provider who would then refer for further follow-up to a hospital if required; caution is required to ensure HCPs are not lost in follow-up.</td>
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<tr>
<td></td>
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<td>Guidelines: Medical educational web sites</td>
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<tr>
<td>Oct-2010 and Sep 2010</td>
<td>Up to Date</td>
<td>Management of Healthcare Workers Exposed to Hepatitis B Virus or Hepatitis C Virus and Management of Healthcare Workers Exposed to HIV</td>
<td>The treatment protocol is in concordance with the US Public Health Services CDC guidelines.</td>
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<td>Year</td>
<td>Source</td>
<td>Topic</td>
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<tr>
<td>2010</td>
<td>e-medicine</td>
<td>Body Fluid Exposures</td>
<td>E-medicine provides information required by a physician while assessing a HCP who has been exposed. It offers details of options with doses and references. This can be used as a useful tool for developing a BBFE protocol, but it is essential that once the healthcare facility has accepted a treatment protocol all physicians follow it.</td>
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**Guideline: Organisations**

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<tr>
<td>World Gastroenterology Organisation</td>
<td>WGO Practice Guideline: NSI and Accidental Exposure to Blood</td>
<td>The guidelines provide a detailed discussion on preventive methods and post-exposure treatment options. It is well referenced to provide evidence of best practices. In preventive measures it did not address training and awareness of HCPs and the role of needle-free systems in preventing future exposures.</td>
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<tr>
<td>1991</td>
<td>UCLA School of Medicine, California</td>
<td>Management Guidelines for Health Care Workers Exposed to Blood and Body Fluids</td>
</tr>
<tr>
<td>2001</td>
<td>University of Alberta</td>
<td>Guidelines for the Management of BBFE During International Academic Experiences</td>
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<tr>
<td>2010</td>
<td>Duke University</td>
<td>Duke University Blood-borne Pathogens</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exposure Control Plan</td>
</tr>
<tr>
<td>2010</td>
<td>University of Newcastle</td>
<td>HIV, Hepatitis B, Hepatitis C Management of HCW Potentially Exposed</td>
</tr>
<tr>
<td></td>
<td>Australia</td>
<td></td>
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<tr>
<td>Year</td>
<td>Institution/Agency</td>
<td>Title</td>
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<td>------</td>
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<tr>
<td>2010</td>
<td>Johns Hopkins U.</td>
<td>HIV Prophylaxis Following Occupational Exposure</td>
</tr>
<tr>
<td>Year</td>
<td>Institution/Agency</td>
<td>Title</td>
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<tr>
<td></td>
<td>Guidance Documents: International and National agencies</td>
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<tr>
<td></td>
<td>OSHA</td>
<td>OSHA Blood-borne Pathogens Standard</td>
</tr>
<tr>
<td></td>
<td>Canadian Centre for Occupational Health and Safety</td>
<td>Needlestick Injuries</td>
</tr>
<tr>
<td>EU</td>
<td>Prevention of Sharps Injuries in the Hospital and Healthcare Sector</td>
<td>It provided legal binding on EU states to ensure the safety of HCPs. It broadly covers the steps required to have a safe workplace. The most important aspect is that it recommends having legislation to ensure the safety measures are taken. It stresses the implementation and guides through the steps required to develop a facility and country specific programme. This is a good blueprint for countries which do not have a system in place on how to protect their HCPs; it advocates a top down approach. It stresses the need for a legal requirement on the employer to be enforced by the state. Once these basic principles are followed then developing a facility specific plan/programme is a natural outcome.</td>
</tr>
<tr>
<td>Health &amp; Safety Executive (HSE)</td>
<td>Blood-borne Viruses in the Workplace: Guidance for Employers &amp; Employees</td>
<td>This guidance document is good for the general public; it was not developed for hospitals hence does not address the needs for HCPs.</td>
</tr>
<tr>
<td>Year</td>
<td>Institution/Agency</td>
<td>Title</td>
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<tr>
<td></td>
<td>Joint Commission International</td>
<td>Protocol for Management of Needle-Stick Injury, Accidental Inoculation and Percutaneous Mucus Membrane Exposure to Blood and Body Fluid Substances</td>
</tr>
<tr>
<td>Author</td>
<td>n (*)</td>
<td>Sample</td>
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<tr>
<td>Zafar et al.</td>
<td>80 (ND)</td>
<td>Physicians 29, Nurses 51</td>
</tr>
<tr>
<td>Muralidhar et al.</td>
<td>428 (ND)</td>
<td></td>
</tr>
<tr>
<td>Tadesse et al.</td>
<td>366 (91.3 %)</td>
<td>Break-down not provided according to profession</td>
</tr>
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</table>

291
<table>
<thead>
<tr>
<th>Author</th>
<th>n (*)</th>
<th>Sample</th>
<th>Aim of study</th>
<th>Main results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efetie et al.</td>
<td></td>
<td>House officers 66.6%, Nurses 44.1%</td>
<td>To assess KAP in HCP on BBFE and factors influencing universal precautions practices.</td>
<td>The study found that both the doctors and nurses had good knowledge related to universal precautions: 97.0% and 92.0% respectively. Nurses were found to have better practices, 75.0%, compared to the doctors, 15.2% (p &lt; 0.05). Lack of availability of personal protective equipment was cited as the major cause of not using universal precautions. Factors which showed significant differences between the doctors and nurses (p &lt; 0.05) include carelessness; lack of display of universal precautions guidelines; emergency nature of the procedure; insufficient water supply; patient perceived to be at low risk of blood-borne pathogens; pressure of time; and universal precautions equipment interfering with technical skills.</td>
</tr>
<tr>
<td>Reda et al.</td>
<td>511 (64.6 %)</td>
<td>Physicains 5.4%, Nurses 66%, Midwives 10.4%, Laboratory tech. 7.1%, and health assistants 11%</td>
<td>To assess the knowledge and perceptions of HCPs related to blood and body fluid and universal precautions.</td>
<td>Study found NSI to be significantly associated with work experience which had a protective effect. Male HCPs were more prone to risky practices such as recapping. Few HCPs reported non-availability of personal protective equipment as the reason for not following universal precautions. Nearly all (99.4%) of the HCPs stated HIV, HBV, HCV, Herpes simplex 1 &amp; 2 are diseases transmitted via NSI. UP guidelines were considered obstructive by 22.9% of HCPs, mainly nurses. Re-capping was found to be the main risky practice followed by handwashing and use of gloves.</td>
</tr>
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<tr>
<td>Moghimi et al.</td>
<td>557</td>
<td>General surgeon 59.8%, Gyne. &amp; obs. 7.7%, Ortho. 5.1%, Thorax surg. 4.2%, Plastic surg. 3.7%, Paed. Surg. 3.3%, Other 16.2%.</td>
<td>To assess the surgeons' concerns related to risk awareness and behavioural methods for protection from transmission of blood-borne pathogens while performing surgery.</td>
<td>The majority of the surgeons overestimated the seroprevalence of HIV, HBV, and HCV in the community. More than 75% of the surgeons underestimated the risk of seroconversion. While 54% of the surgeons always used glasses or masks, only 12.9% used double gloves. While 76% of surgeons had completed a hepatitis B vaccine course, only 56.8% had checked their antibody titre. It was found that surgeons who had proper knowledge of the risk of seroconversion had safer practices.</td>
</tr>
<tr>
<td>Raghavendran et al.</td>
<td>258</td>
<td>Physicians and Nurses (proportions not mentioned).</td>
<td>To evaluate how well staff followed precautions developed to protect them from diseases which can be transmitted via BBFE in operating theatre and critical care environments.</td>
<td>Results showed that 31% of physicians compared to 80% of nurses almost always followed the universal precautions. Most (70%) HCPs cleared sharps for others, while 21% admitted leaving sharps for other HCPs to clear; recapping was found to be practiced by 43% of HCPs. Only 54% of HCPs were aware of how to use the safer devices in their practice.</td>
</tr>
<tr>
<td>Author</td>
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<td>Sample</td>
<td>Aim of study</td>
<td>Main results</td>
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<tr>
<td>Gurubacharya et al.</td>
<td>70 (ND)</td>
<td>Nurses 81%, Laboratory tech 13%, OT assistant 3%, Dental tech 3%.</td>
<td>To assess the KAP of HCPs related to risk associated with NSI, their immunisation status, reporting an exposure and safety devices.</td>
<td>Study demonstrated that 61% and 4% of HCPs were not aware that HCV and HBV can be transmitted through NSI respectively. Most (79%) HCPs thought needles should be recapped while only 23% were following universal precautions; whereas 77% knew about the UP guidelines. Hepatitis B vaccination was taken by 60% of HCPs but only 14% had post vaccine blood tests to verify the antibody status.</td>
</tr>
<tr>
<td>Scouler et al.</td>
<td>245 (44%)</td>
<td>Physicians 9%, Nurses 14%, Lab tech. 9%, Pharmacy 14%, Housekeeping 14%.</td>
<td>To evaluate the awareness of occupational risk associated with blood and body fluid exposure to blood-borne viruses; and the practices of HCPs.</td>
<td>Most of the HCPs (70%) thought they have adequate knowledge but provided incorrect answers related to risk of BBFE. HCPs' perceptions of disease transmission after an exposure were towards the higher side. Nearly half (48%) of the HCPs stated that they have anxiety due to the risk of occupational BBFE. The majority of HCPs were of the view that blood tests of patient after exposure should be done immediately to be discussed later; 68 respondents disagreed with the UK GMC's guidelines on testing of patients for blood-borne diseases.</td>
</tr>
<tr>
<td>Author</td>
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<td>Main results</td>
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<tr>
<td>Manian et al.</td>
<td>277</td>
<td>Surgeons only: Gyne. 26%, Vas. 18%, ENT 13%, Ortho 13% and other 30%</td>
<td>To assess the knowledge and practices of attending surgeons regarding BBFE and explore the reasons of not reporting an exposure.</td>
<td>The study found that 5 years post implementation of universal precautions the perception of risk from a blood and body fluid exposure was low. Most of the surgeons stated they do not report BBFE; 10% had never reported a single exposure. The study revealed that 29% of surgeons had one or more NSI/BBFE every month. Over half (59%) of the surgeons reported a reduction in BBFE in the past 5 years. The most common reason given for non-reporting of exposure was low risk of blood-borne disease transmission followed by not being aware of the reporting procedure.</td>
</tr>
<tr>
<td>Talaat et al.</td>
<td>1485</td>
<td>Nurses 46%, Physicians 22.8%, Dentists 5.3%, Lab. Tech. 6.2%, Housekeeping staff 15.4%, Allied health personnel 4.3%</td>
<td>To evaluate the frequency of exposure to needlestick injuries among the HCPs, their practices and the hepatitis B vaccination trend and coverage among HCPs in Egypt</td>
<td>The causes of NSI reported were mainly manipulating needle after injection (40%), recapping, and sudden movement of patient. Over half (62.4%) of HCPs reported disposing of used needles in the wastebasket. Only 15.8% of HCPs reported complete vaccination for hepatitis B. Kane's model was used to predict infections post NSI: the estimate was 24,004 cases of hepatitis C and 8617 hepatitis B infection in HCPs due to occupational exposure.</td>
</tr>
<tr>
<td>Author</td>
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</tbody>
</table>
| Slater et al.| 584 (62.5%)
   in survey
   one and
   675 (43.4%)
   in survey
   two       | Nurse 81.9%,
   Medical 13.9%,
   Phlebotomist 4.1% | To assess the knowledge and attitudes towards NSI and the acceptability of retractable syringes. | The majority of HCPs reported HIV to be the most likely to be transmitted disease by NSI followed by HCV and HBV. Venepuncture needles were reported by 31% of HCPs to be the most common devices for NSI, whereas 59% thought that all devices had the same risk of NSI. The first survey showed 41.2% of HCPs in favour of needle-free intravenous systems; 29.4% voted for retractable syringes and 14.0% for further education. In the post-trial survey the preferred option had dropped to 31.4%, while only 29.7% favoured retractable syringes, and 17% continued to choose education programmes. |
<p>| Maqbool     | 104 (67%)   | Nurses, and Paramedical staff                | To assess the KAP of HCPs toward risk associated with needlestick injury and use of preventive measures. | The study demonstrated that 84% of HCPs had been vaccinated for HBV but only 10% had their antibody status checked post vaccination. A minority (21% and 30%) of the HCPs were not aware that HIV/AIDS and hepatitis C can be transmitted via NSI. Over half (61%) of the HCPs were aware of the universal precautions but only 27% were following them. Half of the HCPs were not aware of any safety devices. |</p>
<table>
<thead>
<tr>
<th>Author</th>
<th>n (*)</th>
<th>Sample</th>
<th>Aim of study</th>
<th>Main results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Zhang et al.</td>
<td>1144 (100%)</td>
<td>Physicians 317, Nurses 761, Laboratory tech. 66.</td>
<td>To assess present status of BBFE; awareness regarding BBFE and universal precautions.</td>
<td>The total incidence of exposures was 66.3/100 HCPs per year; this resulted in an average number of episodes of BBFE of 7.5 per person in the previous year. Over half (68.3%) of HCPs were vaccinated for HBV. Universal precautions were followed by 47% of HCPs; the study showed lack of knowledge and awareness in HCPs regarding transmission of diseases following a NSI and universal precautions.</td>
</tr>
<tr>
<td>Hashemipoor et al.</td>
<td>269 (91%)</td>
<td>Medical students 74.3% and Dental students 25.7%</td>
<td>To determine the prevalence of NSI and factors associated with it among the dental and medical students.</td>
<td>Medical students had more NSI compared to dental students (p=0.01). More than three NSI were reported by 17%, 17.6% had three, 39.6% had two, and 25.8% had at least one NSI during their training. Most of the students did not report the exposure (90.6%); the common reasons stated were that they did not know how to report (46.7%), who to report to (17.5%), or where to report (11.7), and some believed reporting would not make a difference (15.6). Over half (74%) of the students did not practice universal precautions. Nearly all (93%) had received or initiated hepatitis B vaccination.</td>
</tr>
<tr>
<td>Slavenka et al.</td>
<td></td>
<td>Physicians 127, Nurses and Laboratory tech. 410</td>
<td>To investigate the knowledge, behaviour and attitude of HCPs towards diseases transmitted via blood and body fluid exposure.</td>
<td>Study showed that physicians were more knowledgeable regarding BBFE and transmission of diseases via NSI compared to nurses. Although nurses reported exposures more frequently than physicians, both had negative attitude towards patients with HIV. Universal precautions were used by less than 50% of the HCPs.</td>
</tr>
<tr>
<td>Author</td>
<td>n(*)</td>
<td>Sample</td>
<td>Aim of study</td>
<td>Main results</td>
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</tr>
<tr>
<td>Jacob et al.</td>
<td>1420 (71%)</td>
<td>All HCPs and Support workers (percentage not given)</td>
<td>To assess the frequency of injuries caused by sharps and to identify the risk factors for these injuries among HCPs in the United Arab Emirates (UAE).</td>
<td>The study showed that 19% of HCPs followed standard precautions with sharps injury; risk of suffering a sharps injury almost doubled in the group of HCPs who were not following standard precautions (19 vs. 31% respectively, p&lt; 0.05). The incident of sharps for an individual was calculated and found that 15 individuals had more than five injuries in the last year. An important finding was the HCPs were less likely to report an exposure than the support staff. The most common reason for not reporting sharps injury (49%) was that they were unaware of reporting procedures, whereas 22% felt reporting was useless. Standard precautions significantly reduced the risk of suffering a sharps injury (OR 0.55, 95% CI: 0.3–0.9, p&lt; 0.05).</td>
</tr>
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</table>
### Table 3: Comparison of the significant results of barriers to participation

<table>
<thead>
<tr>
<th>Author</th>
<th>n (%)</th>
<th>Aim of study</th>
<th>Main results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zafar et al.</td>
<td>80 (ND)</td>
<td>Common reason for NSI</td>
<td>Most common reasons identified were stress, over work, and attitude.</td>
</tr>
<tr>
<td>Muralidhar et al.</td>
<td>428 (ND)</td>
<td>Occurrence of NSI, causal factors</td>
<td>Commonest causes for NSI were blood withdrawal (55%), followed by suturing (20.3%) and vaccination (11.7%). 63% of HCPs were recapping.</td>
</tr>
<tr>
<td>Tadesse et al.</td>
<td>366 (91.3%)</td>
<td>Perceptions of risk after an NSI</td>
<td>NSI were reported by only 37% of HCPs; the major reason for not reporting was that HCPs were unaware of the reporting mechanism. Re-capping and emergency situations were the major factors causing exposure.</td>
</tr>
<tr>
<td>Efetie et al.</td>
<td></td>
<td>Factors influencing universal precautions</td>
<td>Nurses were found to have better practices, 75%, compared to the doctors, 15% (p &lt; 0.05). Lack of availability of personal protective equipment was cited as the cause of not using UP.</td>
</tr>
<tr>
<td>Reda et al.</td>
<td>511 (64.6%)</td>
<td>Perceptions of HCPs related to BB/FE and UP</td>
<td>Universal precaution guidelines were considered obstructive by 22.9% of HCPs, mainly nurses. Re-capping was found to be the main risky practice followed by handwashing and use of gloves.</td>
</tr>
<tr>
<td>Moghimi et al.</td>
<td>557 (75%)</td>
<td>Risk awareness and methods for protection</td>
<td>Most surgeons overestimated the seroprevalence of HIV, HBV, and HCV in the community. It was found that surgeons who had proper knowledge of the risk of seroconversion had safer practices.</td>
</tr>
<tr>
<td>Raghavendran et al.</td>
<td>258 (68%)</td>
<td>How well staff followed precautions</td>
<td>Results showed that 31% of physicians compared to 80% of nurses almost always followed the universal precautions. Most (70%) of HCPs cleared sharps.</td>
</tr>
<tr>
<td>Gurubacharya et al.</td>
<td>70 (ND)</td>
<td>Risk associated with NSI</td>
<td>Study showed that 61% of HCPs were not aware that HCV can be transmitted through NSI. Most (79%) of HCPs thought needles should be recapped, while only 23% were following universal precautions.</td>
</tr>
<tr>
<td>Author</td>
<td>n (%)</td>
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</tr>
<tr>
<td>Scoular et al.</td>
<td>245 (44%)</td>
<td>Awareness of occupational risk to BBFE</td>
<td>Most of the HCPs (70%) thought they had adequate knowledge but provided incorrect answers related to risk of BBFE. Nearly half (48%) of HCPs stated that they have anxiety due to the risk of occupational BBFE.</td>
</tr>
<tr>
<td>Manian et al.</td>
<td>277 (43%)</td>
<td>Explored the reasons for not reporting</td>
<td>The most common reason given for not reporting exposure was low risk of disease transmission followed by not being aware of the reporting procedure.</td>
</tr>
<tr>
<td>Talaat et al.</td>
<td>1485 HCP</td>
<td>Frequency of exposure to NSI</td>
<td>The causes of NSI reported were mainly manipulating needle after injection (40%), recapping, and sudden movement of patient. Over half (62.4%) of HCPs reported disposing of used needles in the wastebasket.</td>
</tr>
<tr>
<td>Slater et al.</td>
<td>584 (62%)</td>
<td>Acceptability of safe devices</td>
<td>The first survey showed 41.2% of HCPs in favour of needle-free IV systems. In the post-trial survey only 29.7% favoured retractable syringes.</td>
</tr>
<tr>
<td>Maqbool</td>
<td>104 (67%)</td>
<td>Needlestick injury and preventive measures</td>
<td>A minority (21% and 30%) of the HCPs were not aware that HIV/AIDS and hepatitis C can be transmitted via NSI. Over half (61%) of the HCPs were aware of the universal precautions but only 27% were following them. Half of the HCPs were not aware of any safety devices.</td>
</tr>
<tr>
<td>Min Zhang et al.</td>
<td>1144 (100%)</td>
<td>Awareness regarding BBFE and UP</td>
<td>Universal precautions were followed by 47% of HCPs; the study showed lack of knowledge and awareness in healthcare providers regarding transmission of diseases following a NSI.</td>
</tr>
<tr>
<td>Hashemipour et al.</td>
<td>269 (91%)</td>
<td>Prevalence of NSI</td>
<td>Medical students had more NSI compared to dental students. More than three NSI were reported by 17%, 17.6% had three, 39.6% had two, and 25.8% had at least one NSI during training.</td>
</tr>
<tr>
<td>Slavenka et al</td>
<td></td>
<td>Diseases transmitted via BBFE</td>
<td>Study showed that physicians were more knowledgeable regarding BBFE and transmission of diseases via NSI. Universal precautions were used by less than 50% of the HCPs.</td>
</tr>
<tr>
<td>Jacob et al.</td>
<td>1420 (71%)</td>
<td>Risk factors and frequency of injuries</td>
<td>Risk of suffering a sharps injury almost doubled in the group of HCPs who were not following standard precautions (19 vs. 31% respectively, p&lt; 0.05). HCPs were less likely to report an exposure than the support staff.</td>
</tr>
</tbody>
</table>
Table 4: Search strategies for qualitative structured review:

Search for qualitative studies relevant to issues related to occupational exposure to body fluid, knowledge, attitude and practices, universal precautions, and barriers to best practices in any journal

Ovid MEDLINE(R) 1946 to May 2013

1. exp Qualitative Research/
2. exp Nursing Methodology Research/
3. exp tape recording/
4. (qualitative or ethno$ or phenomenolog$ or grounded theory).mp.
5. (focus group$ or narrative analysis or lived experience$ or life experience$ constant compar$).mp.
6. (theoretical sample$ or purposive sample$).mp.
7. (field stud$ or field note$ or fieldnote$ or field record$).mp.
8. (thematic$ adj3 analys$).mp.
9. (content analys$ or unstructured categor$ or structured categor$).mp.
10. (participant$ adj3 observ$).mp.
11. (nonparticipant$ adj3 observ$).mp.
12. (non participant$ adj3 observ$).mp.
13. action research.mp.
14. (audiorecord$ or taperecord$ or videorecord$ or videotap$).mp.
15. ((audio$ or tape$ or video$) adj5 interview$).mp.
16. or/1-15
17. (needle adj3 injur$).mp.
18. ((blood or body fluid) adj5 exposur$).mp.
19. exp needlestick injury/
21. or/17-20
22. (knowledge adj (application or broke$ or creation or diffus$ or disseminat$ or exchang$ or implement$ or management or mobili$ or translat$ or transfer$ or uptake or utili$)).mp.
23. exp Translational Medical Research/
24. barrier$.mp.
25. facilitat$.mp.
27. exp Health Knowledge, Attitudes, Practice/
28. or/22-28
29. 16 and 12 and 28

OVID AMED (Allied and Complementary Medicine) 1985 to May 2013
1. exp Tape recording/
2. exp Interviews/
3. (qualitative or ethnon$ or phenomenol$ or grounded theor$).tw
4. (constant adj (comparative or comparison) or (purpos$ adj sampl$4) or (focus adj group$) or (participant adj observ$) or lived experience$ or (field adj (study or studies or research)) or narrative analysis or (discourse$3 adj analysis)).tw.
5. or/1-4
6. (needle adj3 injur$).mp.
7. ((blood or body fluid) adj5 exposur$).mp.
8. (infection adj3 control$).mp.
10. or/5-9

11. (knowledge adj (application or broke$ or creation or diffus$ or 
disseminat$ or exchang$ or implement$ or management or mobili$ or 
translat$ or transfer$ or uptake or utili$)).mp.

12. Translational Medical Research$.mp.

13. barrier$.mp.

14. facilitat$.mp.


16. Health Knowledge, Attitudes, Practice$.mp.

17. or/11-16

18. 5 and 10 and 17

Ovid Nursing Database 1950 to May 2013

1. exp qualitative studies/ or exp qualitative validity/

2. exp ethnography/ or exp ethnological research/ or exp ethno$/ or 
exp ethnonursing research/

3. exp phenomenological research/ or exp phenomenology/

4. exp grounded theory/

5. exp Interviews/

6. exp participant observation/ or exp observational methods/

7. exp action research/

8. exp Purposive Sample/

9. exp Content Analysis/

10. exp Thematic Analysis/

11. exp Constant Comparative Method/

12. exp Field Studies/

303
13. exp Theoretical Sample/
14. exp Discourse Analysis/
15. (qualitative or ethnnon$ or phenomenol$ or (grounded adj (theor$ or study or studies or research)) or (constant adj (comparative or comparison)) or (purpos$ adj samp$l$4) or (focus adj group$) or (emic or etic or hermeneutic$ or heuristic or semiotics) or (data adj1 saturat$) or (participant adj observ$) or lived experience$ or (field adj (study or studies or research)) or narrative analysis or (discourse$3 adj analysis)).tw.
16. or/1-15
17. (needle adj3 injur$).mp.
18. ((blood or body fluid) adj5 exposur$).mp.
19. exp Needlestick Injuries/
20. exp infection control/
22. 17 or 18 or 19 or 20 or 21
23. (knowledge adj (application or broke$ or creation or diffus$ or disseminat$ or exchang$ or implement$ or management or mobili$ or translat$ or transfer$ or uptake or utili$)).mp.
24. Translational Medical Research.mp.
25. barrier$.mp.
26. facilitat$.mp.
27. (practice adj3 gap).mp.
28. Health Knowledge, Attitudes, Practice$.mp.
29. 23 or 24 or 25 or 26 or 27 or 28
30. 16 and 22 and 29
S1. (MH “Qualitative Studies+”)
S2. (MH “Ethnographic Research”)
S3. (MH “Phenomenological Research”)
S4. (MH “Ethnonursing Research”)
S5. (MH “Grounded Theory”)
S6. (MH “Qualitative Validity+”)
S7. (MH “Purposive Sample”)
S8. (MH “Observational Methods+”)
S9. (MH “Content Analysis”)
S10. (MH “Thematic Analysis”)
S11. (MH “Constant Comparative Method”)
S12. (MH “Field Studies”)
S13. (MH “Theoretical Sample”)
S14. (MH “Discourse Analysis”)
S15. (MH “Focus Groups”)
S16. (MH “Phenomenology”)
S17. (MH “Ethnography”)
S18. (MH “Ethnological Research”)
S19. qualitative
S20. ethnon*
S21. phenomenol*
S22. grounded N1 theor*
S23. grounded N1 stud*
S24. grounded N1 research
S25. constant N1 compar*
S26. purpos* N1 sampl*
S27. focus N1 group*
S28. data N1 saturat*
S29. participant N1 observ*
S30. field N1 stud*
S31. field N1 research
S32. lived experience*
S33. narrative analysis
S34. discourse analysis
S35. (MH “Life Experiences”)
S36. S1 or S2 or S3 or S4 or S5 or S6 or S7 or S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16 or S17 or S18 or S19 or S20 or S21 or S22 or S23 or S24 or S25 or S26 or S27 or S28 or S29 or S30 or S31 or S32 or S33 or S34 or S35
S37. (MH “blood and body fluid exposure”)
S38. (MM “Occupational-Related Injuries”) OR (MM “Needlestick Injuries”) OR “MM “Needlestick Injuries”) OR (MM “Occupational-Related Injuries”)
S39. (MH “Occupational-Related Injuries”)
S40. (MH “Infection Control+/EP/ED/PC”) OR (MM “Knowledge: Infection Control (Iowa NOC)”)”
S41. (MH “Needlestick Injuries”)
S42. S38 or S39 or S40 or S41 or S42
S43. (MH “Attitude of Health Personnel+/ED/PC”) OR (MH “Employee Attitudes”) OR “knowledge and attitude”
S44. (MM “Practice Patterns”) OR (MM “Medical Practice/EI/TD”) OR (MM “Student Knowledge”) OR (MH “Advanced Nursing Practice+”) OR (MH “Professional Practice, Theory-Based+”)

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S45. "Knowledge, Attitudes, Practice"

S46. (MH "Health Services Accessibility+/AM/EC/ED/MT/UT") OR "Barriers"

S47. (MH "Self-Care Facilitation (Iowa NIC) (Non-Cinahl)+/ET")

S48. S44 or S45 or S46 or S47 or S48

S49. S37 and S43 and S50
Appendix 3: Questionnaire for the knowledge, attitudes, and practices study
Blood and Body Fluid Exposure Questionnaire

Badge #: __________________

Please circle the correct response

I am:  
A: Male  
B: Female

Age:  
A: less 25  
B: 26-35  
C: 36-45  
D: 45-55  
E: 56-65  
F: 66+

Nationality: ________________

Education background:

A: Physician  
B: Nurse  
C: Laboratory Medicine

Are you aware of the blood and body fluid exposure policy/protocol?

A: Yes  
B: No

Where you exposed to blood and body fluid in the last 12 months?

A: Yes  
B: No

Did you report the incidence?

A: Yes  
B: No

If yes: to whom?

A: Manager  
B: Infection Control person  
C: Occ. Health & Safety Clinic

Were you immunised for hepatitis B?

A: Yes  
B: No

If yes: were your anti body titres checked?

A: Yes  
B: No
Do you have a documentation of your full course of hepatitis?

A: Yes  B: No

Did you check your status for hepatitis B & C and HIV?

A: Yes  B: No

Please circle all of the correct responses

If you were to be exposed to blood and body fluid of a patient suspected of having hepatitis B what would you do?

A: Nothing
B: Send blood sample of patient for hepatitis B analysis
C: Take blood sample of patient and healthcare provider for hepatitis B analysis
D: Take course or booster of hepatitis B vaccine (Engerix B)
E: Take immunoglobulin

If you were exposed to blood and body fluid of a patient known to have hepatitis B what would you do?

A: Nothing
B: Send blood sample of patient for hepatitis B analysis
C: Take blood sample of patient and healthcare provider for hepatitis B analysis
D: Take course or booster of hepatitis B vaccine (Engerix B)
E: Take immunoglobulin

If you were exposed to blood and body fluid of a patient suspected to have hepatitis C what would you do?

A: Nothing
B: Send blood sample of patient for hepatitis C antibody analysis
C: Take blood sample of patient & healthcare provider for hepatitis C antibody analysis
D: Take antiviral

E: Take immunoglobulin

If you were exposed to blood and body fluid of a patient known to have hepatitis C what would you do?

A: Nothing

B: Send blood sample of patient for hepatitis C antibody analysis

C: Take blood sample of patient and healthcare provider for hepatitis C antibody analysis & PCR

D: Follow up blood analysis of healthcare provider after 3 and 6 months for C antibody analysis

E: Take immunoglobulin

If you would be exposed to blood and body fluid of a suspected patient with HIV infection what would you do?

A: Nothing

B: Send blood sample of patient for hepatitis HIV antibody analysis

C: Send blood sample of patient and healthcare provider for HIV antibody analysis

D: Initiate post-exposure prophylaxis for HIV

E: Take immunoglobulin

If you were exposed to blood and body fluid of a patient known to have HIV infection what would you do?

A: Nothing

B: Send blood sample of patient for hepatitis HIV antibody analysis

C: Send blood sample of patient and healthcare provider for HIV antibody analysis

D: Initiate post-exposure prophylaxis for HIV

E: Take immunoglobulin
Appendix 4: Research instrument for the effectiveness study
Blood and Body Fluid Exposure Research Instrument

Demographic Information

Name of Staff member: ___________________ Badge #: ___________ KM #: ________

Name of Source: ___________________________ KM# __________________

Incident Information

Location:
☐ SKMC,      ☐ Clenco,      ☐ HAAD,      ☐ Sub contract staff,
☐ PHC,       ☐ PMD,        ☐ ADRC,      ☐ Blood Bank,
☐ BSP

Date of initial assessment: ____/____/____ (YY-MM-DD)

Date of OHS assessment if initial assessment was in ER: ____/____/____ (YY-MM-DD)

Department:
☐ Wards,      ☐ OR & Rec. room,    ☐ ER,          ☐ Laboratory,
☐ CSSD,       ☐ Radiology,       ☐ Dental,      ☐ Out Patient Clinic,
☐ Pharmacy,   ☐ Home Care,       ☐ Dialysis,    ☐ Behav. Science,
☐ ADRC,       ☐ Prev. Medicine,  ☐ Unknown,     ☐ Cleanco,
☐ HAAD/SEHA,  ☐ Diabetic Centre

Medical Information

1. Type of injury:
☐ NSI,        ☐ Laceration,     ☐ Puncture,     ☐ Bite,
☐ Splash,     ☐ Splash Urine,  ☐ Splash Saliva, ☐ Splash Vomit

2. Source blood work:
☐ Normal,     ☐ Hep B +ve,     ☐ Hep C +ve,    ☐ HIV,
☐ N/A,        ☐ Unknown,       ☐ not done,     ☐ Refuse,
☐ Hep B & C,  ☐ Hep C & HIV

3. Staff blood work:
☐ Normal,     ☐ Hep B +ve,     ☐ Hep C +ve,    ☐ HIV,
☐ N/A,        ☐ Unknown,       ☐ not done,     ☐ Refuse,
☐ Resigned,   ☐ Locum,         ☐. Hep B & C,   ☐ Hep C & HIV

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3a. Three months follow up blood work (or 6 wk PCR):

☐ Normal, ☐ Hep B +ve, ☐ Hep C +ve, ☐ HIV,
☐ N/A, ☐ Unknown, ☐ not done, ☐ Refuse,
☐ Resigned, ☐ Locum, ☐ Hep B & C, ☐ Hep C & HIV

3b. Six months follow up blood work:

☐ Normal, ☐ Hep B +ve, ☐ Hep C +ve, ☐ HIV,
☐ N/A, ☐ Unknown, ☐ not done, ☐ Refuse,
☐ Resigned, ☐ Locum, ☐ Hep B & C, ☐ Hep C & HIV

4. Description of event:

________________________________________________________________________

5. Was this incident related to problem with equipment? ☐ Yes ☐ No

6. Causes of Accident / Needle Stick Injuries:

☐ Manipulating needle in patient,
☐ Handling/ passing device during or after use
☐ Cleanup
☐ Improperly disposed needle,
☐ Splash blood,
☐ Splash Saliva,
☐ Lab/ pharmacy accident,
☐ Collision with healthcare worker or needle,
☐ IV line related causes,
☐ Recapping,
☐ Disposal-related causes,
☐ Bite/ Aggressive patient,
☐ Splash Urine,
☐ Splash Vomit,
☐ Faulty instrument
☐ Other____________

7. Recommendation for prevention of this type of incident in future:

☐ Not to pass sharp except surgery,
☐ Dispose sharps in sharps container (25% empty),
☐ Proper and immediate disposal of sharps,
☐ Cause specific recommendations,
☐ Use proper techniques for procedures,
☐ Deal cautiously with aggressive patient
☐ Be careful,
☐ No recapping,
☐ Diligence dur. procedure,
☐ Purchase better devices,
☐ Wear proper PPE,
☐ Other ______________

8. Lost time: Give number of work days lost: ☐ 0, ☐ 1, ☐ 3,

If any blood work is positive require follow up: ____________________________
Appendix 5: Ethical approval from SKMC's Ethics Committee
11 December 2007

Dr. Mosazam Zaidi
Occupational Health, SXM C

---

Dear Dr. Zaidi,

Thank you for submitting your application which was considered at the Research Ethics Committee meeting held on 25th November 2007.

After a panel discussion, the general consensus was that the committee approved this study from an ethical point of view.

Committee members present at the meeting and voted for its approval were as follows:

<table>
<thead>
<tr>
<th>#</th>
<th>Member Name</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Dr. Aly B. Khalil</td>
<td>Chair, Research Committee</td>
</tr>
<tr>
<td>2.</td>
<td>Dr. Iashen Rahj</td>
<td>Consultant, Pediatrics</td>
</tr>
<tr>
<td>3.</td>
<td>Dr. Afrozal Haq</td>
<td>Sr. Clinical Scientist, Clinical Chemistry, Dept. of Lab Medicine</td>
</tr>
<tr>
<td>4.</td>
<td>Dr. Junge Seake</td>
<td>Sr. Clinical Scientist, Dept. of Lab Medicine</td>
</tr>
<tr>
<td>5.</td>
<td>Diane Presley</td>
<td>Director of Nursing</td>
</tr>
<tr>
<td>6.</td>
<td>Jeanette Dabell</td>
<td>Clinical Pharmacist</td>
</tr>
</tbody>
</table>

On behalf of the committee members, we are wishing you all the best and looking forward to the smooth, productive and successful accomplishment of this research study.

Sincerely,

ALI KHALIL, MD, FACEP, FACP, FACE
Chairman, Research Ethics Committee

---

The Research Ethics Committee has been organized and operates according to the Good Clinical Practice (GCP) guidelines.
Appendix 6: Blood and Body Fluid Exposure Algorithm
Appendix 7: Questionnaire on perspectives of Healthcare providers
Healthcare providers' perspectives on blood and body fluid exposure

Questionnaire

(Qualitative Analyses)

1. How would you describe a BBFE?
(Type of injury, kind of instrument used, was it due to device error, deep or superficial, blood oozed or not)

2. Please describe any event when you were exposed to body fluid infected by HIV or hepatitis B or C?
(Description of the event, anything different that day, why did the exposure happen?)

2a. Where you aware that the patient/blood was positive for a disease of concern before the event?
(Were the lab results available, do you frequently treat patients with this disease?)

2b. If you did know: did that make a difference to the procedure you were performing?
(Did you use this technique before, has an exposure happened with this procedure before (could you give an example, were you expecting something would go wrong, could you elaborate on your feeling?)

2c. After the exposure what was your first reaction?
(What came to your mind, what did you think to do, what did you feel, emotional state, values)

3. Let's take a scenario; imagine you are pricked by a needle used on a patient known to be positive for HIV, how would you react?
(Would this be different if the patient had hepatitis B or C?)
4. How would you interact with your colleagues if this incident happened during a procedure?
(If the exposure was due to an event influenced by a colleague, how would you interact with that colleague after the event, how would you feel about it?)

5. Where would you go after an exposure?
(Does your hospital have a policy or procedure regarding blood and body fluid exposure?)

6. What would be your most important concern?
(Why would it be important, if you had been in any other place in the world would it be the same, is there a legal aspect of the concern related to your professional privileges?)

7. What cultural or religious concerns might you have about being exposed to HIV or hepatitis B or C?
(Are you concerned about what people would think, could you elaborate on the concerns?)

8. What would be more important: the stigma and cultural impact associated with the disease or the health consequences and treatment? Why?

10. Would you inform your spouse or partner of the exposure?
(If you would; how do you think he/she may react, how would he/she feel, would you think of using protective measures?)

11. If it occurred, how might exposure to potentially infectious blood affect your daily life (without knowing whether or not you had actually become infected)?
(Describe how you would feel when you are at home, any changes in your personal and family life, could you elaborate if the event could have an impact on your professional life)
12. Would you like to add anything you feel was not covered in your responses to the questions above?
(Any thoughts or feelings you would like to share)
Appendix 8: Ethical approval from Central Ethics Committee Wellington
29 April 2011

Mr Moazzam Zaidi
Branch Medical Advisor
ACC Wanganui
11 Taranaki Street, St Johns Hill
Wanganui 4501

Dear Mr Zaidi

Re: Ethics ref: CEN/11/EXP/022 (please quote in all correspondence)
Study title: Healthcare provider’s perspective of the effect of stigma and cultural values on reporting an incident of exposure to patient’s blood and body fluid in NZ
Investigators: Mr Moazzam Zaidi

This study was given ethical approval by the Central Regional Ethics Committee on 29 April 2011.

Approved Documents

--- Information Sheet

This approval is valid until 1 March 2012, provided that Annual Progress Reports are submitted (see below).

Access to ACC

For the purposes of section 32 of the Accident Compensation Act 2001, the Committee is satisfied that this study is not being conducted principally for the benefit of the manufacturer or distributor of the medicine or item in respect of which the trial is being carried out. Participants injured as a result of treatment received in this trial will therefore be eligible to be considered for compensation in respect of those injuries under the ACC scheme.

Amendments and Protocol Deviations

All significant amendments to this proposal must receive prior approval from the Committee. Significant amendments include (but are not limited to) changes to:

--- the researcher responsible for the conduct of the study at a study site
--- the addition of an extra study site
--- the design or duration of the study
--- the method of recruitment

---
Appendix 9: Information and consent sheet for the cross-cultural study
Information Sheet

Principal Investigator:

Dr. Moazzam Zaidi
Branch Medical Advisor, ACC Wanganui
PhD Student, Occupational & Aviation Medicine, University of Otago
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dmoazzam@hotmail.com, moazzam.zaidi@acc.co.nz

Supervisor:

Dr Rob Griffiths
Director Aviation and Occupational Medicine
Department of Medicine, Wellington School of Medicine, PO Box 7343, Wellington
04 385 5592
rcb.griffiths@otago.ac.nz

Title:

"Healthcare provider's perspective of the effect of stigma and cultural values on reporting an incident of exposure to patient's blood and body fluid in New Zealand"

Introduction:

You are invited to take part in a qualitative study to explore the perspectives of the healthcare providers related to blood and body fluid exposure. It will take only 20-30 minutes of your valuable time. Your participation is entirely voluntary (your choice). You do not have to take part in the study; if you do agree to take part you are free to withdraw from the study at any time, without having to give a reason. You do not have to answer all the questions, and you may stop the interview at any time. If you have any queries or concerns regarding your rights as a participant in this study, you may wish to contact your professional organisation.
Study:

A qualitative study is proposed to explore the perceptions of healthcare providers (HCPs) in New Zealand related to the effect of stigma and culture on reporting exposure to HIV and hepatitis (B and C); these diseases are typically transmitted from patients to HCPs. A qualitative study performed in United Arab Emirates (UAE) showed that the HCPs in an emerging multinational tertiary care hospital after exposure to a patient positive to HIV were concerned about the stigma, cultural and religious aspects more than their health and future professional prospects. This study was part of more comprehensive research leading to a PhD which was evaluating an intervention programme to improve compliance regarding blood and body fluid exposure. To address this unique finding it was essential to examine the results in a different socio-political environment. Hence we wish to conduct a study in New Zealand to explore these issues in a developed country to compare and contrast. We will explore these finding by applying the principles of grounded theory and develop an explanatory theory on the role of stigma, culture and religion in reporting and exposure of blood and body fluid and stress on the HCPs while working in a hospital.

Methods:

The selection criteria will be based on purposeful and theoretical sampling methods to ensure that themes arising from earlier interviews can be explored with a representative professional group in more detail. Participants would be clinicians with active patient exposure, perform tasks which could lead to blood and body fluid exposure (i.e. give injections, perform procedures), representatives from both medical and nursing groups, with more than two years of working experience, if possible a mix of different religious and cultural affiliations.

The study intends to interview 8-12 HCPs but the exact number will be determined by when they reach data saturation; we propose to interview four to six physicians and four to six nurses to have a good representation of both professional groups. We will call for volunteers through Wellington and Wanganui DHB intranets. A semi structured interview questionnaire is developed (attached). The interview questions are kept open ended with an interactive approach to selection of topic. The interviews are to be scheduled for 20-30 minutes with every participant separately at the location agreed: either the hospital or Wellington campus of
Otago University. Signed, informed consent will be obtained prior to the interview. Participants will be assured that the interview will be for research purposes only, their name and all forms of identification will be confidential; pseudonyms will be used to identify the participants in the study. An interview log will be maintained to document the researcher’s observations during the session. The interviews will be transcribed; data analysis will be performed concurrently with data collection.

Benefits:
To address the gap in the literature regarding how different factors such as culture, religion and law of the state play a role in reporting and compliance with a blood and body fluid exposure programme.

Period of Study:
The study will be conducted in the first six months of 2011.

Confidentiality:
No material which could personally identify you will be used in any reports in this study. Your name will not be taken during the interview (which will be recorded); even the interview log will have pseudonyms to identify the participants in the study. The interviews will be transcribed using pseudonyms; the transcription will be coded to analyse the themes for qualitative study by the principal investigator and the co-author.

Results:
Once the study is complete the paper will be shared with the participants.

Ethics Approval:
This study has received ethical approval from the Central Regional Ethics Committee.

AUTHORISATION
I have read and understand this consent form, and I volunteer to participate in this research study. I understand that I will receive a copy of this form. I voluntarily choose to
participate, I further understand that nothing in this consent form is intended to replace any applicable Federal, state, or local laws.

Participant’s Name (Printed or Typed): ________________________________

Participant’s Signature: __________________________________________

Date: ______________________

Principal Investigator’s Name (Printed or Typed): Dr. Moazzam Zaidi

Principal Investigator Signature: ______________________________________

Date: ______________________
Appendix 10: Questionnaire for the cross-cultural study
Health-care providers’ (HCPs) perspectives of stigma and cultural on blood and body fluid exposure (BBFE) Questionnaire

(Qualitative Analyses)

Identification #:__________

1. How would you describe a BBFE?

2. Please describe if you ever had an exposure?
   2a. Where you aware that the patient/blood was positive for a disease of concern?
   2b. If you did know: Did that make a difference to the procedure you were performing?
   2c. After the exposure what was your first reaction?

3. Let’s take a scenario; you are pricked by a needles used on a patient known to be positive of HIV, how would you react?

4. How would you interact with you colleagues if this incident happened during a procedure?

5. Where would you go after an exposure?

6. What would be your most important concern?

7. Do you feel there is a cultural or religious aspect to your concerns?

8. Do you think there would be any stigma or cultural pressure on you related to HIV or hepatitis?

9. What would be more important: the stigma and cultural impact associated with the disease or the treatment and its prognoses?

10. Would you inform your partner of the exposure?

11. How would you describe the impact of the event on your life?

12. Would you like to add anything you feel was not covered in our conversation?
Appendix 11: Published article: Needlestick injuries: An overview of the size of the problem, prevention and management.
Needle Stick Injuries: An Overview of the Size of the Problem, Prevention & Management

Moazzam A*¹, Zaidi, Salem A. Beshyah², Robin Griffith³

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2. Department of Medicine, Sheikh Khalifa Medical City, Abu Dhabi, United Arab Emirates
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Abstract
Over 20 million dedicated health care providers (HCP) expose themselves to biological, chemical, and mechanical hazards daily. The World Health Organization estimates that approximately three million health care providers are exposed to blood and body fluid due to needle stick or sharps injuries annually. Blood and body fluid exposures have resulted in 57 documented cases of HIV seroconversion among healthcare personnel through 2001. Two thousand workers a year become infected with hepatitis C, and 400 contact hepatitis B. There are more than 20 additional types of infectious agents documented to be transmitted through needle sticks. More than 80% of needle stick injuries are preventable with the use of safe needle devices. Legislation has been developed in many countries to protect HCPs by encouraging employers to use best practices to prevent these exposures. Many different protocols for post exposure management of needle stick injuries or blood and body fluid exposure have been proposed. Effectiveness of a protocol depends on early initiation of post exposure management. HIV prophylaxis has the smallest window of time treatment and has to be initiated as soon as possible, preferably in the first few hours. Hepatitis B Immunoglobulin (HBIG) could be given within the first seven days. Healthcare institutions should develop policies and procedures to reduce needle stick injuries by proactively instituting these recommendations, vaccinating all HCP for Hepatitis B (HBV), and incorporating improved engineering controls into a comprehensive needle stick injury prevention program. In this review, we present historical background, nature and size of the problem, followed by review of the state of the art of the prevention, clinical management, and corporate responsibilities.

Key words: Needle stick injury, blood & body fluid exposure, prevention, post exposure prophylaxis

Introduction
Needle stick injury is a nightmare that threatens large numbers of health care professionals (HCP) who are...
exposed to blood and body fluid worldwide. The cost is huge to both the employers and to the nation, and is immeasurable at personal and social levels. In this review, we will present the historical background followed by a discussion of the nature and size of the problem, including discussion of prevention, corporate responsibilities, and legal issues. The post exposure management in general, and as it relates to hepatitis and HIV infections, will be discussed with a short comment on its relevance to practice in the developing world.

Background
Since mid 1840s when the first needle was used through today, this essential part of healthcare provision has been a source of occupational injury for healthcare providers (HCPs) (1). Disposable syringes which became available in early 1960s reduced the burden slightly as the need to sterilize and reuse the same syringe was no longer required. In 1978, a medical technician at the University of Wisconsin Hospital in Madison, WI, seroconverted to Hepatitis B after occupational exposure to hepatitis B from an accidental needle stick injury. This sentinel event lead Dr. Dennis Maki and Ms. Rita McCormick,RN, CIC, to perform groundbreaking research that brought the hazards of needle stick injury to the attention of the medical community. This research created awareness in healthcare providers regarding blood borne diseases from contaminated needles and sharps. In their report, published in 1981, Maki and McCormick found that the most important cause of needle stick injuries was recapping attempts, and warned HCPs not to recap needles. Despite the knowledge and awareness of the problem in the medical community, HBV, and other bloodborne pathogens frequently spread by accidental needle stick injuries. It was not until the deadly specter of HIV/AIDS came in the early 1980s that attention was focused on blood and body fluid exposure and the need of needle safety devices (1).

Nature and Size of the Problem
Worldwide Threat to HCPs
There are 20 million healthcare providers (HCP) dedicating their lives to improve the health of more than 6.7 billion individuals around the globe (2). Healthcare providers are exposed to biological, chemical and mechanical challenges everyday which are in addition to the emotional and mental stress they face. These HCPs live under fear of contacting infectious diseases by exposure to contaminated blood and body fluid (BBBF). Needle stick Injury (NSI) and blood & body fluid has been the reason for 57 documented cases of HIV seroconversion among healthcare personnel through 2001. Two thousand workers a year become infected with Hepatitis C (HCV), and 400 with HBV. More than 20 additional types of infectious agents are documented to have been transmitted through needle sticks, including tuberculosis, syphilis, malaria, herpes, diphtheria, gonorrhea, typhus, and Rocky Mountain spotted fever (3). The principal safety concern for health care providers is needle stick injury and becoming exposed to blood and body fluid resulting in seroconversion to HBV, HCV, or HIV. According to the World Health Organization (WHO) approximately three million individuals are injured annually due to needle stick or sharps injuries. HCPs may encounter needle stick injuries during common work days (Table 1). The US alone has had one million needle stick injuries of this type. The estimated number of similar injuries in UK is 100,000 (1). Due to these exposures, approximately 1,000 HCPs are estimated to suffer from serious infections annually (4). US Department of Labor and Occupational Health, Safety, & Administration (OSHA) indicates that in the US, one out of every seven healthcare workers accidentally suffers from a needle stick injury annually. This can be extrapolated to state that in a span of 30 working years every healthcare worker has a possibility of suffering from 4 needle stick injuries. Exposure to blood and body fluid is not limited to physicians and nurses though they are the groups, which suffer from most of the exposures. Exposures are also seen in laboratory technicians, paramedics, nursing assistants, cleaning/ housekeeping staff and even family members.

Needle Stick Injury and The Law
The US Congress in their 106th Session made changes to the blood-borne pathogen standards in effect under the Occupational Health and Safety Act of 1970. The Needle Stick Safety and Prevention Act was developed to prevent occupational exposure to blood-borne pathogens. In 1991, the Occupational Safety and Health Administration (OSHA) issued a standard regulating occupational exposure to blood-borne pathogens (5). The Food and Drug Administration (FDA) issued an alert to utilize needleless IV systems wherever possible. These legislative and regulatory changes were a clear indication that blood and body fluid exposure was recognized as a major issue and this subsequently led to the development of safer needle designs. The first safe needle designs were patented in the 1970s. The FDA has approved more than 250 devices for marketing as safety devices since that time (4). The European Union Directive 2000/54/EC of the European Parliament and the Council of 18 September, 2000, stressed the protection of workers from risks related
Table 1: Common causes of needle stick injuries

<table>
<thead>
<tr>
<th>Causes</th>
<th>Estimated %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposing of needle</td>
<td>35</td>
</tr>
<tr>
<td>Administrating injections</td>
<td>20</td>
</tr>
<tr>
<td>Drawing blood</td>
<td>18</td>
</tr>
<tr>
<td>Recapping needles</td>
<td>15</td>
</tr>
<tr>
<td>Handling trash and dirty linens</td>
<td>12</td>
</tr>
</tbody>
</table>

...to exposure to biological agents at work (6) and dealt with the use of safe methods to prevent healthcare workers from exposure to blood, body fluids, NSI, and other biological contaminants. It mandated all members to comply with the minimum requirements designed to guarantee an effective and improved standard of safety and health with regard to the protection of healthcare workers from the risks related to exposure to biological agents at work. Essentially, the goal was to ensure the safety and health of workers. After this Directive, member countries have initiated changes in their legislation. Austria’s government has started a safety platform. Belgium, France, and Germany have proposed law changes, and Spain has instituted an initiative to address protection of healthcare workers from exposure to needle stick injury and blood and body fluids (7). The United Kingdom’s National Health Services, in their recent guide for “the healthy work places,” have addressed these issues also.

**Prevention**

More than 80% of needle stick injuries are preventable with the use of safe needle devices (4). Primary prevention is the replacement of the risk with a less hazardous substitute. In the case of blood and body fluid, it would require replacement of needles and other sharps. This is not always possible but should be implemented where applicable with needle free connectors, blunt needle cannulas, and adhesive strips to close wounds. Needles and other sharps would always be present in one form or another in the healthcare facility. Secondary prevention methods add active or passive safety features such as shielding in the case of needles and other sharps.

According to the CDC, one quarter of the injuries happen when the protective device was not activated (8). Proactive approaches should include immunization for HBV, awareness campaigns, and training of HCPs regarding the grave consequences of letting blood and body fluid exposures go unreported.

**Effective Post-Exposure Management**

There are many different protocols for post exposure management of needle stick injuries to blood and body fluids. The Centre for Disease Control (CDC), the World Health Organization (WHO), other organizations as well as institutions such as academic hospitals have their own protocols.

**General Principles**

Initiation of post exposure management to blood and body fluids by needle stick or sharps injury depends on timely reporting of the incident. HIV prophylaxis has the smallest window of time. The treatment has to be started as soon as possible, within the first few hours. After 72 hours most protocols recommend not to initiate HIV prophylaxis. HBV Immunoglobulin (HBIG) could be given within the first seven days and has been shown to be 75% effective in preventing seroconversion. Perceived severity of communicable infections, the perceived efficacy of reporting injuries, and overall motivation to maintain health were the best predictors of reporting compliance. Non-compliant personnel when surveyed emphasized the negative aspects of reporting occupational injuries, mainly that it “takes a lot of time.”

The solution to non-compliance of reporting occupational injuries is to invest in training and education designed to sensitize the healthcare providers to the importance of reporting, and its effect on strategic planning to safeguard their health (9). Physicians are least likely to report a needle stick injury compared to other healthcare providers. It is estimated that approximately only one out of three needle
sticks are reported. In the NIOSH study, it was estimated that over 2,100 health care professionals will incur a needle stick related injury at the time of publication; 1999 (10). Several protocols of post-exposure management exist in the literature. These are exemplified by the algorithm followed at the Sheikh Khalifa Medical City, Abu Dhabi, UAE (Figure 1). According to this protocol, when there is a blood and body fluid exposure the following routine is followed both the source (patient) and staff (individual exposed). Each are assessed for their immune status for HBV, HCV, and HIV. If the source is negative for HBV, HCV, and HIV no further follow-up is mandated. If the source is positive for HBV and the staff has antibody titers for HBV below 10 IU post exposure, prophylaxis (PEP) is started immediately. Both HBV immune globulin (HBIG) and HBV vaccine is given immediately. The second dose of HBIG and HBV vaccine is given four weeks later, followed by the third dose of vaccine at six months from the initial dose. In case the source is positive for HCV, the staff member would be followed to assess if they require treatment according to the protocol which is HCV PCR six week after the exposure with follow up blood work for HCV antibodies and LFTs at three and six months.

Advisory Committee on Immunization Practices (ACIP) in 1994 reviewed the available data regarding the prevention of HCV infection with immunoglobulin (IG) as a post exposure prophylactic treatment for HCV exposure. ACIP concluded that they would not support IG or interferon as PEP for HCV (26). Staff members exposed to blood and body fluid infected with HIV are immediately started on the two drug regimen if the exposure was superficial, and blood did not come in contact with the source’s blood. In the case of deep prick or cut injuries during surgery, the three drug regimen is started. Blood tests are requested for follow up according to the protocol.

**Role of Employers**

Policy guidelines should be developed by healthcare facilities for safe working practices for patients with HBV, HCV, HIV infection and AIDS, and should be disseminated across all occupational groups to reduce negative staff attitudes and improve knowledge of occupational transmission. This will establish an appropriate perception of risk, and create a supportive and caring hospital environment for people with HBV, HCV, and HIV. Managers play an integral role in disseminating the policy guidelines and information to all staff on an ongoing basis (11).

Healthcare employers should try to develop policies and procedures to reduce needle stick injuries by proactively vaccinating all HCPs for HBV, and incorporating improved engineering controls into a comprehensive needle stick injury prevention program (Table 2).

**Specific Clinical Problems**

**Hepatitis B**

Occupational transmission of HBV in HCPs is well recognized (12). Blood contains the highest titer of HBV in all body fluids. HBV surface antigen (HBsAg) was also found to be present in breast milk, bile, cerebrospinal fluid,
Figure 1: Protocol used by Sheikh Khalifa Medical City
feces, nasopharyngeal washings, saliva, semen, sweat, and synovial fluid (13). Risk of HBV infection is primarily associated to the amount of contact with blood and presence of Hepatitis e Antigen (HBe Ag) status of the source. Studies show that if the source is positive of both Hepatitis B surface antigen (HBsAg) and Hepatitis e Antigen (HBe Ag), the risk of developing clinical hepatitis was 22-31%. Serological evidence of HBV infection was 37-62%. Whereas if the exposure was to blood from a source which was only HBsAg positive, the risk of developing clinical hepatitis was 1-2%, and developing serological evidence of HBV infection was 23-37% (14). Recent studies have shown that emergence of HBeAg-minus HBV in wild-type HBV carriers is associated with an exacerbation of liver disease. It also showed the presence of antibodies against HBeAg (anti-HBe) in serum in 50% of the cases. In week, an extremely important factor in transmission (17). Therefore it’s possible to get HBV infection by direct or indirect blood or body fluid exposure that inoculates HBV into cutaneous scratches, abrasions, burns, or other lesions or mucosal surfaces (18).

Due to the high risk of HBV infection among HCPs, routine pre exposure vaccine for healthcare providers against HBV, and universal precautions, have been recommended since the 1980s (19). Compliance with this recommendation increased after Occupational Safety and Health Administration (OSHA) (20) issued a standard regulating occupational exposure to bloodborne pathogens (5). Since June 2002, 22 US states have enacted this regulation to some form of legislation to prevent blood and body fluid exposure.

In cases of individuals who were not vaccinated pre-

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majority anti-HBe-positive patients, HBeAg-minus HBV was the predominant virus: HBeAg-minus HBV was shown to be associated with a course of hepatitis which leads to flare-ups of liver cell necrosis interspersed with periods of asymptomatic HBV carriage. This evidence supports the hypothesis that genetic heterogeneity of HBV significantly influences the infectivity and outcome of chronic HBV (15). Bonino and colleagues showed that the ratio between wild-type HBV virus and HBV mutant, unable to secrete “e” antigen (HBeAg minus HBV), appeared to be an effective determinant in the outcome of chronic HBV and its infectivity. Their study showed that quantitative analysis of HBeAg minus HBV in the blood is a useful tool to monitor infectivity in chronic HBV patients (16). Hepatitis B virus has been demonstrated to survive dried blood at room temperature on environmental surfaces for at least one exposure to contaminated body fluid, the efficacy of post exposure prophylaxis (PEP) has been studied. Both HBV immune globulin (HBIG) and for HBV vaccine have been found to be effective. Regimens involving either multiple dose of HBIG alone or the HBV vaccine series alone are reported to be 70-75% effective in preventing HBV infection. HBIG, if initiated in the first week of the exposure to HBsAg positive blood, provides 75% protection from HBV infection (21).

Hepatitis C

Hepatitis C virus (HCV) is not efficiently transmitted through occupational exposure to blood and body fluids. Occupational exposure to blood and body fluid of a HCV positive patient on average has an incidence of 1.8% (range: 0-7%) seroconversion for HCP (22). One study indicated
that transmission for HCV occurred only from hollow-bore needles when compared with other sharps (23). There is limited data on the survival of HCV in the environment. The Advisory Committee on Immunization Practices (ACIP) in 1994 reviewed the available data regarding the prevention of HCV infection with immunoglobulin (IG) as a prophylactic treatment for HCV post exposure. The ACIP concluded that they did not support IG or interferon as PEP for HCV (24). Their conclusion was based on the fact that no protective antibody response has been identified following HCV infection in experimental studies in chimpanzees with IG. From that research, anti-HCV IG failed to prevent transmission of infection after exposure (8). The FDA has not approved antiviral medications such as interferon for post exposure prophylaxis of HCV infection.

In the absence of an effective post exposure prophylactic treatment for occupational exposure to HCV, recommendations for post exposure management are based on interventions to achieve early identification of the disease. Studies have shown that if serum ALT increases considerably (500-1000 IU/L), early therapy in the acute phase can be beneficial. There have been no studies, to evaluate the efficacy of early therapy HCV RNA -positive with normal ALT levels (8). Treatment initiated early in the chronic phase of HCV infection (within 6 months after onset of infection), might be as effective as treatment started during the acute phase (25).

HIV Infection

HCPs are at risk of occupational transmission of HIV after exposure to blood and body fluid infected with HIV. Studies show the risk of HIV transmission after percutaneous exposure to HIV infected blood is estimated to be approximately 0.3% (range: 0.2- 0.3%) whereas the risk of transmission after mucous membrane exposure is approximately 0.09% (range: 0.006- 0.5%) (26). Risk of HIV transmission after exposure to other body fluid and tissues has been quantified but is probably much lower than that for blood (27). Occupational exposure to HIV infected blood should be evaluated within hours not days. If the source is determined to be HIV positive, the occurrence should be investigated as to what type of sharp caused the infection, the amount of blood involved, the exact method of contact with the HCP, and at what stage of infection is the source. These details will help in deciding which post exposure prophylactic drug regimen should be used. Less severe exposure qualifies for two-drug regimen whereas severe exposure requires a three-drug regimen for four weeks duration (28). Optimal duration for

Personal And Economic Cost Of Needle Stick Injury

The Developing World Perspective

A single needle stick injury can cause anywhere from a few hundred thousand to a million dollars. More important than the economical factors of blood and body fluid exposure is the psychological trauma to the individual as well as the co-workers and family members. This includes delayed childbearing, altered sexual practices, and side effects of post exposure prophylactic treatment. These challenges are further complicated if potential chronic disability is developed leading to loss of employment, denial of compensation claims, and even liver disease requiring liver transplant (Table 3).

The American Hospital Association reported that one case of serious occupational exposure to infection by bloodborne pathogens can add up to $1 million or more in expenditures for testing, follow-up, lost time, and disability payments. Whereas the cost of follow-up for a high-risk exposure per needle stick injury with out infection is generally in the range of $3,000. Therefore the total cost of simply testing without subsequent seroconversion in the US approaches US $2.4 billion (8).

At Sheikh Khalifa Medical City the cost ranges from 1300-3500 AED (US$ 300- 1000) for follow up of one incident of blood or body fluid injury without seroconversion. Millions of dollars invested in follow up and treatment after exposure to blood and body fluid can be saved with proper planning for funding to purchase safe needles and equipment. Safe needle devices cost only 28 cents more than standard devices. Still the unutilization of these devices even in hospitals in the US remains less than 15% (4).

Challenges of needle stick injuries in the developing world are even more complicated. The World Health Organization (WHO) estimated that the global burden from occupational exposure to blood and body fluid results in 40% of known
cases of HBV and HCV, and 2.5% of HIV. The WHO stated while 90% of infections among HCPs are attributed to occupational exposure in the developing world, 90% of the reporting of an occupational exposure to BBP is from the developed world (30). This highlights the importance of sensitization and advocacy for both reporting and post exposure follow up in the developing world. However, at the present time, there are limited research data published from the middle east as an example, despite the predictable high risk of bloodborne transmission in the clinical practice. Out the total of 2710 hits in Medline in response to the term search “needle stick injuries”, only 46 reports came from this region. 24 came from Turkey and Iran, 10 from Saudi Arabia, 4 from Egypt, 3 from Jordan 2 from Morocco, one each from Libya, Lebanon, Palestine and Syria. No reports were available from UAE, Iraq, Tunisia, Algeria, Yemen, Qatar and Bahrain.

Final Remarks

Millions of health care providers are exposed to blood and body fluid due to needle stick or sharps injuries annually. Blood and body fluid exposures have resulted in many cases of HIV, HCV, and HBV. Many different protocols for post exposure management of needle stick injuries or blood and body fluid exposure have been proposed. The key element for the effectiveness of a protocol depends on early initiation of post exposure management. Healthcare institutions should strive to develop policies and procedures to reduce needle stick injuries by working proactively to vaccinate all HCP for HBV and incorporating improved engineering controls into a comprehensive needle stick injury prevention program.

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Appendix 12: Published article: Impact of stigma, culture and law on healthcare providers after occupational exposure to HIV and Hepatitis C
Culture, Health & Sexuality

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/tchs20

Impact of stigma, culture and law on healthcare providers after occupational exposure to HIV and hepatitis C

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Impact of stigma, culture and law on healthcare providers after occupational exposure to HIV and hepatitis C

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Worldwide, approximately three million needlestick or sharps injuries occur annually during healthcare procedures, with an estimated 18–35 healthcare professionals (HCPs) acquiring HIV each year as a result. This qualitative study examined the lived experience of occupational exposure to HIV or hepatitis C reported by four HCPs working in a tertiary care hospital in United Arab Emirates (UAE). Findings were based on interviews conducted as part of a larger two-year study investigating an intervention to improve the reporting and management of blood and body fluid exposures (BBFE) in the hospital. The data showed that due to cultural differences, individuals exposed to the same disease within the same legal system could have different concerns. Five themes arose from the data: (1) experiencing the unexpected, (2) inevitability and finality, (3) impact of stigma, (4) responsibility and risk and (5) legal and financial implications. The participants’ most important concerns and causes of stress arising from occupational BBFE were related to the social implications (i.e., stigma; legal and financial costs) rather than the biological consequences of the disease. Social implications like these may negatively impact on reporting of occupational BBFE in UAE, but may need to be addressed at a societal rather than organisational level.

Keywords: HIV; occupational exposure; stigma; UAE

Introduction

The UNAIDS Report on the Global AIDS Epidemic 2010 reported that the total number of people living with HIV in the Middle East and North Africa rose from 180,000 in 2001 to 460,000 in 2009 (Joint United Nations Programme on HIV/AIDS 2010). These numbers are thought to be a fraction of the real figures as there are several reasons for shortages of accurate statistics regarding HIV in the Middle East, including a lack of epidemiologic surveys, cultural stigmatization of the disease, repressive practices of law and religion against high risk groups such as sex workers, and governmental policies that discriminate against HIV-positive individuals (Kulczycki 2004; Magnani et al. 2005; Barss 2009).

In 2009, the total number of people living with HIV was estimated to be approximately 33.3 million worldwide, including 2.6 million individuals who were newly infected and 1.8 million who lost their life due to HIV (Joint United Nations Programme on HIV/AIDS 2010). Healthcare providers (HCP) are confronted on a daily basis with the reality that they could have an occupational exposure to blood or body fluid of a patient positive for
HIV (Breman 1987; Meisenhelder 1998; Prüss-Üstün, Rapiti, and Hutin 2005). This places some HCPs under stress in the work place (Songwathana and Manderson 2001). According to the World Health Organization, approximately three million blood and body fluid exposures (BBFE) occur involving healthcare providers due to needlestick or sharp injuries annually (World Health Organization 2002), with an estimated 18 to 35 HCPs acquiring HIV each year as a result (Black 2006).

It has been argued that the high-risk groups may also contribute further to HIV transmission if they avoid diagnosis or appropriate management of the disease due to the stigma associated with it (Yang et al. 2005; Parvaneh et al. 2006; Cassell and Surdo 2007). Speaking at the 17th International AIDS Conference. Ban Ki-Moon (2008, Secretary-General of the United Nations, labelled stigma ‘the single most important barrier to public action ... a main reason why too many people are afraid to see a doctor to determine whether they have the disease, or to seek treatment if so ... [and] is a chief reason why the AIDS epidemic continues to devastate societies around the world’ (para. 7).

When considering the management of stigma associated with HIV and AIDS, it is important to differentiate between stigma associated with the direct health effects of the disease and stigma associated with its social consequences (Chan, Rungpun, and Reidpath 2009). Chan and colleagues stressed that it is important to understand this distinction before it can be addressed appropriately, stating that there is, however, ‘a scarcity of studies that have explored the relationship between the social stigmatisation of high-risk behaviour and fear of accidental occupational exposure from the perspectives of healthcare workers’ (p. 355). Chan and colleagues studied Thai nurses’ perspectives on issues related to HIV exposure, finding that the nurses’ perceptions of the social consequences of occupational exposure to HIV greatly influenced their attitudes and behaviour towards people living with HIV. Chan’s study, however, focused on nurses speculating about what it potentially might be like to become exposed to HIV, rather than examining the lived experience and social response to a real occupational exposure to HIV.

In our qualitative study an abbreviated version of grounded theory (Willig 2008) was used to explore the responses of HCPs in United Arab Emirates (UAE) to an occupational exposure to a patient’s blood or body fluid infected with HIV or hepatitis C. For the purposes of this paper the term ‘exposure’ is used to refer to direct contact between the blood and body fluid of a patient and the blood or mucus membrane of a health professional (i.e., via a needle stick injury or blood splash where blood goes into the health professionals mouth or eye). While the number of people participating in this study was low (as the number of health professionals exposed to HIV or hepatitis C was low), data from this study is valuable for to two key reasons. Firstly, there is scant research being conducted on prevention, management and treatment of HIV in UAE (Barss 2009) and, secondly, almost no data exists on the experience of health professionals of such an occupational exposure (Chan and Reidpath 2007)

Methods
A qualitative study applying an abbreviated version of grounded theory was used to explore the effect of stigma and culture on reporting by HCPs following occupational exposure to HIV and hepatitis C (Charmaz 2006; Willig 2008). Abbreviated grounded theory is an approach to grounded theory where study data is analysed ‘following the principles of grounded theory (i.e. the processes of coding and constant comparative analysis); [but where] theoretical sensitivity, theoretical saturation and negative case analysis can only be implemented within the texts that are being analysed’ (Willig 2008, 39). Such an approach
was necessary in this study because (as is described below) insufficient numbers of participants, as required for a full grounded theory investigation, were able to be recruited due to the nature of the research question (i.e., the eligible population of potential participants was very small).

This qualitative study was nested within a two-year intervention study designed to explore the impact of how reporting and follow up of BBFE could be improved by involving the staff in developing evidence-based guidelines for a hospital in UAE (Zaidi and Griffiths 2011). The hospital in question was a tertiary care hospital in a UAE city. Ethical approval for the study was provided by the Research and Ethics Committee of the hospital in which the study was performed.

Health care professionals were eligible to participate in the qualitative study if they had experienced occupational exposure to HIV or hepatitis C. During the two years of the interventional study only 3 HCPs were reported to have been exposed to HIV and 21 HCPs as having been exposed to hepatitis C as a consequence of BBFE. Convenience sampling was used, whereby all eligible participants exposed to HIV were recruited to the qualitative study. One additional participant, a surgeon who had been exposed to hepatitis C, was selected to be a part of the study so that we could compare his experience of the threat to his right to perform surgery in UAE arising from a possible infection with hepatitis C to similar threats experienced by the HPCs exposed to HIV.

Data collection involved semi-structured interviews (Payne 1999; Boyce and Neale 2006) conducted with the participants on the hospital campus within the first three days of the exposure. The interview questions were kept open-ended to facilitate an interactive approach (Strauss and Corbin 1990). The interview schedule was designed by the principal investigator and included questions regarding: the participants' perspectives on the factors and events that contributed to their BBFE; the impact of prior knowledge (or lack thereof) of the patients' infectious status on their activities leading up to the BBFE; their reaction to the BBFE in terms of their thoughts and feelings; their behavioural response in terms of their actions within the hospital as well as at home and in the community following BBFE; and their perceptions of the potential impact of the BBFE on their lives. The interviews were conducted by the principal investigator, who was trained in qualitative research methods, including in-depth and focus-group interviews (Smith 2003).

The principal investigator was working as an occupational physician within the hospital at the time of the study. This provided him with an 'insider' perspective to the world of the participants and the research topic. There are advantages and disadvantages of approaching qualitative research from an insider perspective (Conneeley 2002). It is possible for instance that the participants might have been less forthcoming with their opinions. However, it seemed in the case of this research, that the pre-existing relationship meant that the participants felt more assured that their data would be managed ethically and appropriately and so were more candid than perhaps they might have been with an 'outsider' researcher whom they did not know. Having insider status also contributed to the principal investigators' theoretical sensitivity when analysing the data. The dual roles of physician and researcher also raised ethical issues, however. The principal investigator was therefore very careful that he was clear at all times in his work with the participants about when he was working as a physician and when he was working as a researcher and gathering data for this study.

Informed consent was provided orally before each interview. (The participants did not wish to provide written consent, which would have required them to record their name.) The participants were assured that the interview was for research purposes and that their data would be treated as confidential and anonymous. All data for this study was stored electronically in private, password-protected computers, kept separate from all clinical
records associated with the participants and only accessible to the researchers involved in this study. The interviews were each 30–40 minutes in duration and intentionally not audio-recorded due to the sensitivity of the subject matter. While the participants consented to have their comments written down verbatim, they did not want their voices recorded. The principal investigator therefore took in-depth notes during each interview, including verbatim quotes for particularly pertinent comments, and these notes formed the written interview notes for analysis.

The written interview notes from each interview were analysed using grounded theory methods (Charmaz 2006). This involved coding and categorization of data following the constant comparison approach, whereby each interview note was initially read and then coded, with subsequent rereading and coding taking into account the concepts and ideas emerging from all interviews. All written interview notes were individually coded by two authors (MZ and WL) using NVivo 8 software. Initial coding was undertaken on a line-by-line basis. The relationships between and within concepts emerging from this coding were explored with increasingly higher levels of conceptualisation.

Several strategies were employed to ensure the credibility and trustworthiness of the emerging theory. The researchers undertook independent coding of the interview data before comparing findings to ensure that the themes highlighted in the analysis did in fact arise out of the data instead of being imposed on it. Opportunities for the field researcher (MZ) to debrief with the other researchers were sought in order to check the other researchers’ understandings and interpretations of the data. Negative case analysis was used within individual cases to challenge and enrich the themes and concepts which arose from the data. Finally, extracts from data are presented to support the findings described below. Note that these extracts have not been presented with a unique identifier for each participant in order to maximise their anonymity by preventing the construction of an identity of any one participant on the basis of their individual stories.

Findings

The exposure to infection was viewed by the participants as threatening every aspect of their lives: their health, their social standing in society and among peers, their family life, their professional life and employment and their residence in the country. The five main themes arose from analysis of the interview data that reflected the participants’ thoughts and experiences. These were labelled: (1) experiencing the unexpected, (2) inevitability and finality, (3) impact of stigma, (4) responsibility and risk and (5) legal and financial implications. Each of these is discussed below with extracts from the written interview notes.

Participant characteristics

The participants included two men and two women, from medical, nursing and allied health professional backgrounds. All four of the participants were expatriates: three from Asian countries and one from Europe. They had been working in their respective fields for more than five years. The events resulting in BBFE for these participants included needlestick injuries and blood splashes.

Experiencing the unexpected

The HCPs participating in this study were clearly aware that BBFE was an occupational hazard of their work and took this risk seriously but, nevertheless, when exposure occurred
the experience was unexpected and shocking. The participants described having performed the same procedures many times without any exposure or concern; knowledge of the patient’s disease status also tended to make them more cautious. In the case of one of the HCPs, a whole surgical procedure involving a patient known to have HIV had been successfully completed before he pricked himself with the suture needle finishing up:

I don’t know how I got pricked. I just can believe it I was so cautious throughout the surgery.

The other participants also reported shock and surprise about their sudden exposure to infection. Indeed, the hospital had an infection control policy, which the staff had followed appropriately. Some of the participants described having been particularly cautious prior to exposure, either because of the patients’ known infectious status or because of factors that made the situation appear more risky (i.e., patient irritability or severe injury or bleeding where the chances of exposure to blood and body fluid are higher than normal health care activities):

I was not distracted I was more cautious than ever. But I had this bad feeling that this will go wrong.

This accident was totally unexpected ... how could I even think that the instrument would slip from my hand and the sample would be splashed onto my face ... I never thought that this could happen.

The emergency room was described as being one of the most vulnerable locations for exposure as work in this environment was stressful and occasionally events needed to occur without significant prior planning. Patients were also described as more likely to behave in an unpredictable manner in the emergency room. One participant for instance was expecting to be pushed or kicked by the patient and so was being particularly attentive to the potential for needlestick injury. However, she was splashed with blood when her patient unexpectedly pulled on his intravenous line:

In this case I was just drawing blood and did not expect that he would remove the IV line and I would get a splash of blood.

The participants’ first reaction to these unexpected events was surprise, followed by feelings of anger or incredulity at being the subject of what was felt to be an unfair or undeserved outcome. All of the participants wondered why they had been the one who had become exposed:

Nobody in the laboratory has been exposed. Why only me? ... never had a needle stick injury. Why did I get exposed to infected blood?

These emotional responses to BBFE, which are discussed in more detail below, thus appeared to both reflect and reinforce the stigma that the participants perceived to be associated with the disease.

Inevitability and finality

The emotional impact of an exposure from a patient known to have HIV was so significant that some of the HCPs described feeling as if they had lost everything, even before the outcome of exposure could be determined. The HCPs experienced many adverse psychological feelings, such as nervousness, anxiety and depression following exposure:

My partner [a co-worker] had seen this [the exposure], he took over, I immediately went out and took off my gloves hoping it did not reach the skin but when I saw the blood ... it was over. [Here the participant took a deep breath, shaking his head and stopped speaking for a while]
Through his use of the words ‘it was over’ and his body language this participant expressed a sense of finality: an irreversible ending, not just regarding the surgery, but also his career and lifestyle. Later in the interview, this same participant stated:

What could I do? There was nothing left to do . . . it was like the world came to a sudden end.

Other participants also expressed similar intense emotions associated with BBFE and a similar sense of finality, despite, of course, the consequences of their exposure not yet being fully known. One female participant described how her experience of BBFE had impacted not only on her career, but also on her home life, her relationships and her whole worldview. These were changes which were perceived to be irrevocable, contributing to this sense of finality:

What do you mean impact? This event has changed everything for me my confidence, my view of life and relationship with my family and colleagues . . . If I would of wore it [a face mask] I would not have been exposed and not going through this traumatic experience. It cannot be changed.

Knowledge of the infectious status of the source of exposure contributed further to a feeling of impending disaster. This knowledge appeared to play an important role in the participant’s immediate reaction to exposure and to their sense of loss or irreversibility of the event:

The sample was rechecked and it’s positive. They are all saying nothing would happen and I have been transferred from that section now but . . . now it’s too late.

It’s amazing how a single event can change one’s life.

Interestingly, in contrast to reports of shock and surprise upon being exposed to infection, the participants equally expressed a strong sense of the inevitability of their exposure. This sense of inevitability was closely related to the experience of finality; that an event had occurred which could not be changed:

But there was no way that I could have prevented it. Some things are just meant to happen.

I think there will always be the chance of getting pricked during surgery or while performing procedures. Especially the chances of prick increase when you are working under stress and in the chaotic environment of the ER.

**Impact of stigma**

While many events have an impact on the course of one’s life, some events have a more serious impact than others. Similarly many diseases can influence one’s health and social activities, but diseases which have an associated stigma can have a more serious impact. Two of the three individuals who were exposed to HIV-infected blood expressed far more concern with the cultural impact of the disease than with the physical or biological consequences:

You can understand the stigma attached to it, and who would believe that it had [occurred as a result of] a needlestick injury, and [there will be] those who will would say it’s still my fault when I knew that the patient was HIV-positive [so] why didn’t I take precautions? It was entirely my fault.

I do not want to get HIV or AIDS. A girl getting this disease! Do you understand what that will mean? Everyone will start talking. Not just me, my family will be ruined. Our entire family lives in this country. If the disease won’t, the gossip will kill me.

These quotes provide an indication of the social pressure the participants were under and the kinds of problems they believed they were likely to face. They were not only
concerned for themselves but also for the possibility that their family name would be marred:

This is not a simple disease like cancer. It has a stigma to it. You need to live but you live with people. This disease is more a social problem to me than the health concern. If it would be hepatitis B or C or cancer only I would die but in this my whole family will be ruined. Everyone will see them like they have done something wrong ... and my whole family is terrified.

The stigma of infection was so strong that these two participants feared their lives were utterly ruined. Even prophylactic treatment for possible exposure to HIV was stigmatizing:

I can still remember the look on the face of the pharmacist when she was giving me the HIV medication, like I had HIV already. My God it’s hard to live.

It was evident from one participant’s interview that he felt he would be judged negatively by others were he to contract HIV because of the stigma associated with the disease. HIV was linked to social and sexual activities that this participant believed to be forbidden by his religion and that he therefore would become associated with these activities and lifestyles were he to contract HIV, regardless of the method of transmission of the disease. Consequentially he feared he was at risk of being barred from his usual religious activities and, as a result, contracting HIV was considered ‘worse than dying’:

I was thinking if people knew that I have HIV would they like to pray with me? You cannot feel what I am going through these days. It’s worse than dying. Because I am alive and do not know what will happen.

Furthermore, this health professional had been unable to face informing his family. Nevertheless, due to his possible exposure to HIV, he had significantly restricted his relationships with his wife and his children. This was a burden he felt unable to share, so he suffered in silence:

I just did not have the courage to tell her [my wife]. She asked me why I was so quiet and taking this medication I told her this is a precaution that I am taking like a vaccine. She is thinking something is wrong but she does not know what is wrong. I just can’t tell her ... I am not having any close contact with my wife till I know what my fate is. I am not even kissing my kids either. I cannot tell them and I cannot go near them. God this should not happen with anyone.

For other participants, however, the social stigma associated with HIV was less feared. For example, one female participant was less concerned about the impact of infection on her religion and relationships. This seemed to be because she considered her home country to be relatively understanding about the possible mechanisms by which someone could become exposed to HIV. Nevertheless, the stigma of HIV was still considered significant enough to impact on her future employability and therefore of concern from an economic perspective:

The disease is known to have sexual transmission as a way of getting it, but I think people are aware of the occupational link and home is different than this place. I do not see religion being involved in it. But getting a job as a nurse with HIV will not be possible. I do not think any hospital will take me. So I am more concerned of the social and financial aspect, but I am hopeful it will all be ok.

The one participant who had been exposed to hepatitis C rather than HIV expressed similar concern regarding the impact of stigma associated with infectious disease on his future employment. He expressed frustration about the influence of political and religious views on what he viewed to be entirely a clinical issue:
I am a surgeon not a politician I do not think science and politics should be mixed. Disease is a
disease it should not be stigmatized or politicized. Whatever evidence based medicine has
proved we should follow … and to my knowledge in Europe surgeons with hepatitis C can
still practice.\(^1\)

The range of beliefs expressed by the participants regarding the stigma of these infectious
diseases demonstrated how different cultures can influence priorities and perspectives and
how these can impact on quality of life.

**Responsibility and risk**

The participants’ stories of BBFE highlighted a tension between responsibility and risk –
responsibility to provide care according to one’s professional calling and risk of coming to
harm as a result. The ethics of balancing responsibility with risk became more complex
when the burden of risk was not perceived as being equally shared by the clinical team. In
one participant’s case, a colleague responsible for a surgical procedure had not reported in
for work on a day when a patient, known to have HIV, was scheduled for surgery. This
participant stated that he therefore felt as if he was then in a situation of having to choose
whether or not to take responsibility (and thus taking the ‘risk’) for the operation:

> I had to decide to perform surgery or refuse and I decided it’s my professional responsibility to
> perform the surgery. All was going well; all of us were very careful and the surgery went well.
> It was just at the end that when I was stitching that my hand slipped and the finger got pricked.

The surgeon in this case took the responsibility for undertaking the surgery, which he could
have refused. Events like this made the participants question the risks they had been
previously prepared to take. Thus, the participants came to question their continued
involvement in their profession. However, most, once they had time to accept that exposure
had occurred, moved from anger onto feeling that the risk was worth the professional
satisfaction they achieved by serving others:

> At times I do think of changing my profession. In our profession we will always be exposed to
> these diseases. If not HIV something else, but this is the worst – it’s just does not kill you, it
> brings shame for you and your family in our society.
>
> I do think at times that this could happen again, why not change the profession? But then there
> are so many nurses who work all their life and nothing happens to them.

**Legal and financial implications**

Every country has a legal system that has to be respected and followed. In the Middle East
and most of the Gulf countries there are a number of diseases that can result in deportation.
These include HIV and hepatitis B. Surgeons are also not allowed to continue to operate if
infected with hepatitis C, hence all four people involved in this study faced possible legal
implications in terms of their employment, residency in UAE or both. Of note in this study,
those participants who were from communities where HIV was stigmatized tended to be
more concerned about the cultural consequences of the disease rather than the legal or
financial consequences:

> At present I am not thinking of where to stay. My priority is what is going to happen with me
> and what will my future be. Will I live or die with such a stigma. I don’t care where I would
> live. Does it make a difference?

In comparison, those individuals who perceived their cultural communities to be less
judgmental about HIV were far more concerned with the legal and financial impact of the
disease:
I will be deported and the treatment is too expensive at home, I will lose my job and get a disease which is very expensive to be treated.

This kind of stress is horrible when I am performing my duty I do not ask if the patient has any of these diseases and if it [the patient] does would I not treat it; then how can I lose everything if I get it as a result of my occupational exposure?

In addition to the legal and health consequences of infection, the participants were also very concerned about the financial aspect of a diagnosis of HIV or hepatitis. The participants were aware that if they became HIV-positive they would lose their job at the hospital and residence in the country, which would then influence their economic status. Furthermore, it would be hard to find another job in healthcare:

I am stressed because if I seroconvert I could lose my rights to practice surgery and the job. At this stage in my professional life it’s not that easy to go back and establish your practice. As far as family life is concerned I do not see any problem.

All of the participants stated that they believed both the cultural and legal impact (and thus the secondary impact on the financial status) would be considerably different were they to have acquired an infection via BBFE in another country. The participants believed that in Western countries HCPs are insured for such occupational exposures and in most cases the exposed individual would still retain a job in the same or in a different capacity, with treatment being provided by the hospital:

If this would have happened there [in Europe] my concerns would be totally different. I would be thinking of my health not my financial future. The latter would be protected and I would still be allowed to perform surgery. That is a fear you have to live with when you are practicing in this part of the world because the rules are so that if something happens to you; you are sent home without any insurance or treatment.

Definitely if something had gone wrong I would be insured, they would be responsible for my treatment and keeping me employed it would be totally different. I have read of nurses who got a disease after occupational exposure they were given full treatment and were cared for along with ensuring their employment.

It was evident that an occupational exposure to these diseases could potentially have very significant legal and financial implications for the participants involved.

Discussion

An important finding in our study was that all four of the HCPs exposed reported the incident immediately, demonstrating that these individuals trusted the BBFE program and were aware of the importance of early reporting and treatment. By virtue of this, post-exposure prophylaxis treatment was initiated within two hours of exposure, which was in itself evidence of the benefit of the hospital’s new BBFE program.

Only one HCP thought that her exposure could have been prevented. This event changed her practice: she started to wear a face shield while working in the laboratory. The other three HCPs, however, were certain that they had taken all protective measures possible and that these types of incidents were an inevitable part of their job. Health care professionals in China (Lin et al. 2008), India (Mehta et al. 2005), Thailand (Chan, Rungpueng, and Reidpath 2009) and South Africa (Necama and Uys 2003) have also expressed similar beliefs that needlestick injuries and other BBFE are a sometimes unavoidable risk that HCPs have to take – a risk that can be ameliorated but not removed entirely from their work.

The dilemma for HCPs is therefore whether to choose to place the patients’ wellbeing and interests before their own (i.e., an altruistic response) or to place themselves before the patient
(i.e., an avoidance response) (Chan, Rungpueng, and Reidpath 2009). In our study, when the HCPs were faced with the option of treating a person living with HIV or avoiding treatment, they opted to treat. In this regard our findings were similar to the study reported by Chan (Chan, Rungpueng, and Reidpath 2009) and in contrast to studies where HCPs were suggested to have avoidant attitudes towards people with HIV (Chan and Reidpath 2007; Chan et al. 2008). It can be argued that professional codes of practice should provide guidance for decisions in these matters when HCPs find themselves challenged by such a dilemma.

For our study participants, the BBFE was followed by a strong emotional response. The first thought that came to the participants’ minds was that they had suffered a dreadful and irreversible event. Our findings were in concordance with those of Lin and colleagues (2008), who reported that HCPs experienced adverse psychological consequences after an exposure to HIV including nervousness, despair and anxiety. Similarly, Kennedy and colleagues (2009) showed that 35% of HCPs reported that they had moderate or significant anxiety after BBFE. Ncama and Uys (2003) likewise described HCPs in South Africa as experiencing shock, confusion and apprehension to such occupational exposure. Nurses in a study conducted in South Africa reported to have fear of acquiring HIV when they treat a person with HIV even without experiencing BBFE (Ncama and Uys 2003).

The most important concerns for the HCPs in our study were related to the social implications (i.e., stigma, legal and financial penalties etc.) rather than the biological consequences of the disease. It was evident from the cases studies that stigma played a significant role in stress after BBFE. Weiss, Ramakrishna and Somma (2006) defined health-related stigma as ‘a social process, experienced or anticipated, characterized by exclusion, rejection, blame or devaluation that results from experience, perception or reasonable anticipation of an adverse social judgment about a person or group’ (280). Stigma and peer pressure related to HIV were factors that influenced a HCP’s reaction to BBFE (Genberg et al. 2009). Similarly, the Thai nurses in Chan and colleagues’ (2009) study reported that fear of acquiring HIV through occupational exposure was associated primarily with the anticipated social rejection arising from the disease. When asked, these nurses thus all stated that acquiring HIV was much worse than acquiring leukaemia – a chronic, fatal disease – because leukaemia was not accompanied by the same stigma. Lin and colleagues (2008) reported that HCPs had four main concerns after BBFE: family, support from employing institution, future career and societal discrimination. In our study an additional factor, namely laws governing residency and thus employment in UAE, was also identified as potentially influencing HCPs’ attitudes and behaviour regarding BBFE.

Our study suggests that BBFE reporting is not merely an organizational issue – it needs to be addressed at a societal level. Public awareness campaigns and advocacy is required to increase awareness of different modes by which HIV can be transmitted and the availability of post-exposure treatment. Others have also highlighted the importance of reducing stigma associated with HIV as means of reducing the psychological stress experienced by exposed HCPs (Lin et al. 2008). The issue of HIV prevention and stigma is complex in Muslim countries and requires a multifaceted approach that is sensitive to cultural norms. To develop a harm reduction strategy for preventing HIV in these countries, it is essential to examine the social dynamics and practices of the populations at high risk (Hasan 2005).

One limitation of our study was the small sample size. However, the study’s sample size reflects the low number of HCPs being exposed to HIV or low reporting, with only three reported occupational exposures to HIV in the hospital during the two-year period of the study.

Another possible criticism of this study might be that we relied on hand-written notes to record data from participant interviews rather than transcripts of audio-recordings.
This could be perceived as undermining the trustworthiness of the data. However, it should be noted that not all qualitative researchers require interview data to be audio-recorded. Glaser, for instance, one of the two co-creators of ground theory methods, is reported to have advocated against audio-recording interviews, with the suggestion that ‘if you have a lot of detail, that just interrupts your thinking, and you can get side-tracked and detailed’ (Puddephatt 2006, 8). While this was not the reason we chose to avoid using tape-recorders for this study (participant preference was the primary reason) it is certainly true that at least some leading qualitative researchers believe that it is possible to undertake credible qualitative research without use of audio-recorders to collect data.

The strength of the study was that we were able to interview all three HCPs exposed to HIV, providing data on an otherwise seldom discussed experience. Given the sensitive nature of this topic, any data on the views of HCPs who find themselves in this position is valuable and can be learnt from.

Conclusion
This study has shown that due to cultural and religious differences, individuals exposed to the same disease in the same legal system can have different concerns. Stigma attached to HIV and AIDS exists in all societies, though it is perhaps more pronounced in Middle East. The Middle East arguably has a less accepting attitude towards non-mainstream lifestyles in comparison to Western countries and so even if an infection results from occupational exposure, the health professionals may be shunned (or feel at risk of being shunned) by their community.

Our study explored the emotional state and stress that four healthcare providers experienced after an exposure. It showed how the exposure impacted on their personal, family and professional life; how a single accident can change one’s most intimate relationships and one’s view of life. These were real concerns of real people, which need to be addressed in future policies, interventions, education and advocacy campaigns in UAE. Blood and body fluid exposure reporting is not just an organizational issue, but needs to also be addressed at a societal level. More in-depth research is required, particularly in the Middle East, to explore the mechanisms and factors influencing cultural pressures on healthcare providers. Of particular interest would be further studies in which there is a cross-cultural comparison of healthcare providers’ experiences and perspectives regarding occupational exposure to HIV.

Acknowledgements
The authors would like to thank Geoff Fougere, University of Otago, for editorial input during the development of this paper.

Note
1. The ‘Scottish Intercollegiate Guidelines Network (SIGN) Report’ (SIGN 2006) states that HCPs with hepatitis C RNA-positive are not allowed to perform exposure prone procedures in the UK. This is contrary to the view expressed by the HCP.

References
Black, L. 2006. From needlestick statistic to nurse advocate: An on-the-job injury led to HIV and hepatitis C infection. American Journal of Nursing 106: 64G.


Résumé
Dans le monde entier, environ trois millions de blessures par aiguilles ou par objets tranchants se produisent annuellement au cours d’actes médicaux, avec pour conséquence un nombre estimé entre 18 et 35 professionnels de santé infectés par le VIH chaque année. Cette étude qualitative a examiné l’expérience vécue de l’exposition professionnelle au VIH ou à l’hépatite C, rapportée par quatre professionnels de santé exerçant leur activité dans un hôpital pour soins tertiaires dans les Emirats Arabes Unis. Les résultats sont basés sur des entretiens conduits dans le cadre d’une étude plus importante d’une durée de deux ans, sur une procédure visant à améliorer le système des déclarations et de la gestion des expositions au sang et aux fluides corporels dans l’hôpital. Les données révèlent qu’en raison des différences culturelles, les inéquités sont variables parmi les personnes exposées à la même maladie, malgré un système juridique commun à toutes. Cinq thèmes ont été identifiés : (1) expérience de l’inattendu, (2) inévitabilité et irrévocabilité, (3) impact du stigma, (4) responsabilité et risque, et (5) implications juridiques et financières. Les préoccupations et les causes de stress les plus importantes parmi les participants, dues à l’exposition professionnelle au sang et aux fluides corporels, étaient plus souvent associées à des implications sociales liées aux maladies (c’est-à-dire le stigma ; les coûts juridiques et financiers) qu’à leurs conséquences biologiques. Ces implications sociales pourraient avoir un impact négatif sur la transmission d’informations sur l’exposition professionnelle au sang et aux fluides corporels dans les Emirats Arabes Unis, mais pourraient nécessiter d’être abordées au plan sociétal plutôt qu’au plan organisationnel.

Resumen
En todo el mundo cada año ocurren aproximadamente tres millones de lesiones producidas por agujas u objetos punzantes durante procedimientos sanitarios, y en consecuencia se calcula que unos 18 a 35 profesionales de la salud al año se contagian con el virus del sida. En este estudio cualitativo analizamos qué experiencia con la exposición en el trabajo al VIH o la hepatitis C tuvieron cuatro profesionales de la salud que trabajaban en un hospital de atención terciaria en los Emiratos Árabes Unidos (EAU). Los resultados se basaron en entrevistas llevadas a cabo como parte de un estudio más grande de dos años de duración en el que se investigó una intervención para mejorar los informes y el tratamiento de las exposiciones a sangre y fluidos corporales en el hospital. Los datos mostraron que debido a las diferencias culturales, las personas expuestas a la misma enfermedad en el mismo sistema legal podrían tener diferentes problemas. De los datos surgieron cinco temas: (1) experimentar lo imprevisto, (2) inevitabilidad y finalidad, (3) impacto del estigma, (4) responsabilidad y riesgo, y (5) implicaciones legales y financieras. La preocupación más importante de los participantes y las causas de estrés debido a exposiciones a sangre y fluidos corporales en el entorno laboral estaban relacionadas con las implicaciones sociales (es decir, el estigma y los costes legales y financieros) más que con las consecuencias biológicas de la enfermedad. Este tipo de repercusiones sociales podrían tener un efecto negativo en los informes sobre exposiciones a sangre y fluidos corporales en el entorno laboral en los EAU, pero se deberían abordar a nivel social más que organizativo.
Appendix 13: Published article: The reporting of blood and body fluid exposure and follow-up practices in a tertiary care hospital in United Arab Emirates.
ARTICLE

The Reporting of Blood and Body Fluid Exposure and Follow-up Practices in a Tertiary Care Hospital in the United Arab Emirates

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Abstract
The study explored the reporting and follow-up practices after blood and body fluid exposures in a tertiary care hospital in the United Arab Emirates. The Occupational Health Clinic schedule was audited, and medical files of staff members visiting the Clinic to report an exposure during 2006 and 2007 were retrieved for a detailed review. The raw data were obtained and analyzed; the original files were used as a reference to recover any missing information. Results showed that 156 exposures were reported; of which 77.6% were needle stick injuries. These were most commonly caused by handling, passing, disposing of needles, or while manipulating the needle in the patient. Hospital Wards were the most common location from which exposures were reported (41%). Nurses reported 61% of the exposures, followed by physicians 24%, laboratory staff 9%, and others 6%. Blood analysis was performed for 63% of patients to whose blood staffs were exposed. Post exposure blood tests were performed on 91% of staff. Treatment and follow-up was traced for 6 months at which 42.3% of the staff did not complete the follow-up. The retrospective clinical audit showed that the reported exposures were not managed properly. Repeated preventable exposures were being reported which involved exposures related to recapping and disposal. We recommend a comprehensive blood and body fluid programme to improve the safety and quality of work at the hospital.

Key words: Clinical Audit, blood & body fluid exposure, reporting, treatment and follow-up

Introduction
The World Health Organisation (WHO) stated that, while 90% of infections among healthcare providers (HCPs) are attributed to occupational exposure in the developing world, 90% of the reports of occupational exposure to blood and body fluid are from the developed world (1). An assessment conducted by the WHO Eastern Mediterranean Regional Office reported an average of 4 needlestick injuries per year per HCP (2). The most serious consequence of
failure to report an exposure is loss of access to subsequent medical treatment and follow-up for the HCP. According to published studies, 45-65% of all needlestick injuries are unreported (3). There is limited research data published on blood and body fluid exposure (BBFE) from the Middle East and United Arab Emirates (4,5).

Clinical audit has been used for the last two decades as a quality tool to improve outcomes through systematic review of care against explicit criteria, flowing through to subsequent implementation of change (6). Clinical audits have improved clinical outcomes and effectiveness of the interventions. The aim of this study was to perform a clinical audit to assess the reporting and follow-up practices of BBFE in a tertiary care hospital in UAE. Blood and body fluid exposures in this hospital were reported to the Occupational Health Clinic. This study was an integral part of a larger interventional programme. This study was a pre-intervention assessment to examine current practices which would help in developing a comprehensive BBFE programme to improve reporting, treatment, and follow-up of blood and body fluid exposures.

Materials and Methodology

Setting
The Occupational Health Clinic’s records were retrospectively reviewed, to identify all cases in which employees visited the clinic to report an exposure to blood or body fluid between 1 January 2006 and 31 December 2007. For each case, the medical file was reviewed, and the following data were extracted; the number of exposures, the profession of the healthcare provider, type of exposure (needlestick injury or splash), cause of exposure (the physical activity when exposure took place), patients’ blood test (blood analysis of patient whose blood or body fluid was the source of exposure to the hospital staff), staff treatment and follow-up (blood analysis and treatment received by the hospital staff), and seroconversion (post exposure blood test results after six months). The files were reviewed and data was collated by trained individuals; to assess transcription error 10% of the data was randomly verified via the hard copies by the principal investigator.

Data was analysed using Statistical Package for Social Sciences (SPSS) version 18 (7); descriptive statistics were conducted. The research proposal was approved by the Research and Ethics Committee of the hospital.

Audit Standards
We audited against two standards. Firstly, those practices, which were being followed in the hospital; the treating physician would decide the type of post exposure treatment and required follow-up. Secondly, those standards set by “Updated U.S. Public Health Services Guidelines for the Management of Occupational Exposures to HBV, HCV and HIV and Recommendations for Post exposure Prophylaxis” (8).

Results

Reporting
156 BBFE cases were identified in the year study. The most common causes of BBFEs were needlestick injuries. Those injuries were most commonly caused by handling/passing or disposing of the needle, or while manipulating the needle in the patient. A detailed description of blood and body fluid exposures is provided in table 1. The departments where the exposures occurred are shown in Figure 1, which illustrates that the wards were the most common location of the reported exposures, followed by emergency and operating rooms. Blood and body fluid exposures were examined to determine which professional groups reported exposure. Reports were submitted by nurses 61%, physicians 24%, laboratory staff 9% and 6% others, at rates of 3.8 BBFE per 100 full-time equivalent (FTE) nurses followed by 3.3 BBFE per 100 FTE physicians. The exact numbers of other professional groups were not available therefore it was not possible to calculate the rates for those groups.

Patients’ Blood Results
Blood test of those patients to whose blood or body fluid staff were exposed was performed for only 99 out of 156 patients (63.5%). Blood analysis showed that 18 out of 99 patients assessed were infected with either hepatitis C, hepatitis B or HIV, as shown in table 2.

Staff Treatment and Follow-Up
91% of HCPs had their blood tested immediately after the exposure (table 3). However, the proportion having blood tests at three and six months decreased to 74% and 46% respectively. Files which did not have a note indicating need for a follow-up visit were categorized as not applicable for a follow-up visit.

Seroconversion
In 66 out of 156 cases staff did not complete post exposure follow-up. In the 71 cases where follow-up was completed there were no cases of seroconversion identified. Of the 18 known exposures to infected blood, only six individuals were followed up for six months.
<table>
<thead>
<tr>
<th>Type</th>
<th>Clinical or circumstantial cause</th>
<th>Frequency (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needle stick Injury (121)</td>
<td>Manipulating needle in patient</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>IV line related causes</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Handling/passing device during or after use</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Recapping</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Collision with healthcare worker or needle</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Disposal-related causes</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Improperly disposed needle</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Lab/ pharmacy accident</td>
<td>1</td>
</tr>
<tr>
<td>Laceration (13)</td>
<td>Improperly disposed needle</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Handling/passing device during or after use</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Manipulating needle in patient</td>
<td>4</td>
</tr>
<tr>
<td>Puncture (3)</td>
<td>Improperly disposed needle</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Handling/passing device during or after use</td>
<td>2</td>
</tr>
<tr>
<td>Bite (4)</td>
<td>Bite/ Aggressive patient</td>
<td>4</td>
</tr>
<tr>
<td>Splash (15)</td>
<td>Splash blood</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>IV line related causes</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Splash Urine</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Splash Saliva</td>
<td>4</td>
</tr>
</tbody>
</table>
Figure 1. Departments from where blood and body fluid exposure (BBFE) was reported. Notes: OR = Operating Room and ER = Emergency Room.

<table>
<thead>
<tr>
<th>Blood Results</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>81</td>
</tr>
<tr>
<td>Hep B</td>
<td>5</td>
</tr>
<tr>
<td>Hep C</td>
<td>11</td>
</tr>
<tr>
<td>HIV</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 2. The Numbers of Involved Patient’s Blood Results

<table>
<thead>
<tr>
<th>Blood analysis</th>
<th>Immediate [n (%)]</th>
<th>Three months [n (%)]</th>
<th>Six months [n (%)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performed</td>
<td>142 (91)</td>
<td>116 (74.4)</td>
<td>71 (45.5)</td>
</tr>
<tr>
<td>Not applicable</td>
<td>7 (4.1)</td>
<td>10 (6.4)</td>
<td>10 (6.4)</td>
</tr>
<tr>
<td>Not Performed</td>
<td>7 (4.1)</td>
<td>28 (18)</td>
<td>66 (42.3)</td>
</tr>
</tbody>
</table>

Table 3. Staff treatment and follow-up

Discussion
Reporting rates of BBFE exposure are determined by both the effectiveness of primary prevention programmes targeted at needlestick injuries, and the proportion of exposures that are properly reported for assessment and follow-up. The clinical audit in this hospital recorded that 156 HCPs working in a 400 bed hospital reported an exposure during two years, a rate of 19.5 exposures/100 beds/year. This reported rate is slightly greater than reported by McCormick, who reported a rate of 14.7 exposures/100 beds/year (9), Memish who recorded 15.1 exposures/100 beds/year (10), and the International Healthcare Workers Safety Center

Ibrosina Journal of Medicine and Biomedical Sciences (2012)
from US reported average percutaneous injuries of 16.16 exposures/100 beds/year (11). A higher rate of reported exposures was reported by Ruben who reported 32.1 exposures/100 beds/year (12). The extent of under-reporting in the study hospital cannot be accurately assessed, but the absence of a standard protocol, or reporting system suggests that the actual rate of BBFEs are higher than recorded in this audit.

The departmental reporting pattern illustrated that wards reported the largest number of exposures at 41% followed by ER 11%, and OR 7.7%; this may be explained on the grounds that most of the exposure prone activities take place in these settings. Our findings were comparable to statistical information from National Health Services Scotland where 53% of the exposures were reported in the wards followed by 16% in OR and 3% in ER (13) and Jahan from Kingdom of Saudi Arabia, who reported 45% exposures in the wards, 16.9% in OR and 19.2% in ER (14).

The study demonstrated that nurses were more likely to report BBFE than other groups; these findings were in concordance with the results of Zafar (15) and McCormick (9). It has been suggested that the reason for this is that physicians self-assess the exposure (13) and have low perception of risk related to transmission of disease, and therefore under-report to a greater extent.

Most of the BBFE reported were needlestick injuries, with relatively few splashes and bites reported. This may indicate that HCPs felt that only NSI or laceration needed to be reported as a source of exposure. Exposure to other body fluid on non-intact skin or mucous membrane may not have been perceived as reportable by HCPs. The most common reasons for exposures were handling and passing devices, incidents occurring during disposal, manipulating needles inside patients, and contact with needles that should have been consigned to a “Sharps Container”, but had not been. Data from EPINet studies suggest that 47.5% of injuries occur while using sharps, 10% after use but before disposal, and 11% injuries during disposal (11); Jahan reported 39% injuries occurred while using sharps, 53.4% after use but before disposal (14). When compared our audit showed a substantially large proportion of injuries related to disposal.

The audit found that blood test for the patient whose blood was the source of BBFE was performed in only 63% of cases. The CDC recommends that all patients (source) should be informed of the incident and have their blood tested for Hepatitis B, C and HIV because it is essential for appropriate treatment and follow-up for the staff member (8). In 63% of source patients tested in our audit, 18% were found to be infected with either hepatitis B, hepatitis C or HIV. While 91% of staff had an initial blood test following BBFE, only 45% of staff completed the recommended six month blood testing protocol. Twelve out of 18 staff that were exposed to blood known to be infected did not complete the six month protocol.

The CDC recommends that healthcare providers should have follow-up blood test after six month in case of exposure to HIV and hepatitis C and in case of hepatitis B they should be test two months after the third dose of vaccine (8). This was achieved in less than half the cases in this audit, and in only one third of the exposures which were known to be from an infectious source. This could be because the protocols were physician-dependent. Reasons given were that some staff may have thought it was not important to have follow-up blood tests performed, stigma attached to HIV, or fear of being diagnosed with disease which would result in deportation by the UAE health authorities.

The clinical audit showed a level of BBFE reporting comparable to other published studies. However, there were considerable limitations identified in the way reported BBFEs were investigated and followed up. A comprehensive BBFE programme with a standardised protocol addressing investigation and follow-up of BBFEs is required to improve the safety and quality of work at hospital.

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Appendix 14: Published article: Blood and body fluid exposure related knowledge, attitude and practices of hospital based healthcare providers in United Arab Emirates.
Original Article

Blood and Body Fluid Exposure Related Knowledge, Attitude and Practices of Hospital Based Health Care Providers in United Arab Emirates

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Objectives: Knowledge, attitudes, and practices of healthcare providers related to occupational exposure to bloodborne pathogens were assessed in a tertiary-care hospital in Middle East.

Methods: A cross-sectional study was undertaken using a self-administered questionnaire based on 3 paired (infectivity known vs. not known-suspected) case studies. Only 17 out of 230 respondents had an exposure in the 12 months prior to the survey and of these, only 2 had complied fully with the hospital's exposure reporting policy.

Results: In the paired case studies, the theoretical responses of participating health professionals showed a greater preference for initiating self-directed treatment with antiviral or immunisation rather than complying with the hospital protocol, when the patient was known to be infected. The differences in practice when exposed to a patient with suspected blood pathogens compared to patient known to be infected was statistically significant (p < 0.001) in all 3 paired cases. Failure to test an infected patient's blood meant that an adequate risk assessment and appropriate secondary prevention could not be performed, and reflected the unwillingness to report the occupational exposure.

Conclusion: Therefore, the study demonstrated that healthcare providers opted to treat themselves when exposed to patient with infectious disease, rather than comply with the hospital reporting and assessment protocol.

Keywords: Blood and body fluid exposure, Knowledge, Attitude and practices

Introduction

Blood and body fluid exposure has been a known occupational hazard since 1978, when it was first documented that a healthcare provider had acquired an infectious disease due to an occupational exposure to infected blood [1]. The World Health Organization reported that while 90% of infections among healthcare providers are attributed to occupational exposure in the developing world, 90% of the reporting of occupational exposure to blood and body fluid is from the developed world [2,3]. Failure to report an exposure increases the likelihood of consequential infection.

Most of the developing countries do not have a formal blood and body fluid exposure reporting system, due to which exposures go unreported and inadequately treated [4]. Prevention of infection following occupational exposure to a healthcare provider is based on the principles of disease prevention, which can be categorized as primary, secondary, or tertiary. Primary prevention includes safe techniques, needle-free sys-
tems, safe equipment, staff training on safe clinical procedures, and health risk awareness education of blood and body fluid exposures. Secondary prevention includes exposure reporting, immediate post-exposure risk assessment based on characteristics of the source patient, the affected staff member and the nature of the incident itself, which will direct subsequent treatment, follow-up, and surveillance. Tertiary prevention includes counseling for exposed individuals, appropriate safe work advice, and rehabilitation. Reporting is therefore of immense importance because, if this crucial step is not taken secondary and tertiary interventions cannot be implemented. One of the most important aspects of reporting is that the source patient’s blood can be tested as part of the risk assessment. Even if the infection of the patient is known, retesting at the time of the incident indicates the patient’s infectivity, through a polymerase chain reaction test for human immunodeficiency virus (HIV) and hepatitis C, and the hepatitis B envelope antigen (HBeAg) and hepatitis B surface antigen (HbsAg).

According to recently published studies, 5-65% of all needlestick injuries are unreported [5-7]. There is limited research data published on blood and body fluid exposures from the Middle East and United Arab Emirates (UAE) [8,9]

Consistency between health information and knowledge, and knowledge and practice, is the cornerstone for the success of any health promotion or disease prevention program. To measure the effectiveness of a specific blood and body fluid exposure program, many researchers have performed cross-sectional studies to assess the knowledge, attitudes, and practices (KAP) of healthcare providers, which have been successful in identifying the quality and effectiveness of the exposure program. A recently conducted detailed search of the literature was not able to show a single study on blood and body fluid exposure related KAP of hospital based health workers in the UAE [8,9]. Our study was designed to explore KAP of healthcare providers by evaluation of how they might respond to different scenarios that they come across while providing care to patients.

Materials and Methods

In July 2008, healthcare providers visiting the hospital’s occupational health and safety (OHS) clinic were requested to complete an anonymous questionnaire on the first visit only; this convenience sampling method was considered to be representative of the staff complement of the hospital. The hospital had more than 4,500 staff members trained in 40 different countries, introducing differences in culture and religion as they affect KAP. The mean age of participants was 33 year-old (range 20-55). Males were 30% (70 employees) and females were 70% (160). Filipinos were 46% (105 employees), followed by Indians (19%, 43), Arabs (9%, 21) and other nationalities (26%, 61). They were 133 nurses (58%), 19 physicians (8%), 11 laboratory staff (5%) and 67 other healthcare providers (29%) (Table 1). A total of 230 questionnaires were completed with a response rate of 82%

A simple questionnaire was designed to assess the KAP of healthcare providers in terms of:

- Knowledge – This was assessed by questions related to the hospital’s policy and protocol for blood and body fluid exposure including options of investigation, treatment, immunization, and management.
- Attitude – The paired case studies examined the difference in attitudes when a healthcare provider was exposed to a patient known to have hepatitis B, C, or HIV versus an unknown patient.
- Practices – These were assessed by asking if they had reported an exposure, their immunization status, antibody titre, and responses to scenarios in which case management was assessed.

Three disease scenarios (involving hepatitis B, hepatitis C, and HIV) were presented to the participants in paired case studies with a number of options from which to select what action they would take. The first case study had a question regarding exposure to blood of a patient, who was suspected of having hepatitis B, which was followed by a question regarding exposure to a patient who was known to have hepatitis B. The sec-

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ond and third paired case studies had similar questions related to suspected and known cases of hepatitis C and HIV, respectively. Descriptive statistics were generated using SPSS version 18 (SPSS Inc., Chicago, IL, USA). The research proposal was approved by the Research and Ethics Committee of the hospital. Informed consent was obtained from the participants.

Results

First paired case: hepatitis B

The participants were asked to select what they would do if they were exposed to blood or body fluid of patient with suspected hepatitis B. The most common attitude at 55.7% was to have the patient and healthcare provider both undergo a blood test, the number that answered that the patient only should undergo a blood test was 14.3%. The rate of request for a blood test and taking the hepatitis B vaccine and immunoglobulin was 13%, immunoglobulin only was 4.8%, hepatitis B vaccine was 4.3%, and the response of no action should be done was 3%. The responses were different to what they would do if they were exposed to blood or body fluid of a patient with known hepatitis B. The most common action was a blood test for patient and health care workers at 34.8%, followed by taking immunoglobulin as of 22.6%. The rate of taking hepatitis B vaccine was 16.1%, requesting a blood test and taking immunoglobulin and hepatitis B vaccine was 13.0%; no action was the option proposed by 2.6%. The attitude of participants was statistically different when they would be exposed to a suspected

| Table 2. Attitude at the situation of having been exposed to blood or body fluid to suspected or known hepatitis B |
|---|---|---|---|---|
| | Suspected hepatitis B | | Known hepatitis B | |
| | Number | Percentage | Number | Percentage |
| Blood test, engerix B, and immunoglobulin | 30 | 13.0 | 30 | 13.0 |
| Take immunoglobulin | 11 | 4.6 | 52 | 22.6 |
| Take hepatitis B vaccine | 10 | 4.3 | 57 | 16.1 |
| Blood test for patient and healthcare providers | 128 | 55.7 | 90 | 34.8 |
| Blood test for patient only | 33 | 14.3 | 17 | 7.4 |
| No action | 7 | 3 | 6 | 2.6 |
| No response | 11 | 4.8 | 8 | 3.5 |
| Total | 230 | 100.0 | 230 | 100.0 |

F-value = 19.5, p-value < 0.001.

| Table 3. Attitude at the situation to be exposed to blood or body fluid to suspected or known hepatitis C |
|---|---|---|---|---|
| | Suspected hepatitis C | | Known hepatitis C | |
| | Number | Percentage | Number | Percentage |
| Blood test and immunoglobulin | 5 | 2.2 | 24 | 10.4 |
| Take immunoglobulin | 19 | 8.3 | 24 | 10.4 |
| Take antiviral | 11 | 4.8 | 76 | 33.0 |
| Blood test for patient and healthcare providers | 130 | 60.4 | 72 | 31.7 |
| Blood test for patient only | 41 | 17.8 | 18 | 7.8 |
| No action | 7 | 3.0 | 5 | 2.2 |
| No response | 8 | 3.5 | 10 | 4.3 |
| Total | 230 | 100.0 | 230 | 100.0 |

F-value = 18.5, p-value < 0.001.
versus confirmed hepatitis B ($p < 0.001$) as shown in Table 2.

**Second paired case: hepatitis C**

In the second paired case, the participants were asked to select what they would do if they were exposed to blood or body fluid of patient with suspected hepatitis C. The most common attitude at 60.4% was a blood test for the patient and healthcare provider, followed by a blood test for patient only as of 17.8%, taking immunoglobulin was 8.3%, taking antiviral 4.8%, blood test and immunoglobulin 2.2%, and no action was 3.0%. The responses were different to what they would do if they were exposed to blood or body fluid of patient with known hepatitis C. The most common action of the healthcare providers was to take antiviral 33.0%, followed by a blood test for the patient and healthcare providers 31.7%. The rate of request for blood test and immunoglobulin was 10.4%, taking immunoglobulin only was of 10.4%, blood test for patient only was 7.8% and no action was selected by 2.2%. The attitude of participants was statistically different when exposed to between suspected versus patient with known hepatitis C ($p < 0.001$) as demonstrated in Table 3.

**Third paired case: HIV**

After which the participants were asked to select what they would do if they were exposed to blood or body fluid of patient with suspected HIV. The most common attitude was a blood test for the patient and healthcare provider with a response rate of 52.2%, followed by blood test for the patient only of 18.3%. The rate of requesting a blood test and taking post exposure prophylaxis was 12.2%, initiating post exposure prophylaxis without blood test was 11.7%, taking immunoglobulin only was 0.9%, and no action should be done was 1.3%. The respondents had different responses to what they would do if they were exposed to blood or body fluid of a patient known to be infected with HIV. The majority of the respondents 35.7% opted to initiate post exposure treatment without any blood work, followed by 35.7% to perform blood test for patient and health care workers. The rate of request to perform a blood test for both and to start post-exposure prophylaxis was only 10.9%, performing a blood test for patients only was 6.5%, taking immunoglobulin was 4.3%, and no action was 1.3%. The attitude of participants was statistically different when exposed to between suspected versus patient with known HIV ($p < 0.001$) as detailed in Table 4.

**Other questions**

The majority of the respondents (186; 80%) stated that they were immunized for hepatitis B, but only 91 (40%) had their titres checked after immunization to establish that their immunization had been effective, as recommended by hospital policy. Most of the respondents (209; 90%) reported they were aware of a hospital policy to report a blood or body fluid exposure. Only 17 out of 230 respondents had the blood and body fluid exposures in the last 12 months and of these only 2 reported the exposure to both their manager and OHS clinic as required by the hospital policy, whereas 8 respondents reported the exposure to only one of them. The group of 17 healthcare providers who reported having an exposure was further examined for profession and reporting pattern; it composed of 11 nurses, 3 physicians, one laboratory staff member, and 2 healthcare

| Table 4. Attitude at the situation to be exposed to blood and body fluid to suspected or known HIV |
|-----------------|-----------------|-----------------|-----------------|
|                  | Suspected HIV   | Known HIV       |
|                  | Number          | Percentage      | Number          | Percentage      |
| Blood test for both and post exposure prophylaxis | 28              | 12.2            | 25              | 10.9            |
| Take immunoglobulin | 2              | 0.9             | 10              | 4.3             |
| Initiate post-exposure prophylaxis         | 27              | 11.7            | 82              | 35.7            |
| Blood test for patient and healthcare providers | 120             | 52.2            | 82              | 35.7            |
| Blood test for patient only                  | 42              | 18.3            | 15              | 6.5             |
| No action                                     | 3               | 1.3             | 3               | 1.3             |
| No response                                   | 8               | 3.5             | 13              | 5.7             |
| Total                                         | 220             | 100.0           | 230             | 100.0           |

HIV: human immunodeficiency virus,
F-value = 21.8, p-value < 0.001.
providers categorized as ‘other’. When analysed in terms of which professional group reported or decided not to report an exposure, the breakdown showed that 7 out of 11 nurses and 1 out of 3 physicians reported the exposure as shown in Table 5.

The exposure to blood and body fluid of patient was confirmed by 7.4% (17 cases) of the respondents. The most frequent professional group exposed were the nurses 8.3% (11 among 133), followed by physicians 15.8% (3 among 19) and the laboratory staff 9.1% (1 among 11). However, among 17 healthcare providers who were exposed, only 11.8% (2 cases) reported the exposures to both their manager and the OHS clinic. The report to either of them was 47.0% (8 cases). No report to either of them was 41.2% (7 cases) as shown in Table 5.

### Discussion

The study was conducted in a hospital with healthcare providers that had been trained in many different countries; hence before developing a training and awareness campaign for a comprehensive blood and body fluid exposure program, it was essential to assess the determinants of compliance with blood and body fluid exposure protocol in this multinational group of healthcare providers. The hospital had recently implemented a corporate policy that mandated reporting of occupational exposure to blood or body fluids and had developed a post-exposure management protocol.

### Knowledge

The majority of the health professionals were well aware of the different treatment options after an exposure. For example, few healthcare providers selected the option of taking immunoglobulin in case of exposure to hepatitis C, as there is no passive or active immunity enhancement available for this pathogen. In contrast to our finding, Jankovic et al. [10] found that 25% of health care providers incorrectly believed that there was a vaccine for hepatitis C. Similar findings were reported in studies which showed that 30-61% of the health professionals were not aware that hepatitis C was transmitted after a blood or body fluid exposure [11,12].

In the case study of exposure to HIV, less than 5% opted for immunoglobulin’s which are not available. These findings concur with those of Efitie and Salami [13] who found that both the doctors and nurses had good knowledge related to universal precautions: 97% and 92% respectively. On the contrary, Alam [11] reported that 21% healthcare providers did not consider HIV/acquired immune deficiency syndrome (AIDS) to be transmissible after an exposure. While, Slater et al. [14] reported that most of the health professional perceived HIV to be the most likely transmitted disease by needlestick injury followed by hepatitis C and hepatitis B. This demonstrated that knowledge of health professionals varied from study to study; health professionals in the hospital were more knowledgeable than some of their colleagues in other studies. The majority of the healthcare providers were aware of the hospital’s policy for notification of a blood or body fluid exposure in response to recent awareness sessions. However, the concordance of knowledge with attitudes and practices was disappointingly low.

### Attitudes

An attitude is a hypothetical construct that represents an individual’s like or dislike for something. Generally attitudes are the result of either direct experiential or observational learning from the environment. An attitude based upon direct experience appears to be more likely than one based upon indirect experience to have an impact on behavior [15]. Attitudes can be modified by persuasion, awareness, knowledge, and similar strategies. Our study found that healthcare providers knew the importance of blood tests for themselves and the source
patient, but when exposed to a patient known to have hepatitis B, C, or HIV the majority would skip testing and initiate treatment without formal risk assessment. They may have thought that the risk was so serious that testing was unlikely to add value; in addition, there was a reluctance to test as this would require reporting of the incident, the importance of which was under-estimated. Similar attitudes were reported by Aisien and Shobowale [16] in Nigeria, and Mungherera et al. [17] in Uganda. Future education and awareness training should focus on an understanding of the effectiveness of the hospital’s protocols. Moghimi et al. [18] reported that surgeons with proper knowledge of the risk of seroconversion had safer practices. Reda et al. [19] asserted the positive effect of work experience on reducing the frequency of needlestick injuries. These studies supported the fact that experiential or observational learning could positively influence attitudes.

Practices

Hospital staff had a detailed knowledge of potential treatment options, but their responses to the scenarios were based on personal opinion rather than evidence or protocols and there was little consensus. This demonstrated that a standard protocol for post exposure management was required to avoid confusion and improve follow-up. Our findings were in concordance with those of Zhang et al. [20] in China and Mehta et al. [21] in India. The gap between knowledge and practice was indicated by 7 out of 17 healthcare providers who had an exposure in the last 12 months did not report the incident although 90% of them were aware that it should be reported. This finding is in agreement with the literature which showed that there is a pattern of low reporting [22]. Studies in different parts of the world found the number of needlestick injuries to vary from 17 to 30 per 100 beds [23-25]. The low blood and body fluid exposure reporting demonstrated in our study is consistent with similar studies of needlestick injury reporting published by Gurubacharya et al. [12] in Nepal: 21%; Alam [11] in Saudi Arabia: 7%; McGee et al. [7] in Canada: 5%, and Zafar et al. [26] in Pakistan: 53%. These results demonstrate the need for more targeted education and that awareness is required for improving compliance. It is possible that nurses (64%) regard testing and risk assessment more seriously, as they reported the exposures more often than physicians, a finding in concordance with the results of Zafar et al. [26] and McCormick and Maki [1]. This finding needs to be studied further to understand why other professional groups did not report exposures. The majority of the healthcare providers did not have their post-immunization status checked, which is the recommended best practice [27,28]. The results are in agreement to the studies which reported that 60-80% of respondents had been immunized, but only 10-14% had their antibodies checked [11,18,20].

The limitations of this study were that while convenience sampling was used to ensure a good response rate, we were not able to verify the information provided by the healthcare providers because the information was collected anonymously.

The study showed that there was considerable underreporting of occupational exposures and a statistically significant difference in the healthcare providers’ responses to the hypothetical situation, when they knew that the source was positive for HIV, hepatitis B, or C in which healthcare providers opted to treat themselves rather than follow the hospital’s post-exposure protocol.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Acknowledgments

Intramural funds from the hospital were used for photocopying the questionnaires. We are grateful to Ms. Bell and Mr. Flynn for their help with proofreading.

References


Appendix 15: Published article: Healthcare providers’ perspectives on occupational exposure to HIV: A cross-cultural comparison
Healthcare Providers’ Perspectives on Occupational Exposure to HIV: A Cross-Cultural Comparison

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Abstract

Interviews were conducted with 24 doctors and nurses in United Arab Emirates and New Zealand to better understand factors that might influence behaviour after occupational exposure to HIV (e.g., following needlestick injury). While participants in both countries held similar beliefs regarding their primary health concerns, open reporting of HIV exposure in United Arab Emirates hospitals appeared threatened by sociocultural and political factors (particularly stigma and risk of deportation) compared to in New Zealand hospitals.

Keywords: HIV; Hepatitis C; Blood and body fluid exposure; Culture; Religion; Law; Healthcare providers (HCPs)

Introduction

Healthcare providers’ perspectives on occupational exposure to HIV: A cross-cultural comparison

In 2002, the World Health Organization reported that 2.5% of HIV cases amongst healthcare professionals (HCPs) worldwide were the result of occupational exposure [1]. Even when infection does not occur, incidents such as sharps injuries involving HIV-infected blood or body fluids can be significantly distressing for the HCPs involved [2]. Occupational exposure to HIV is particularly concerning in the Middle East, where it is estimated that HCPs receive four needlestick injuries on average per year [3], but where reporting of sharps injuries is poor [4].

We aimed to examine the beliefs and attitudes of HCPs in United Arab Emirates (UAE) compared to those of HCPs in New Zealand (NZ) regarding occupational exposure to HIV-infected blood in order to better understand the factors that might influence behaviour after such exposure. NZ was selected for comparison as it was a Western country of comparable size to UAE (population 4.4 million versus 8.2 million respectively), but with a more established clinical culture of reporting sharps injuries (67% of needlestick injuries are reported in NZ [5] versus just 18% in UAE [4]).

This study employed grounded theory methods [6]. We conducted semi-structured interviews with HCPs (doctors and nurses) who had been working in hospitals in either UAE or NZ for at least five years. Interviews occurred face-to-face in NZ and by audio conference for UAE participants (with three UAE participants providing written responses to questions only). Written consent was obtained for all NZ participants and verbal consent for UAE participants. Interviews were conducted by an occupational health physician with experience working in both NZ and UAE. Interviews lasted 45-60 minutes, were recorded and transcribed. Discussion centered on the participants’ beliefs and experiences regarding management of risk of exposure to patient blood or body fluid, and on personal reactions to hypothetical scenarios involving a sharps injury where a patient’s blood was positive for either HIV or hepatitis C. Data analysis involved coding and categorization of interview transcripts following the constant comparative methods of grounded theory. The study was approved by local ethics committees in NZ and UAE.

Two groups of 12 HCPs from UAE and NZ participated in this study (24 participants in total). Half of the participants in each country were physicians and half nurses. Fourteen participants were male and ten female. All participants from UAE were expatriates from Canada, India, NZ, Pakistan, Palestine, UK, and the USA. Nine participants from NZ were immigrants, who had gained citizenship in NZ having completed their medical or nursing training abroad. Three major themes emerged from the interviews which highlighted key similarities and differences in the participants’ perspectives: primary health and social concerns, perceived severity of stigma, and trust in the system.

The two groups were equally knowledgeable regarding the risks and clinical consequences of occupational exposure to HIV and hepatitis C. Both groups held very similar views regarding the low likelihood of acquiring HIV compared to hepatitis C following sharps injuries, but considered HIV to be the more serious condition due to its social implications.

"I think they're just as bad as each other... even though I'd rather have hepatitis C than HIV... the stigma is more with HIV (Nurse, NZ)

"I think that [HIV] illness would be the most important one, and especially other people knowing about it because of the stigma associated with it. (Doctor, UAE)

The groups differed however in terms of the severity of stigma presumed to arise from occupationally-acquired HIV. Participants from UAE believed HIV was primarily associated with drug addiction and sexual practices stigmatized in the Middle East (e.g. same sex relationships; prostitution) and thought that HCP with HIV (and their families) would be markedly ostracized regardless of the cause of their infection. By comparison, HCP in NZ viewed HIV to be primarily

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associated with homosexuality – a group of people not significantly marginalized in NZ – thus, stigma associated with HIV was somewhat less concerning.

I would think that if one explains how it occurred there would be acceptance. (Doctor, NZ)

The stigma attached to this is strong enough to push someone over the line and may even make them commit suicide. Stigma is worse than having the disease itself. (Doctor, UAE)

The most significant difference between the two groups however, was regarding the participants' trust in their respective countries to support them after exposure or infection. NZ participants felt that all their medical and financial needs would be met were they to acquire HIV at work, hence indicated that they would report any occupational exposure to HIV and immediately access prophylactic treatment.

If it was a needlestick injury, I think this country’s great. You would have ACC [the national health insurance scheme] and you would be supported for a reasonable length of time with them. (Doctor, NZ)

HCP in UAE however were greatly conflicted on this topic, as they risked deportation should they become infected with HIV. Reporting exposure to HIV-infected blood allowed access to prophylactic treatment, but also carried potentially negative legal and employment consequences. Consequentially, some believed that not all HCP would report such exposure in UAE, and one participant stated that he would consider covertly returning to his home country for treatment.

My biggest fear would be that they [other HCPs] would not report it (Nurse, UAE)

I may think of maybe urgently going to my home country, and get the treatment there quickly (Doctor, UAE)

This study highlights the potential for sociocultural and political factors to impact on the uptake of strategies by HCP to better manage risk of occupational exposure to HIV. International policies and procedures for management of such risk may only ever be at best partially effective if implemented at a hospital level only in UAE. Interventions at a state level, to address social and legislative deterrents to reporting of exposure, may be required to achieve levels of reporting similar to that of other countries. Arguably, any country benefiting from the work of HCP has a social responsibility to care for them should they become harmed in the line of duty.

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