Patient experiences of codesigned rehabilitation interventions in hospitals: a rapid review

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ABSTRACT

Background Codesign strengthens partnerships between healthcare workers and patients. It also facilitates collaborations supporting the development, design and delivery of healthcare services. Prior rehabilitation reviews have focused mainly on the clinical and organisational outcomes of codesign with less focus on the lived experience of rehabilitation patients.

Objective To explore patient experiences of codesigned hospital rehabilitation interventions.

Design Rapid review and evidence synthesis of the literature.

Data sources CINAHL, MEDLINE, Embase and Cochrane databases were searched from 1 January 2000 to 25 April 2022.

Study selection Studies reporting patient experiences of codesigned rehabilitation interventions in hospitals.

Results 4156 studies were screened, and 38 full-text studies were assessed for eligibility. Seven studies were included in the final rapid review. Five out of the seven studies involved neurological rehabilitation. The main barriers to codesign were related to staffing and dedicated time allocated to face-to-face patient-therapist interactions. High-quality relationships between patients and their therapists were a facilitator of codesign. Thematic synthesis revealed that codesigned rehabilitation interventions can enable a meaningful experience for patients and facilitate tailoring of treatments to align with individual needs. Personalised rehabilitation increases patient involvement in rehabilitation planning, delivery and decision-making. It also promotes positive feelings of empowerment and hope.

Conclusion This rapid review supports the implementation of codesigned rehabilitation interventions to improve patient experiences in hospitals.

INTRODUCTION

Ensuring positive experiences for patients is a cornerstone of person-centred care. Healthcare providers, health professionals and policy makers seek consumer involvement when designing safe and high-value health services across the globe. This is reflected in the ‘Quadruple Aim’, a global framework for healthcare quality improvement, which emphasises positive patient experiences as a central element of person-centred care.

The Beryl Institute describes patient experience as the ‘sum of all interactions shared by an organisation’s culture that influence patient perceptions across the continuum of care.’ Measuring and fostering positive patient experiences extends beyond documenting patient satisfaction, outcomes and perceptions. It also encompasses consumer engagement, codesign and coproduction of interventions, based on high-quality interactions between consumers and their healthcare team. Positive patient experiences and consumer involvement in care design and delivery are associated with improved safety and clinical outcomes.

‘Codesign’ aims to improve patient experiences by involving stakeholders such as patients, carers and families in the planning, design and implementation of healthcare improvements. Codesign also involves care providers and organisations to improve patient experiences. Healthcare improvements which are created in partnership with patients who have experience of the problem being addressed are arguably more likely to achieve positive outcomes. Hospital standards across the globe emphasise the
importance of three closely related concepts in healthcare delivery: codesign, patient engagement and shared decision-making.\textsuperscript{12,13} Patient engagement involves care recipients in the codesign of services.\textsuperscript{8,14,15} It also relates to the connections that patients have with health professionals,\textsuperscript{16} and the degree to which patients participate in the design and delivery of health initiatives.\textsuperscript{13} Shared decision-making promotes patient involvement in clinical decision-making in partnership with health professionals.\textsuperscript{17} Shared decision-making can be used in the development, design and implementation of healthcare interventions by creating tailored treatment programmes and patient-centred goals according to patients’ preferences.\textsuperscript{10}

Rehabilitation aims to enable people to optimise their mobility, capability, autonomy, function and quality of life.\textsuperscript{19} Rehabilitation also aims to provide hospital patients with the skills and tools to discharge home safely and independently.\textsuperscript{20} An emerging area of codesign and rehabilitation research is mHealth which is the use of mobile technology in healthcare delivery.\textsuperscript{21,22} mHealth interventions can include ‘empathic avatars’, which are digital animations of human users which incorporate interactive scenarios based on patient experiences.\textsuperscript{23} They are argued to facilitate behavioural change by providing health information in an engaging way.\textsuperscript{24} Avatars designed to reflect the culture of the user’s environment are perceived positively by patients.\textsuperscript{25} A systematic review on codesigned mHealth systems by Noorbergen et al\textsuperscript{21} mapped codesign methods to four stages: ‘predesign, generative, evaluative and postdesign’.\textsuperscript{21} They showed benefits for patients at each of these stages.\textsuperscript{21} Although the literature noted the importance of the postdesign stage, it was not included in the vast majority of studies.\textsuperscript{21} Given this gap, the current review mainly focuses on the postdesign stage of rehabilitation codesign, which relates to how patients report their experiences of inpatient rehabilitation after implementation has occurred.\textsuperscript{21,26}

Prior systematic reviews have evaluated codesign in relation to services and clinical outcomes in hospitals\textsuperscript{2}; the organisational and patient outcomes of codesigned hospital services and tools\textsuperscript{3}; effects of patient engagement strategies on patients and health services\textsuperscript{4}; the influence that codesigned interventions can have on changing health professional behaviour\textsuperscript{27} and contemporary codesign approaches in research.\textsuperscript{28} There is only limited research on how patients in hospital experience codesigned rehabilitation interventions. The primary objective of the current study is to evaluate patient experiences of codesigned rehabilitation interventions in hospitals. We also review methods used to codesign hospital rehabilitation interventions and identify perceived barriers and facilitators to codesign implementation.

METHODS AND ANALYSIS

The protocol for this rapid review has been published online in BMJ Open and registered on the international prospective register of systematic reviews (PROSPERO CRD42021264547).\textsuperscript{29,30} The rapid review has been completed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) as there is no peer-reviewed reporting guideline for rapid reviews.\textsuperscript{31,32}

A rapid review was performed to satisfy stakeholder requests for timely evidence on this emerging research area. A rapid review uses streamlined methodology to provide an accelerated version of a traditional systematic review.\textsuperscript{33} The Cochrane Rapid Reviews Method Group provided provisional recommendations and guidance on the methods of rapid reviews which have been implemented in the searching of the literature for this paper.\textsuperscript{34} Their recommendations include the use of date restrictions during database searching, limiting databases searched and a limit on grey and supplemental searching.\textsuperscript{35} These abbreviated search methods have been shown to expedite the review process without reducing methodological rigour when compared with systematic reviews.\textsuperscript{34}

Patient and public involvement

This rapid review and its preceding protocol paper have been coauthored by two consumer representatives.\textsuperscript{30} The consumer representatives assisted in the codesign of this paper in several ways including the conception, development and refinement of the research question; planning for the rapid review; and reviewing the manuscript.

Eligibility criteria

Studies were included if they were manuscripts with any empirical study design published in English in either journals or conference proceedings; involved adult participants; conducted in an inpatient rehabilitation hospital such as acute, subacute or slow stream musculoskeletal, neurological or cardiorespiratory rehabilitation; involved a codesigned rehabilitation intervention; reported on patient experiences. Studies were excluded if they involved mental health alone, vocational, drug and alcohol rehabilitation; involved rehabilitation in the home or an outpatient setting; were protocols, abstracts of any type, book chapters, editorials or doctoral theses; included only participants that required a medical decision-maker to participate on their behalf.

Identification and selection of included papers

The search strategy was devised with a health services librarian. Search terms were developed from key concepts including patient experiences, codesign, rehabilitation interventions, acute healthcare settings, hospitals. The databases of Cochrane, MEDLINE, Embase and CINAHL were searched from 1 January 2000 to 25 April 2022. The search strategy is given in online supplemental file 1.

The search references were downloaded and combined in EndNote V.20.\textsuperscript{35} They were then imported into Covidence, a systematic review programme.\textsuperscript{36} After removal of duplicate studies in Covidence, two reviewers (JPM,
SCS/CT) independently screened the titles and abstracts before completing the full text review. Screening differences were resolved by discussion with a third reviewer (MEM).

**Method quality assessment**

Studies with any empirical design were eligible for inclusion. Although we made provisions for the assessment of any study design, the final yield of included papers only included qualitative studies. Therefore, these were appraised with the JBI Critical Appraisal Checklist for Qualitative Research. This has a 10 question checklist which are accompanied by detailed explanatory notes which assist reviewers to assess the methodological bias of the included studies in a systematic review. Two critical appraisers (JPM and CT) assessed independently the methodological bias of each included study in accordance with the JBI Critical Appraisal Checklist for Qualitative Research. Any differences in the appraisals between the two authors were resolved through consultation with a third reviewer (MEM).

**Data extraction and management**

The Covidence Extraction 2.0 template was employed to extract the study characteristics from the included studies. Characteristics extracted included aim of study, healthcare setting, study design, population description, descriptive statistics if applicable, outcome data if applicable, codesigned intervention characteristics and description, codesign strategy used, patient experiences, themes and facilitators or barriers to codesign. This process was completed independently by two reviewers (JPM and CT) for all included studies. Differences in the extracted data were resolved through deliberation and consensus between the two reviewers.

**Data analysis/synthesis**

Data from the included studies were analysed and synthesised according to qualitative methods described by Thomas and Harden. This approach involved three main stages and has the support of the Cochrane Qualitative and Implementation Methods Group. First, thematic findings from each included study were extracted in Covidence. Second, these themes were then grouped according to their similarities to develop overarching descriptive themes to encapsulate common insights. Third, the descriptive themes were analysed to form new analytical themes to answer the questions posed by this rapid review.

**Confidence in cumulative evidence**

The Confidence in Evidence from Reviews of Qualitative Research (GRADE-CERQual) was used to make an assessment of the overall findings of this rapid review. The GRADE-CERQual includes four components: adequacy of data, coherence, relevance and methodological limitations. The four components are used to assess the confidence in the evidence as very low or low, moderate or high. These levels describe the degree to which a review finding accurately represents the topic under review. A GRADE-CERQual Summary of Findings table with an assessment of each review finding was completed by one author (JPM) and confirmed by a second reviewer (CT).

**RESULTS**

**Included studies**

A total of 6112 studies were imported for screening. A total of 4156 titles and abstracts were screened after 1956 duplicate papers were removed. The full text of 38 studies were screened for eligibility. In total seven studies were included in this rapid review. A PRISMA flow diagram is provided in figure 1.

**Quality appraisal**

The seven included studies all had qualitative designs hence they were appraised with the JBI Critical Appraisal Checklist for Qualitative Research. All studies demonstrated congruity between their research methodology and purported philosophical perspective. All studies had congruity between their research question, data collection and analysis, research methods and interpretation of results. Two studies addressed the relationship between the study participants and the researcher. One study included a statement on the theoretical perspectives and cultural orientation of the research team. All studies were conducted ethically, had adequate representation of the voices of their participants, and had conclusions...
that were logically drawn.42–48 See table 1 for the quality appraisal summary.

**Characteristics of included studies**
The number of codesign participants ranged from 11 to 201 patients (table 2). Studies were conducted in inpatient rehabilitation hospitals in high-income countries including three studies published in the UK. Five out of the seven studies focused on neurological rehabilitation. Five out of seven were published within the last 5 years.

**Types of codesigned rehabilitation interventions**
Collaborative goal setting was employed as the codesign intervention in three studies,42 43 48 Two involved a goal setting workbook,42 43 while one used an interactive goal setting application (table 2).48 Two studies involved personalised neurological rehabilitation.45 47 One study involved the development of care partnerships using patient advisors.46 One study implemented improvements and increased supervision in stroke units.44

**Codesign strategies**
Three studies used collaborative goal setting to develop codesigned goals (table 2).42 43 48 In two studies, the patients were able to codesign their own rehabilitation programme.45 47 The Partnership Co-design Lab method was used in Pomey et al46 to introduce patient advisors at patient bed sides.46 Evidenced-based codesign and accelerated evidenced-based codesign was implemented in one study to address inactivity in stroke units.44

**Barriers and facilitators to codesign**
Authors of the included studies identified two primary barriers to the codesign of rehabilitation interventions in hospitals. First, codesign was often impeded by staff shortages (table 2).42 44 45 Staff shortages were reported by patients as being a key limitation to receiving a high quantity of therapy, in addition to increased waiting times for treatment.42 44 45 Patients perceived these limitations as having a negative impact on their rehabilitation experiences.45

Limited time dedicated to patient-therapist interactions was also seen by some patients as a hurdle to the codesign process.42 47 48 These patients reported experiencing stress or dissatisfaction due to having limited time to discuss their rehabilitation with doctors.47 A lack of time with health professionals to discuss goals was perceived by patients as a negative factor influencing the codesign process.45 The use of a tablet application to facilitate collaborative goal setting was perceived by health professionals as time consuming.46 A key facilitator of codesign was a positive relationship between patients and others involved in their rehabilitation such as peers, family and health professionals.42 47 Patients mentioned that peers who had similar conditions to their own helped to support and provide encouragement during the decision-making process.47 High-quality patient–therapist relationships were perceived as helpful in achieving rehabilitation goals.42
| Author (year), country | Study design, participants (n) | Setting | Aim of study | Co-designed rehabilitation intervention | Co-design strategy | Barriers and facilitators to co-design implementation | Patient experiences |
|------------------------|--------------------------------|---------|--------------|----------------------------------------|-------------------|-------------------------------------------------|---------------------|
| Holliday et al (2007) UK | Qualitative, n=28 | Inpatient neurological rehabilitation unit. | To investigate patients’ perceptions of two goal setting methods that differ in the amount of patient involvement. | An increased participation goal setting approach. | Provision of a goal setting workbook and use of a key worker role to increase patient contact time with staff. | Barriers: staff shortages and time constraints. Facilitators: positive relationship between key worker and patients. | Patients felt that the goals were specific and individualised when they were involved in goal setting. |
| Holliday et al (2007) UK | Non-randomised controlled study, n=201 | Inpatient neurological rehabilitation unit. | To explore an increased participation goal setting method. | Increased participation goal setting. | Provision of a goal setting workbook with patient participation facilitated by a key worker. | Not reported. | Patients use of a goal setting workbook led to increased therapy precision and greater patient satisfaction. |
| Jones et al (2021) UK | Mixed-methods case comparison, n=156 | Four separate inpatient acute stroke units. | To evaluate codesigned improvements to increase therapeutic patient activity in stroke units. | Experience-based codesign improvement cycles. | Incorporated patient, family and staff experiences to design and deliver quality improvements. | Barriers: staff shortages, increased severity of disability of patients. | The codesign process was perceived by users to improve social interaction between patients, families and staff. |
| Last et al (2022) Canada | Qualitative, n=11 | Three inpatient rehabilitation programmes. | To explore patient perspectives of the facilitators and barriers to engaging in stroke rehabilitation in hospital. | Personalised rehabilitation. | Therapy activities were designed and refined to include activities which were meaningful to patients and in line with their goals. | Barriers: limited resources, low ratio of therapists to patients, negative attitude towards rehabilitation. | Patients perceived that therapy was enhanced by personalised rehabilitation. Therapy seemed to be most meaningful when it was designed to meet the goals of the patients. |
| Pomey et al (2018) Canada | Qualitative, n=51 | Specialist acute and rehabilitation centre for amputation management | To increase rehabilitation adherence rates with patient advisors in a peer support programme. | Patient advisor programme. | Four focus groups were undertaken to develop approaches to improving patient adherence to rehabilitation. | Not reported. | Patients who received support from patient advisors reported feeling less isolated, increased hopefulness and morale, and a reduction in pain perception and disability. |

Continued
| Author (year), country | Study design, participants (n) | Setting | Aim of study | Co-designed rehabilitation intervention | Co-design strategy | Barriers and facilitators to co-design implementation | Patient experiences |
|------------------------|--------------------------------|---------|--------------|------------------------------------------|-------------------|-------------------------------------------------|---------------------|
| Scheel-Sailer et al (2017) Switzerland<sup>17</sup> | Qualitative n=22 | Single inpatient rehabilitation centre. | Explore patients' perception of their participation in decision-making after spinal cord injury. | Personalised rehabilitation. | Patients had the ability to choose additional treatments. | Barriers: time pressure. Facilitators: a supportive therapeutic team. | Patients experienced a sense of empowerment and increased capability when they were able to exercise their decision-making ability to choose additional therapies to tailor their rehabilitation. |
| Strubbia et al (2021) New Zealand<sup>48</sup> | Qualitative n=16 | Three inpatient rehabilitation services. | To detail the experiences of health workers and patients using a goal setting application aid. | Collaborative goal setting. | A tablet application decision-making tool. | Barriers: time constraints, accessibility of the tablet. | Use of the tool facilitated meaningful collaborative goal setting. Patients developed a broader understanding of rehabilitation and reported increased hope of recovery. |
Patient experiences

Codesigned rehabilitation interventions resulted in a more positive experience for patients. The primary theme that emerged from the included studies was the paradigm of tailor-made rehabilitation. Tailor-made rehabilitation was associated with more meaningful therapy, increased patient involvement, empowerment and autonomy (table 2). This concept was described by patients in a study by Holliday et al who felt that their increased involvement in goal setting enabled their goals to be specific to their needs. This increased their sense of ownership over their goals and resulted in a positive rehabilitation experience. There were similar findings in a second study by Holliday et al which also investigated collaborative goal setting. Patients who were in the increased participation goal setting group had higher satisfaction with their rehabilitation. Providing patients with a structure to design their own goals resulted in greater patient autonomy and goal relevance. Rehabilitation that involved increased patient participation in goal setting was perceived as more targeted to the individual. Jones et al found that codesigned changes which aimed to address inactivity of stroke patients in rehabilitation hospitals were beneficial. Patients and their carers associated the codesign approach with several improvements. Codesigned activity boxes were provided to patients to enable them to engage in extra therapy such as a cooking group. This helped to reduce inactivity of patients after stroke and resulted in a more positive experience.

Patients in Last et al reported that their therapy was enhanced when their treatment was tailored to their specific preferences, needs and goals. Tailored therapy was seen as more meaningful, enjoyable and motivating for patients. This was best exemplified by a patient who had a goal of kayaking. The patient’s therapist incorporated kayaking, in a hydrotherapy pool, into the patient’s rehabilitation programme. Patients in a study by Scheel-Sailer et al had the ability to design their rehabilitation programme by choosing additional therapies. Patients felt a sense of empowerment and self-efficacy by exercising this decision-making ability. It was also emphasised by patients as an important method to make their rehabilitation programmes more interactive and tailored.

A secondary theme that emerged was codesigned rehabilitation interventions provided inpatients with feelings of hope regarding their recovery. A codesigned tablet application for collaborative goal setting and decision-making described in Strubbia et al assisted patients to have a more thorough understanding of their condition and treatment. This provided patients with hope for the future as they were educated on what to expect from rehabilitation. Patients felt empowered through their increased understanding of their rehabilitation which enabled them to participate in making meaningful decisions regarding their care. Health professionals suggested that the tablet application could be improved for patients by including culturally appropriate images.

Pomey et al explored a codesigned patient advisor programme to increase adherence to rehabilitation. Patient advisors supported patients in the hospital by answering their questions regarding treatment and ensuring that each patient received the necessary amount of care. An evaluation of the interactions between patients and their advisors found that patients felt increased motivation and hopefulness regarding their rehabilitation. Some patients who had support from patient advisors also reported reduced feelings of pain or disability.

Confidence in review findings

Table 3 shows moderate to high confidence in the majority of the review findings. Whereas there was high confidence in the finding that codesigned rehabilitation interventions increased patient involvement in treatment, decision-making autonomy and were perceived as more meaningful, there was moderate confidence in the finding that staff shortages and time constraints were barriers to codeign implementation. There was less confidence in the findings that codesigned rehabilitation interventions provided patients hope about their recovery and were facilitated by high-quality patient-therapist relationships.

DISCUSSION

This rapid review showed positive patient experiences of codesigned rehabilitation interventions delivered in hospital settings. Codesigned rehabilitation interventions included goal setting workbooks, personalised rehabilitation therapies, patient advisors, hospital environmental and organisational changes, and a technological collaborative goal setting application. In agreement with Clarke et al, the current review showed that the main barriers to codesign were related to staffing and time constraints. As with Lim et al patient experiences of codesigned interventions were reported to be positive. Thematic analysis of included studies revealed that codesign facilitated the development of tailor-made treatment which increased patient involvement in their rehabilitation, autonomy over decision-making and feelings of empowerment. Tailor-made rehabilitation was perceived by some patients as being more meaningful than usual care, which facilitated improved patient experiences of their rehabilitation. Codesigned rehabilitation interventions also fostered a feeling of hope among patients and improved their treatment expectations and outlook on their recovery.

This review was coauthored with two consumers and was rigorously conducted in accordance with a peer-reviewed protocol paper and best practice guidelines. As a rapid review, truncated methods endorsed by The Cochrane Rapid Reviews Method Group were used to expedite the review process. This included a date...
Table 3  GRADE-CERQual summary of qualitative findings41

| Summary of review finding | Studies contributing to the review finding | Confidence assessment | Explanation of GRADE-CERQual assessment |
|---------------------------|------------------------------------------|-----------------------|---------------------------------------|
| Staff shortages were a barrier to the implementation of codesigned rehabilitation interventions in hospitals. | Holliday et al42, Jones et al44, Last et al46 | Moderate | Minor methodological limitations, relevance and coherence concerns. Moderate concerns about adequacy. |
| Time constraints were a barrier to the implementation of codesigned rehabilitation interventions in hospitals. | Holliday et al42, Scheel-Sailer et al47, Strubbia et al48 | Moderate | Minor methodological limitations, relevance and coherence concerns. Moderate concerns about adequacy. |
| Codesigned hospital rehabilitation interventions were facilitated by a good quality relationship between patients and their therapists. | Holliday et al42, Scheel-Sailer et al47 | Low | Minor methodological limitations, relevance and coherence concerns. Serious concerns about adequacy. |
| Codesigned rehabilitation interventions were meaningful to patients and associated with increased patient involvement in therapy, increased autonomy in decision-making and empowerment. | Holliday et al42, Holliday et al43, Jones et al44, Last et al46, Scheel-Sailer et al47 | High | Minor methodological limitations, relevance and coherence concerns. Minor concerns about adequacy. |
| Codesigned rehabilitation interventions improved inpatient experiences by providing patients with a better understanding of the rehabilitation process and increased feelings of hope for the future. | Pomey et al45, Strubbia et al48 | Low | Minor methodological limitations, relevance and coherence concerns. Serious concerns about adequacy. |

CONCLUSION

Positive patient experiences occur with codesigned rehabilitation interventions in hospitals.42–48 Patients who are highly involved in their treatment report greater decision-making autonomy, empowerment, and positive experiences.42–48

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Contributors   JPM, SCS, JAJ and MEM designed the study and formulated the research question and search terms. JPM, SCS, JAJ, AH, MK, JG, JW, CT and MEM assisted in the planning for this rapid review. JPM, SCS, CT and MEM were involved in the study screening and review process. JPM, CT and MEM completed the data extraction and the method quality assessment of the included studies. JPM wrote the draft manuscripts, which were edited by SCS and MEM. All authors reviewed the final manuscript before publication.

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restriction during database searching, a limit on databases searched and a restriction on grey and supplemental literature.

A limitation of this review is that it only yielded seven publications, all of which were qualitative in design. Also, it is possible that relevant case studies or conference proceedings that were not peer-reviewed were not identified. Although we limited the search from the year 2000, five of the seven studies included in this review had been published since 2017. This highlights the growing interest in this topic and suggests that future research on patient experiences of codesigned rehabilitation interventions is warranted.
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