

Running head: Childhood sexual abuse and abortion

Experience of sexual abuse in childhood and abortion in adolescence and early adulthood

Abstract

Objective: The present study examined the associations between the experience of sexual abuse in childhood (CSA) and the number of abortions in adolescence and early adulthood.

Method: A 25-year prospective longitudinal study of the health, development, and adjustment of a birth cohort of 1,265 New Zealand children (630 females). Measures included assessments of experience of CSA using retrospective data gathered at ages 18 and 21, self-reported abortions from ages 15-25, measures of childhood socioeconomic disadvantage, family stability, family functioning, experience of childhood physical abuse, and pregnancy in adolescence and early adulthood.

Results: Severity of CSA experience was significantly ($p < .01$) associated with an increasing rate of abortions during ages 15-25. Adjustment of the association for potentially confounding factors from childhood reduced the magnitude of the association, but it remained marginally statistically significant ($p < .10$). However, controlling for the mediating effects of pregnancy risk in adolescence and early adulthood reduced the association between experience of CSA and abortion to statistical non-significance ($p > .70$).

Conclusions: The current study suggested that the association between experience of CSA and increased rates of abortion was mediated by the increased rates of pregnancy associated with CSA experiences. The results suggest a causal chain in which experience of CSA leads to increased rates of pregnancy, which in turn leads to increased rates of abortion.

In recent decades, there has been a large amount of research into the consequences of experience of sexual abuse in childhood (CSA). Numerous studies have shown that individuals exposed to CSA are at greater risk for a wide range of adverse outcomes, including mental health problems and psychosocial adjustment, suggesting that the experience of CSA has long-term consequences for adjustment in adulthood (for reviews see Chalk, Gibbons, & Scarupa, 2002; Cicchetti & Toth, 2005; Fergusson & Mullen, 1999; Finkelhor, 1990; Holmes & Slap, 1998; Johnson, 2004; Kaplan, Pelcovitz, & Labruna, 1999; National Clearinghouse on Child Abuse and Neglect Information, 2005; Putnam, 2003; Wissow, 1995).

One issue that has been of particular interest in the study of CSA has been the consequences of abuse experience on sexual behaviour in adulthood. A number of studies have examined the long-term consequences of the experience of CSA on later sexual behaviour, with several studies suggesting that the experience of CSA in childhood may be related to increases in sexual risk-taking in adulthood. For example, a large multi-site study of over 3000 women suggested that experience of CSA increased the risks of unprotected sex, having a larger number of sexual partners, and engaging in sex while under the influence of drugs and alcohol (NIMH Multisite HIV Prevention Trial Group, 2001). Also, Fergusson, Horwood, and Lynskey (1997) found, in a prospective study of a birth cohort of young women, that increasing severity of experience of CSA was associated with increased risks of early onset of sexual intercourse, teenage pregnancy, a greater number of sexual partners, and having unprotected intercourse. Stock et al. (Stock, Bell, Boyer, & Connell, 1997), in a retrospective study of over 3000 adolescent females, reported that experience of CSA was associated with earlier age at first consensual intercourse and a lower likelihood of using birth control during intercourse. A further retrospective study of women enrolled in a managed care organization (Hillis, Anda, Felitti, & Marchbanks, 2001) found that women who had been exposed to CSA were at greater risk of early onset of intercourse, were more likely to have had 30 or more sexual partners, and were more likely to perceive themselves as being at greater risk for contracting HIV.

A further range of studies have suggested that experience of CSA may also be related to increased risks of undergoing elective abortion in adolescence and early adulthood. For example, Fisher and colleagues (Fisher et al., 2005) found that women who had presented for a repeat termination were more likely to have been exposed to CSA than women presenting for a first termination. Also, Wingood and DiClemente (1997), using a sample of African-American women, found that women who had been sexually abused in childhood were 1.5 times more likely to have had an abortion. Bourassa and Berube (Bourassa & Berube, 2007) reported that women who chose to have an abortion were more likely to have been exposed to CSA as compared with women continuing with pregnancy. Finally, Russo and Denious (1998; , 2001), using data from a large cross-sectional study of women, found that women who had undergone an abortion were more likely to have been exposed to CSA than women who had not undergone an abortion.

The findings of links between the experience of CSA and risky sexual behaviour, and links between CSA experiences and an increased risk of abortion, suggest a causal chain association in which experience of CSA plays a causal role in increasing sexual risk taking leading to pregnancy, and an increased risk of elective abortion. However, previous studies of the consequences of CSA experiences have not investigated these potential links, and studies linking CSA to increased risks of abortion have controlled for neither potentially confounding factors, nor the potentially increased risk of pregnancy amongst those exposed to CSA. The present study examined the associations between the experience of CSA, risk of pregnancy, and risk of abortion using a longitudinal birth cohort of New Zealand-born women. The aims of the present study were to:

1. Examine the associations between the extent of experience of CSA and risk of pregnancy termination in adolescence and early adulthood.
2. Adjust the associations between CSA experiences and pregnancy termination for both potentially confounding factors, and the potentially mediating factor of increased risk of pregnancy.

Method

The data were gathered as part of the Christchurch Health and Development Study (CHDS), a longitudinal study of a birth cohort of 1,265 children born in the Christchurch (New Zealand) urban region in mid-1977. The cohort has been studied at birth, 4 months, 1 year and at annual intervals to age 16 years, and again at ages 18, 21, and 25 (Fergusson & Horwood, 2001; Fergusson, Horwood, Shannon, & Lawton, 1989). The study has collected information from a variety of sources including: parental interviews, teacher reports, self-reports, psychometric assessments, medical, and other record data. The cohort was recruited via contacting all mothers giving birth in all Christchurch maternity hospitals during a four-month period in mid-1977. A total of 1310 children were born in Christchurch during this period, of whom the mothers of 1265 (97%) agreed to participate in the study (630 sample members were female). The study is not representative of the New Zealand population as a whole, but rather represents a cross-section of the population of the Christchurch urban region in 1977.

All phases of data collection were subject to signed consent from research participants. Prior to age 14 all information was collected on the basis of signed parental consent only; from age 14 onwards, signed consent was also obtained from the cohort members. All phases of data collection were subject to ethical approval from the Canterbury Ethics Committee. Data were collected via face-to-face interviews conducted by trained interviewers in single sessions lasting 1-3 hours. The present study was based on data from the 492 women for whom reports of experience of CSA and abortion outcomes were available. This sample comprised 78% of the original sample of 630 females. Missing data on the measure of CSA experiences (below) was due primarily to sample attrition. Preliminary analyses revealed no significant differences on either the pregnancy or abortion measures between those who provided data on CSA and those who did not.

The present analysis used the following measures:

The assessment of childhood experience of sexual abuse (CSA).

Retrospective reports of experience of childhood sexual abuse prior to age 16 were obtained from cohort members at ages 18 and 21 years. Sexual abuse was assessed by asking whether, before the age of 16, anyone had ever attempted to involve them in any of a series of 15 unwanted sexual activities, including: (a) non-contact episodes involving indecent exposure, public masturbation or unwanted sexual propositions; (b) episodes involving sexual contact in the form of sexual fondling, genital contact or attempts to undress the respondent; (c) episodes involving attempted or completed vaginal, oral or anal intercourse (Fergusson, Horwood, & Lynskey, 1996; Fergusson, Lynskey, & Horwood, 1996). Using these data, participants were classified into one of four experience groups reflecting the extent/severity of CSA reports: (a) no sexual abuse (85.9% of the sample); (b) non-contact sexual abuse only (2.7% of the sample); (c) contact sexual abuse not involving attempted or completed sexual penetration (5.1% of the sample); and (d) attempted or completed sexual penetration including vaginal, oral and anal intercourse (6.3% of the sample). This classification was based upon the most severe form of CSA reported at either age 18 or 21. In the present analysis, groups 1 (no sexual abuse) and 2 (non-contact sexual abuse only) have been combined, as preliminary analyses showed that members of these groups had very similar outcomes in terms of the abortion measures reported in this study.

The availability of repeated measures data on CSA provided an opportunity to examine the stability of abuse reporting and the effects of current mental state on reporting errors. This analysis has been reported in a previous paper (Fergusson, Horwood, & Woodward, 2000) which produced the following conclusions:

- i) Reports of CSA showed considerable instability with a kappa value between assessments made at 18 and 21 of .45.
- ii) Whilst reports showed considerable instability and change between 18 and 21 years, there was no evidence to suggest that these reports were influenced by current mental state measures.

- iii) Latent class analyses showed that combining the reports gathered at ages 18 and 21 using an “Or” algorithm in which the participant was assigned to the most severe outcome reported at 18 or 21 led to a correct rate of assignment to the latent classes greater than 98%.

Pregnancy and abortion, ages 15-25

Sample members were interviewed at ages 15, 16, 18, 21, and 25 about pregnancy and abortion occurring since the previous assessment. These reports showed that by age 25, 191 women (39% of the sample) had become pregnant on at least one occasion. These women reported a total of 395 pregnancies of which 86 (22%) were terminated by abortion. The earliest pregnancy and the earliest abortion reported in the cohort were at age 15. The number of abortions during ages 15-25 served as the outcome measure for the present investigation, while the number of pregnancies during ages 15-25 served as a covariate measure.

To cross validate self-report data, the study estimates were compared with officially recorded pregnancy and abortion statistics for New Zealand (Abortion Supervisory Committee, 2002). These comparisons suggested some underreporting of abortion. The observed rate of abortion by age 25 in the cohort (175 per 1000) was 80% of the rate expected based on population figures (220 per 1000). This difference was statistically significant ($p < 0.05$).

Covariate factors

A range of covariate factors was chosen for the study, based on their association with: (a) CSA (Fergusson, Boden, & Horwood, 2008; Fergusson & Mullen, 1999; Putnam, 2003); and (b) abortion during ages 15-25 (Fergusson, Boden, & Horwood, 2007; Fergusson, Horwood, & Ridder, 2006).

Several covariate indices were combined to form the following covariate factors:

Family socio-economic adversity. The extent of family socio-economic adversity was assessed using three measures. (i) *Family socioeconomic status:* This was assessed at the time of the survey child's birth using the Elley-Irving (Elley & Irving, 1976) revised scale of socioeconomic

status for New Zealand. (ii) *Parental education*: Both maternal and paternal education levels were assessed at the time of the survey child's birth using a three level classification system reflecting the highest level of educational attainment (no formal qualifications; high school qualifications; tertiary qualifications). (iii) *Standard of living*: At each assessment from age 1 to age 12 years, interviewer ratings of the family's standard of living were obtained using a 5-point scale that ranged from 'obviously affluent' to 'obviously poor/very poor'. An overall index of the extent of family socio-economic adversity was constructed from these variables by creating a points score as follows. Specifically, the sample member received a point for each of the following criteria that applied: (i) the family was of low (semiskilled or unskilled) socio-economic status; (ii) both parents lacked formal educational qualifications; (iii) the family was rated as having below average living standards on three or more occasions.

Family instability. Comprehensive data on family placement and changes of parents were collected at annual intervals from birth to age 16 years. This information was used to construct two measures of family stability over the period 0-16 years: (i) *Single parent family*: this measure was based on whether the child had ever spent time in a single parent family before age 16 either as a result of entering a single parent family at birth, or as a result of parental separation/divorce. (ii) *Changes of parents*: an overall measure of family instability was constructed on the basis of a count of the number of changes of parents experienced by the child before age 16 years. Information on family instability was supplemented by a further measure of parental conflict. (iii) *Interparental violence*: At age 18, sample members were questioned using items from the Conflict Tactics Scale (Straus, 1979) to assess the extent to which they had witnessed incidents of physical violence or serious threats of physical violence between their parents prior to age 16. An overall measure of family instability/conflict was created by scoring a point for each of the following criteria that applied: (i) the child had spent time in a single parent family; (ii) the child had experienced 3 or more changes of parents; (iii) the young person reported witnessing physical violence or threats of violence between parents.

Parental adjustment. The extent of parental adjustment problems was assessed on the basis of three dichotomous measures. (i) *Parental alcohol problems:* When sample members were aged 15 years, parents were questioned as to whether any parent had a history of alcohol problems. (ii) *Parental criminality:* Also at age 15, information was obtained from parents on whether any parent had a history of criminal offending. (iii) *Parental illicit drug use:* When sample members were aged 11, information was obtained from parents as to whether any parent had a history of illicit drug use. An overall index of parental adjustment was created by summing the three measures for each sample member to produce a count of the number of parental adjustment problems reported.

Parental use of physical punishment (childhood physical abuse: CPA). At ages 18 and 21 sample members were asked to describe the extent to which their parents used physical punishment during childhood (Fergusson & Lynskey, 1997). Separate questioning was conducted for mothers and fathers. This information was used to create a 4-level scale reflecting the most severe form of physical punishment reported for either parent: parents never used physical punishment; parents rarely used physical punishment; at least one parent used physical punishment on a regular basis; at least one parent used physical punishment too often or too severely, or treated the respondent in a harsh or abusive manner.

Statistical analyses

The bivariate association between the three-category measure of experience of CSA and the number of abortions ages 15-25 was modelled using Poisson regression. Covariate adjustment of the model proceeded in two stages. First, the model was adjusted for potentially confounding factors by extending the model to include the three covariate factors described above, entered simultaneously. In the second stage, the model was adjusted for the potentially mediating factor of rate of pregnancy by extending the previous model to include the measure of pregnancies to age 25. In both cases, adjusted rates of abortion were calculated using the methods described by Lee (Lee, 1981).

Results

Associations between experience of CSA and rate of abortions, ages 15-25

Table 1 shows the cohort classified according to the most severe level of experience of CSA (see Methods). The Table displays the associations between experience of CSA and the rate (per 100) of elective abortions from ages 15-25, and reports on the test of linear trend, given by the Wald chi square test from the Poisson regression model. The Table shows that, in general, those exposed to more severe forms of CSA had significantly higher rates of abortion ($B = .39$, $SE = .13$, $p < .01$). For example, those exposed to attempted/completed intercourse had rates of abortion that were approximately 2.25 times greater than those who were not exposed to sexual abuse, or who were exposed to non-contact forms of abuse only.

INSERT TABLE 1 HERE

Socio-economic, family, and individual correlates with experience of CSA

Table 2 shows the Pearson product-moment correlations between the extent of experience of CSA and a range of socio-economic, family stability, and family functioning factors identified as being potentially related to CSA (see Methods). In all cases the correlations were statistically significant ($p < .05$), indicating that the experience of CSA was associated with: (a) greater family socio-economic deprivation; (b) greater family instability; (c) higher rates of parental adjustment problems; and (d) greater experience of CPA.

In addition, analyses also showed that CSA experience was significantly ($p < .0001$) associated with increased rates of pregnancy during ages 15-25. Those in the attempted/completed intercourse classification had the highest rate of pregnancy ($M = 1.70$, $SD = 1.80$), followed by the contact-only classification ($M = 1.17$; $SD = 1.40$); and finally the none/non-contact abuse classification ($M = 0.70$; $SD = 1.16$).

INSERT TABLE 2 HERE

Associations between experience of CSA and rate of abortions, ages 15-25, after adjustment for confounding factors and pregnancy

The preceding analyses raise the possibility that the association between CSA and abortion during adolescence and early adulthood reflects the presence of selection and confounding processes relating to both CSA and abortion. Two models were fitted to the data in order to adjust for confounding and possible mediation pathways. In Model 1, the associations between CSA and abortion were adjusted for the potentially confounding factors shown in Table 2. In this model, the socioeconomic, family stability, parental adjustment, and experience of CPA covariate factors were added to the model simultaneously. Model 2 was an extension of Model 1, and included the number of pregnancies during ages 15-25 years as a variable that mediated the linkage between CSA and abortion. Table 3 shows the rate of abortions for each level of CSA experiences during ages 15-25 after adjustment for: (a) confounding factors in childhood and adolescence (Model 1); and (b) after adjustment for both confounding factors and pregnancy (Model 2). The Table shows:

1. After adjustment for covariate factors related to family socioeconomic status, family stability, parental adjustment, and experience of CPA, the association between experience of CSA and abortion during ages 15-25 was reduced in magnitude, but remained marginally statistically significant ($B = .24$, $SE = .14$, $p < .10$). Statistically significant covariate factors in the final model included the measure of parental adjustment ($p < .05$).
2. Adjustment for the number of pregnancies during ages 15-25 substantially reduced the magnitude of the association between CSA experiences and abortion, to the point of statistical non-significance ($B = .04$, $SE = .14$, $p > .70$).

INSERT TABLE 3 HERE

Supplementary analyses

In order to examine the robustness of the above findings, the analyses reported above were repeated in two separate analyses using the data on CSA experiences collected at : (a) age 18; and (b) age 21. The results of these analyses were consistent with those reported above, with somewhat weaker associations reported. First, at both ages, those reporting more severe forms of sexual abuse also reported higher rates of abortion ($p < .05$). Controlling for covariate factors related to family socioeconomic status, family stability, parental adjustment, and experience of CPA reduced the magnitude of these associations to statistical non-significance. However, as in the case of the model reported above, the addition of the covariate factor number of pregnancies to the models further reduced the association between CSA experiences reported at ages 18 and 21 and rates of abortion.

Discussion

This study has used data gathered over the course of a 25-year longitudinal study to examine the linkages between the experience of CSA and the risk of abortion in adolescence and early adulthood. This analysis led to the following conclusions.

First, in confirmation of previous research linking experience of CSA and abortion (Bourassa & Berube, 2007; Fisher et al., 2005; Russo & Denious, 1998, 2001; Wingood & DiClemente, 1997), there was a clear linkage between increased rates of abortion from ages 15-25 and experience of CSA. Those who were exposed to the most severe class of abuse, attempted/completed intercourse, had rates of abortion that were 2.25 times higher than those who had experienced no abuse or non-contact abuse only. Furthermore, there was evidence that the association between experience of CSA and abortion could be attributed to particularly high rates of abortion amongst the group who experienced the most severe form of sexual abuse, attempted/completed intercourse.

One explanation of the association between experience of CSA and abortion is that this may be due to common confounding processes that influence both risk of experience of CSA and rates of abortion in adulthood. A strength of the present study was the assessment of a wide range of prospectively-measured confounding factors relating to socioeconomic status, family stability, and parental adjustment measures in childhood. While control for these factors reduced to some extent the magnitude of the association between experience of CSA and abortion, the association remained marginally statistically significant. While a number of previous studies have linked experience of CSA with increased risk of abortion (Bourassa & Berube, 2007; Fisher et al., 2005; Russo & Denious, 1998, 2001; Wingood & DiClemente, 1997), the present study suggests that the link cannot be fully accounted for by the effects of confounding factors, suggesting a causal process by which experience of CSA increases the likelihood that a woman will have a pregnancy termination in adolescence and early adulthood.

The findings of the present study suggest that the causal process may be mediated by the strong linkages between experience of CSA and increased rates of pregnancy. In a previous study of this cohort, it was shown that experience of CSA increased the likelihood of engaging in risky sexual behaviour, including unprotected sex, and increased the risks of pregnancy (Fergusson et al., 1997). Control for the mediating effects of increased pregnancy rates in adolescence and early adulthood was sufficient to explain any linkage between the experience of CSA and increased rates of abortion. These findings clearly suggest a causal process in which experience of CSA leads to increased risk of pregnancy, which in turn results in higher rates of abortion amongst those exposed to CSA. These results are consistent with a wide range of research that suggests one consequence of experience of CSA is increased levels of risky sexual behaviour, including unprotected sex, which in turn lead to increased rates of pregnancy (Hillis et al., 2001; NIMH Multisite HIV Prevention Trial Group, 2001; Stock et al., 1997).

While the findings of the present study suggest causal links between experience of CSA, rates of pregnancy, and later abortion, the mechanisms linking CSA to pregnancy and abortion are

unclear. It has been speculated, for example, that issues arising from CSA experiences may be due to inadequate coping responses (Erdmans & Black, 2008). In addition, it has been shown that CSA experience is associated with increased risks of substance use and dependence (Fergusson et al., 2008; Nelson et al., 2006), which in turn is associated with increases in risky sexual behaviour and increases in pregnancy rates (Saewyc, Magee, & Pettingell, 2004). However, further research is required to elucidate the mechanisms underpinning the links between CSA experiences, pregnancy, and later abortion.

These findings are, of course, subject to a number of limitations. First, they report on the experiences of a particular group of individuals born at a specific time and reared in a specific social context. Second, the results are based on self-report data, and thence will be subject to errors of reporting and reminiscence. In particular, although there was considerable instability in the measure of CSA, the use of latent class measures of CSA showed that was in fact a reliable means for assigning participants accurately to classifications of CSA experiences (Fergusson et al., 2000). Third, it may be possible that the links between CSA experiences and abortion may have been mediated by unmeasured factors, in addition to pregnancy; future research may serve to further elucidate the causal pathways linking CSA experience and abortion.

Notwithstanding these limitations, this study leads to three major conclusions about the linkages between experience of CSA and abortion in adolescence and early adulthood. First, there was clear evidence to suggest that experience of CSA was associated with increasing rates of abortion. Second, while the associations between CSA experiences and abortion were explained to some extent by the associations between family background, parental adjustment in childhood, and CSA, there remained a marginal association between CSA experiences and abortion after control for confounding factors. Third, there was suggestive evidence of a causal chain process in which experience of CSA led to increased rates of pregnancy, with this leading to higher rates of abortion amongst those exposed to CSA.

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