**Title**

The use of technology in supporting goal setting in rehabilitation in adults: Protocol for a scoping review.

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**Abstract**

Background: Goal setting is considered an essential component of any rehabilitation programme. However, health professionals can struggle to involve patients in the goal selection process to the extent that they think is desirable. The use of wide spread digital technologies has been suggested as a way to increase engagement of patients in goal setting. There is a need now to collate information on the use of technology to support goals setting for rehabilitation in order to inform future research and clinical practice.

Purpose: To gather and synthesize research on the effectiveness of technology for goal setting in rehabilitation to improve patient outcomes.

Design: Scoping review

Method: MEDLINE (via Ovid), CINAHL (via EBSCO), AMED, and Scopus will be searched for observational or interventional studies, and ProQuest Dissertations and Theses database for grey literature. Two review authors will independently screen the titles and abstracts of each of the potential studies we identify and categorise them as either ‘retrieve’ or ‘do not retrieve’. We will extract data on the characteristics of the included studies: author(s), year of publication, study location; intervention type; duration of the intervention; study populations; aims of the study; methodology used; outcomes collected. Data charting will be developed concurrently with data extraction to produce the results of the review.

**Keywords:** Rehabilitation; Goals; Patient-Centered Care; Mobile Applications; Telemedicine

**Background**

Goal setting is considered an essential component of any rehabilitation programme. For instance, Barnes and Ward stated that ‘the essence of rehabilitation is goal setting’ and that ‘if rehabilitation is to be taken forward, agreed goals and outcomes are essential’. (Barnes & Ward, 2000, p.8) Goal-setting in rehabilitation ensures explicit identification of the reasons for any clinical activity. The term “goal setting” can have multiple meanings depending on the context, the approach or process used to identify and select goals, and by the individuals involved in the selection. In rehabilitation, it has been suggested that setting goals may: increase the patient motivation and drive; allow the rehabilitation process to be better monitored and so to stop ineffective interventions; enhance the effectiveness of therapy; and enhance share decision making and thus the person-centeredness of rehabilitation service delivery. (Levack et al., 2016; Wade & Classification, 2005)

Despite the important attributed to goal setting, health professionals can struggle to involve patients in the goal selection process to the extent that they think is desirable.(Barnard et al., 2010; Berg et al., 2017; Levack et al., 2011; Rohde et al., 2012) This lack of involvement may be due to: a) patients being hesitant to promote their own ideas because they rely in the health professional in charge to direct rehabilitation planning (Schoeb et al., 2014); b) health professionals being overwhelmed by the task of collaborating with patients in goal setting and with goal setting interactions with other professionals, patients and families being perceived as complex, difficult and requiring significant effort (Lloyd et al., 2014); c) lack of clinician education on how to engage patients in goal setting processes, or d) lack of patient interest in participating (Dicianno et al., 2017). The end result, or purpose, of shared decision-making is to ensure that patients are well informed, meaningfully involved in the decision-making process and receive tests and treatments that reflect their goals and concerns.(Cantu, 2018; Sepucha et al., 2016)

The idea that goals setting can positively influence patient engagement in rehabilitation and thus health outcomes is supported by evidence from psychology that has demonstrate that goals can have a significant effect on human performance in general (Austin & Vancouver, 1996). However, evidence from studies in rehabilitation contexts is a less clear. A systematic review of randomised controlled trials investigating the effect of goal setting on health outcomes in rehabilitation found that there was low quality evidence that the addition of goal may influence self-reported quality of life and emotions status after rehabilitation.(Levack et al., 2012) However, this review found no evidence that goal setting could influence scores on measure of body structure, body function, activity or participant after rehabilitation.(Levack et al., 2012) It may be that more targeted, theory driven approach to goal setting could achieve better outcomes for rehabilitation patients.

The use of now wide spread technologies such as electronic tools, systems, devices and resources that generate store or process data like websites, smartphones, apps and social media has been suggested as a way to increase engagement of patients in goal-setting.(Dicianno et al., 2017)

In particular mobile apps are an appealing mobile technology that might support goal setting in the rehabilitation setting. However, the bulk of mobile phone apps on the market are designed for helping the user manage one specific health or wellness activity such as weight loss or exercise, or one specific health condition such as diabetes.(Sepucha et al., 2016) Few mobile phone apps engage the user into the types of goal-setting activities that are important for patients with disabilities who have very complex presentation.(Dicianno et al., 2017; Rose et al.,2017) Over the past 15 years, innovative mHealth or mobile health tools have been developed to help individuals with physical disabilities to establish and communicate their goals. Within mHealth systems, it is now possible to collect, analyse, and display summary data back to the user as a way to “automate” the tracking of progress toward a goal. There is a need now to collate information on the use of technology to support goals setting for rehabilitation in order to inform future research and clinical practice.

**Review objective/s:**

The primary objective of this scoping review is to gather and synthesize research on the effectiveness of technology for goal setting in rehabilitation to improve patient outcomes. For the purposes of this review ‘technology’ will include computer programmes, websites and other Internet-based services, and mobile apps (e.g. apps for smart phones and tablets, websites and social media). The secondary objectives of this scoping review are to identify and summarise the literature which examines:

1. The application of technology for goal setting in rehabilitation (i.e. what works for which patients, how and why);
2. The potential impact of technology for goal setting on the rehabilitation process, patient experiences, patient motivation, and patient engagement in therapy.
3. The extent of current knowledge, knowledge gaps and future research priorities.

**Methods**

For conducting the scoping review we will adopt the framework recommended by Arksey and O’Malley 2005 (Arksey et al., 2005) further developed by Levac, Colquhoun and O’Brien 2010 (Levac et al., 2010) and finally enhanced by the work of Peters et al. 2015 (Peters et al., 2015).This five-step process will include: a) identifying the research question, b) identifying relevant studies, c) selecting studies, d) charting data and e) collating, summarizing and reporting results. (Appendix 1)

**Criteria for considering studies for inclusion**

Types of studies

We will include studies that have explored the development or application of technology (internet-based technology and mobile apps) to facilitate goal setting in rehabilitation, regardless of the methods used in the study. For example, we will include review publications, experimental trials (e.g. randomized controlled trials), observational studies (e.g. cohort studies), case studies, and qualitative studies. We will not exclude studies based on publication date. We will exclude studies published in non-English languages only. We will exclude narrative reviews, opinion pieces and editorials.

Type of participants

We will include studies involving adults with any health conditions, as defined by the International Classification of Disease (10th revision, 5th edition; World Health Organization, 2016), who are receiving rehabilitation. For the purposes of this review, we will use the conceptual description provided by Meyer et al. (2011) to determine what was counted as ‘rehabilitation’. An abbreviated version of this description is that: “Rehabilitation is a health strategy which, based on the World Health Organization’s integrative model of functioning, disability, and health, applies and integrates [assessments and therapeutic interventions]… in partnership between person and provider… to enable persons with health conditions experiencing or likely to experience disability to achieve and maintain optimal functioning”. (Meyer et al., 2011, p.768) We will include studies that include adults who are rehabilitation service users, their health professionals, and their family members, caregivers and supporters.

Types of technology

We will include both goal setting technology that has been designed specifically for rehabilitation services and goal setting technology designed for general use but applied to rehabilitation services. For the purpose of this review we will include the following types of technology: computer programmes, websites and other Internet-based services, and mobile apps (e.g. apps for smart phones and tablets) design to help people set rehabilitation goals. For the purposes of this review will define a rehabilitation goal as: ‘A desired future state to be achieved by a person with a disability as a result of rehabilitation activities. Rehabilitation goals are actively selected, intentionally created, have purpose and are shared (where possible) by the people participating in the activities and interventions designed to address the consequence of acquired disability’ (Levack and Siegert, 2015, p. 11). We will define goal setting as “the establishment or negotiation of rehabilitation goals’ (Levack & Siegert, 2015, p. 11).

We will exclude studies that investigate the development or application of technology that is primarily designed to aid communication (e.g. augmented and alternative communication), without being specifically designed for goal setting. We will exclude studies that investigate the development or application of technology to measure performance against goals (e.g. pedometers to measure step count against a goal related to walking). We will review our interpretation of these criteria once the number of potential articles has been determined, in accordance with the reflexive nature of scoping reviews. (Arksey & O’Malley, 2005; Daudt et al., 2013)

**Search strategy**

We will search MEDLINE (via Ovid), CINAHL (via EBSCO), AMED, and Scopus, and will adapt our search strategy as appropriate for each database. We will search ProQuest Dissertations and Theses database for the grey literature. We will search in these databases their inception to the date of the search. To develop the search strategy for each database we drew on previous publications on the area of rehabilitation, goal setting and mobile technology and we also consulted the librarian of the University of Otago to define the search strategy. Appendix 2 presents the complete search strategies for each database. In addition to electronic database search, we will search the reference lists of all included studies by hand.

**Data collection and analysis**

Selection of studies

Two review authors will independently screen the titles and abstracts of each of the potential studies we identify from the search, and categorise them as either ‘retrieve’ (eligible or potentially eligible/unclear) or ‘do not retrieve’. We will retrieve the full-text study reports/publications and two review authors will independently screen the full-text and identify studies for inclusion, identifying and recording reasons for exclusion of the ineligible studies. We will use Rayyan to manage the selection of included studies. We will resolve any disagreement through discussion or, if required, will consult a third review author. We will record the selection process in sufficient detail to complete a PRISMA flow diagram. (Appendix 3)

Data extraction

As detailed by the Arksey and O’Malley framework, the extraction and charting the data will be an iterative process, with initial analysis being used to influence decisions regarding future data extraction. To begin with we will extract data on the characteristics of the included studies: author(s), year of publication, study location; intervention type; duration of the intervention; study populations; aims of the study; methodology used; outcomes collected.

Where studies report on outcomes, we will extract the following as primary outcomes:

* Participation outcomes as defined by the ICF (WHO 2001a), e.g. work, community integration, social relationships.
* Activity outcomes as defined by the ICF (WHO 2001a), e.g. activities of daily living, mobility.

We will extract the following as secondary outcomes of interest:

* Adverse outcomes, e.g. complications, morbidity, mortality, readmission rate.
* Quality of life
* Outcomes at the level of body structure and function as defined by the ICF (WHO 2001a).
* Patient motivation or engagement in rehabilitation
* Satisfaction with the goal setting or rehabilitation process (from the perspective of any patients, clinicians, family members/carers/supporters).
* Patient or family/carers/supporter engagement in the rehabilitation process.

For the purpose of this review, we will consider “engagement” to be “a co-constructed process and a patient state. It incorporates process of gradually connecting with each other and/or a therapeutic program, which enables the individual to become an active, committed and invested collaborator in healthcare.” (Bright et al., 2015, p.650) We will consider measures of motivation, effort in rehabilitation, or adherence to be tools for evaluating components of engagement.

Data charting

Data charting will be developed concurrently with data extraction. We will organize and gather the information we collect into table for better communication and interpretation. We will summary the main issues or concepts that emerge from this data charting in a narrative report on the study findings. We will present the results of this review as a map of the data extracted in a diagrammatic or tabular form, and/or in a descriptive format that aligns with the objective/s and scope of the review.

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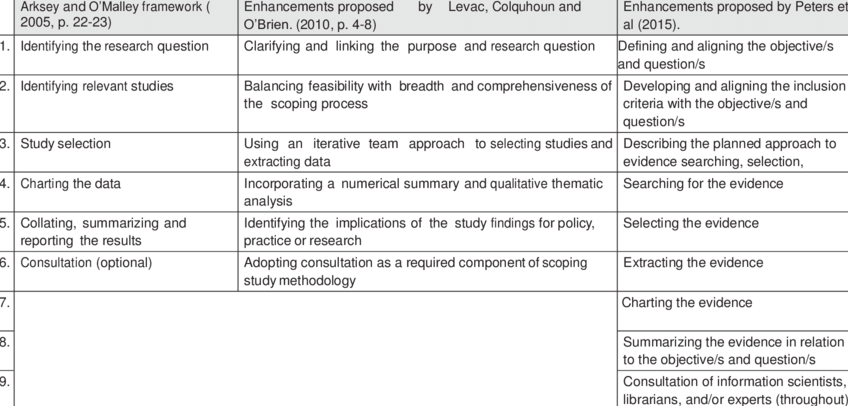
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**Appendix 1. Framework for scoping review**



**Appendix 2. Databases and preliminary search results**

**MEDLINE**

|  |  |  |
| --- | --- | --- |
|  | **Search** | **Results** |
| 1 | ((app or apps or application\* or technolog\*) adj2 (mobile\* or device or tablet or tablets or phone\* or cellphone\* or smartphone\* or smart-phone\* or handheld\* or hand-held\* or digital or communication)).tw,kw. | 20332 |
| 2 | ((social adj1 (app\* or media\* or networking)) or website\* or web-site\* or internet-based or webpage\* or web-page or web-based).tw,kw. | 74245 |
| 3 | mobile applications/ | 4237 |
| 4 | Cell Phone/ | 7848 |
| 5 | computers, handheld/ or smartphone/ or internet/ or web browser/ or social media/ | 79919 |
| 6 | (mhealth or m-health or app or apps).tw,kw. | 26898 |
| 7 | or/1-6 | 170841 |
| 8 | exp rehabilitation/ | 288576 |
| 9 | exp rehabilitation centers/ | 13979 |
| 10 | recovery of function/ | 47951 |
| 11 | exp physical therapy modalities/ | 144294 |
| 12 | (physiotherap\* or physical therap\* or occupational therap\* or neurorehab\* or rehab\* or recover\*).tw. | 802634 |
| 13 | or/8-12 | 1046754 |
| 14 | ((goal\* or target\*) adj3 (behavio\* or set\* or plan\* or agree\* or negotiat\* or discuss\* or propos\* or prescrib\* or develop\* or formulat\* or elaborat\* or establish\* or identif\* or write or written or state\* or specif\* or construct\* or manag\* or direct\* or orient\* or attain\* or achiev\* or evaluat\* or cent?red)).tw. | 293336 |
| 15 | Goals/ | 15831 |
| 16 | 14 or 15 | 303481 |
| 17 | 7 and 13 and 16 | 375 |
| 18 | limit 17 to english language | **370** |

**AMED**

|  |  |  |
| --- | --- | --- |
|  | **Searches** | **Results** |
| 1 | exp computers/ or internet/ | 2799 |
| 2 | (internet\* or web-based or website\* or web-site\* or webpage\* or web-page\* or cellphone\* or "cell\* phone\*" or smartphone\* or smart-phone\* or "mobile device\*" or mhealth or m-health or app or apps or "mobile phone\*" or "digital technolog\*" or handheld\* or hand-held\* or tablet or tablets).mp. | 3196 |
| 3 | 1 or 2 | 4739 |
| 4 | (goal\* or target\*).mp. | 11101 |
| 5 | goals/ | 537 |
| 6 | 4 or 5 | 11101 |
| 7 | 3 and 6 | 254 |
| 8 | nursing/ or rehabilitation/ or "therapeutic use"/ or therapy/ | 102163 |
| 9 | (rehab\* or physiotherap\* or therap\* or exercis\* or recover\* or neurorehab\*).mp. | 183240 |
| 10 | 8 or 9 | 185566 |
| 11 | 7 and 10 | 169 |
| 12 | limit 11 to english | **158** |

**Scopus**

**403 document results**

( ( TITLE-ABS-KEY ( ( ( app OR apps OR application\* OR technolog\* ) W/2 ( mobile\* OR device OR tablet OR tablets OR phone\* OR cellphone\* OR smartphone\* OR smart-phone\* OR handheld\* OR hand-held\* OR digital OR communication ) ) ) OR TITLE-ABS-KEY ( ( ( social W/1 ( app\* OR media\* OR networking ) ) OR website\* OR web-site\* OR internet-based OR webpage\* OR web-page OR web-based ) ) OR TITLE-ABS-KEY ( ( mhealth OR m-health OR app OR apps ) ) ) ) AND ( ( TITLE-ABS-KEY ( physiotherap\* OR "physical therap\*" OR "occupational therap\*" OR neurorehab\* OR rehab\* OR recover\* OR "exercis\* therap\*" OR "activities of daily living" ) AND TITLE-ABS-KEY ( ( ( ( goal\* OR target OR targets ) W/3 ( behavio\* OR set\* OR plan\* OR agree\* OR negotiat\* OR discuss\* OR propos\* OR prescrib\* OR develop\* OR formulat\* OR elaborat\* OR establish\* OR identif\* OR write OR written OR state\* OR specif\* OR construct\* OR manag\* OR direct\* OR orient\* OR attain\* OR achiev\* OR evaluat\* OR centred OR centered ) ) ) ) ) ) AND ( LIMIT-TO ( LANGUAGE,"English" ) )

**CINAHL**

|  |  |  |
| --- | --- | --- |
| S16 | S12 AND S15 | (242)  (**236**) with English limit |
| S15 | S13 OR S14 | (76,908) |
| S14 | TI ( (goal\* OR target\*) N3 (behavio\* OR set\* OR plan\* OR agree\* OR negotiat\* OR discuss\* OR propos\* OR prescrib\* OR develop\* OR formulat\* OR elaborat\* OR establish\* OR identif\* OR write OR written OR state\* OR specif\* OR construct\* OR manag\* OR direct\* OR orient\* OR attain\* OR achiev\* OR evaluat\* OR centred OR centered) ) OR AB ( (goal\* OR target\*) N3 (behavio\* OR set\* OR plan\* OR agree\* OR negotiat\* OR discuss\* OR propos\* OR prescrib\* OR develop\* OR formulat\* OR elaborat\* OR establish\* OR ident [...](javascript:showHistoryTerm('ctl00_ctl00_MainContentArea_MainContentArea_historyControl_HistoryRepeater_ctl02_ellipsis',true)) | (68,724) |
| S13 | (MH "Goals and Objectives") OR (MH "Goal-Setting") OR (MH "Goal Attainment") | (16,845) |
| S12 | S7 AND S11 | (6,229) |
| S11 | S8 OR S9 OR S10 | (445,114) |
| S10 | TI ( (physiotherap\* or physical therap\* or occupational therap\* or neurorehab\* or rehab\* or recover\* OR "exercis\* therap\*" OR "activities of daily living") ) OR AB ( (physiotherap\* or physical therap\* or occupational therap\* or neurorehab\* or rehab\* or recover\* OR "exercis\* therap\*" OR "activities of daily living") ) OR SU ( (physiotherap\* or physical therap\* or occupational therap\* or neurorehab\* or rehab\* or recover\* OR "exercis\* therap\*" OR "activities of daily living") ) | (340,610) |
| S9 | (MM "Rehabilitation Centers") | (2,226) |
| S8 | (MH "Rehabilitation+") | (251,562) |
| S7 | S1 OR S2 OR S3 OR S4 OR S5 OR S6 | (104,812) |
| S6 | TI ( ((social N1 (app\* OR media\* OR networking)) OR website\* OR web-site\* OR internet-based OR webpage\* OR web-page OR web-based)) ) OR AB ( ((social N1 (app\* OR media\* OR networking)) OR website\* OR web-site\* OR internet-based OR webpage\* OR web-page OR web-based)) ) OR SU ( ((social N1 (app\* OR media\* OR networking)) OR website\* OR web-site\* OR internet-based OR webpage\* OR web-page OR web-based)) ) | (56,365) |
| S5 | TI ( (mhealth OR m-health OR app OR apps) ) OR AB ( (mhealth OR m-health OR app OR apps) ) OR SU ( (mhealth OR m-health OR app OR apps) ) | (7,581) |
| S4 | TI ( (app OR apps OR application\* OR technolog\*) N2 (mobile\* OR device OR tablet OR tablets OR phone\* OR cellphone\* OR smartphone\* OR smart-phone\* OR handheld\* OR hand-held\* OR digital OR communication) ) OR AB ( (app OR apps OR application\* OR technolog\*) N2 (mobile\* OR device OR tablet OR tablets OR phone\* OR cellphone\* OR smartphone\* OR smart-phone\* OR handheld\* OR hand-held\* OR digital OR communication) ) OR SU ( (app OR apps OR application\* OR technolog\*) N2 (mobile\* OR device OR tablet OR  [...](javascript:showHistoryTerm('ctl00_ctl00_MainContentArea_MainContentArea_historyControl_HistoryRepeater_ctl12_ellipsis',true)) | (14,725) |
| S3 | (MM "Internet") OR (MH "Social Media+") OR (MM "World Wide Web") OR (MM "World Wide Web Applications") OR (MH "Internet of Things") | (48,958) |
| S2 | (MH "Smartphone") OR (MH "Cellular Phone") OR (MH "Computers, Hand-Held") OR (MH "Computers, Portable") | (8,478) |
| S1 | (MH "Mobile Applications") OR (MH "Web Browsers") | (5,872) |

**Proquest Dissertations and Theses database**

**413 results**

((ti(((app OR apps OR application\* OR technolog\*) NEAR/2 (mobile\* OR device OR tablet OR tablets OR phone\* OR cellphone\* OR smartphone\* OR smart-phone\* OR handheld\* OR hand-held\* OR digital OR communication))) OR ab(((app OR apps OR application\* OR technolog\*) NEAR/2 (mobile\* OR device OR tablet OR tablets OR phone\* OR cellphone\* OR smartphone\* OR smart-phone\* OR handheld\* OR hand-held\* OR digital OR communication))) OR su(((app OR apps OR application\* OR technolog\*) NEAR/2 (mobile\* OR device OR tablet OR tablets OR phone\* OR cellphone\* OR smartphone\* OR smart-phone\* OR handheld\* OR hand-held\* OR digital OR communication))) OR ti(mhealth OR m-health OR app OR apps) OR ab(mhealth OR m-health OR app OR apps) OR su(mhealth OR m-health OR app OR apps) OR ti(((social NEAR/1 (app\* OR media\* OR networking)) OR website\* OR web-site\* OR internet-based OR webpage\* OR web-page OR web-based)) OR ab(((social NEAR/1 (app\* OR media\* OR networking)) OR website\* OR web-site\* OR internet-based OR webpage\* OR web-page OR web-based)) OR su(((social NEAR/1 (app\* OR media\* OR networking)) OR website\* OR web-site\* OR internet-based OR webpage\* OR web-page OR web-based))) AND (ti(physiotherap\* OR "physical therap\*" OR "occupational therap\*" OR neurorehab\* OR rehab\* OR recover\* OR "exercis\* therap\*" OR "activities of daily living") OR ab(physiotherap\* OR "physical therap\*" OR "occupational therap\*" OR neurorehab\* OR rehab\* OR recover\* OR "exercis\* therap\*" OR "activities of daily living") OR su(physiotherap\* OR "physical therap\*" OR "occupational therap\*" OR neurorehab\* OR rehab\* OR recover\* OR "exercis\* therap\*" OR "activities of daily living"))) AND noft((goal\* OR target\*) NEAR/3 (behavio\* OR set\* OR plan\* OR agree\* OR negotiat\* OR discuss\* OR propos\* OR prescrib\* OR develop\* OR formulat\* OR elaborat\* OR establish\* OR identif\* OR write OR written OR state\* OR specif\* OR construct\* OR manag\* OR direct\* OR orient\* OR attain\* OR achiev\* OR evaluat\* OR centred OR centered))

Applied filters

Scholarly Journals OR Dissertations & Theses OR Conference Papers & Proceedings OR Other Sources OR Books OR Working Papers

English

**Appendix 3. PRISMA for scoping review**

