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RESEARCH ARTICLE

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Implementing ward-based practice books to increase the amount of practice completed during inpatient stroke rehabilitation: a mixed-methods process evaluation

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ABSTRACT

Purpose: Stroke survivors must complete large amounts of practice to achieve functional improvements but spend many hours inactive during their rehabilitation. We conducted a mixed methods process evaluation exploring factors affecting the success of a 6-month behaviour change intervention to increase use of ward-based practice books.

Methods: Audits of the presence, quality and use of ward based-practice books were conducted, alongside focus groups with staff ($n=19$), and interviews with stroke survivors ($n=3$) and family members ($n=4$). Quantitative data were analysed descriptively. Focus group and interview transcripts were analysed using qualitative analysis.

Results: Personal (patient-related) factors (including severe weakness, cognitive and communication deficits of stroke survivors), staff coaching skills, understanding and beliefs about their role, affected practice book use. Staff turnover, nursing shift work and a lack of action planning reduced success of the behaviour change intervention.

Conclusions: Staff with the necessary skills and understanding of their role in implementing ward practice overcame personal (patient-related) factors and assisted stroke survivors to successfully practice on the ward. To improve success of the intervention, repeated training of new staff is required. In addition to audit and feedback, team action planning is needed around the presence, quality, and use of ward practice books.

> IMPLICATIONS FOR REHABILITATION

- Ward-based practice books are one evidence-based strategy that can be used by rehabilitation teams to increase the amount of practice completed by stroke survivors during inpatient rehabilitation.
- Stroke survivors' personal factors (including severe weakness, cognitive and communication deficits), staff beliefs about their role and coaching skills, affected stroke survivors ability to practice on the ward using practice books.
- Staff with the necessary skills, understanding and belief about their role in implementing ward practice can overcome personal (patient related) factors (such as severe weakness) and assist stroke survivors to successfully practice on the ward.
- To increase the success of ward practice, repeated booster training of staff is required along with audit and feedback and team action planning on the presence, quality, and use of ward practice books.

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Introduction

Stroke is a leading cause of death and disability worldwide [1]. For stroke survivors to reduce their disability and achieve greater functional independence, a large amount of therapy is required, specifically, repetitive task-specific active practice [2,3]. Despite this evidence, stroke survivors worldwide do not receive the minimum amount of therapy time recommended in national guidelines [4,5] and can spend most of their day alone and inactive on rehabilitation wards [6].

One resource-efficient strategy to increase the amount of practice is to promote semi-supervised or independent ward-based practice using practice books. These books contain instructions for the stroke survivor on how to complete exercises independently on the ward, or with the help of nurses and family members [7]. However, several barriers to ward-based practice have been reported by stroke survivors, family members, and staff including the motivation of stroke survivors [8] and limited knowledge about what practice stroke survivors can complete independently outside of therapy [9].

Tailored behaviour change interventions are designed to overcome local barriers to practice change, with known behaviour change interventions such as audit, feedback and training typically used to increase staff skills [10]. We developed a tailored staff

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behaviour change intervention in collaboration with one rehabilitation team, to increase use of ward-based practice books and the amount of practice completed by stroke survivors during inpatient rehabilitation [11]. Therapists (occupational therapist, speech pathologists and physiotherapists) were required to design and provide the practice books with the aim of the stroke survivor completing the exercise on the ward with the help of nurses, assistants and/or family members. Core components of the 6-month long behaviour-change intervention are depicted in Figure 1 and included: (1) face-to-face training sessions to improve staff skills in building motivation and coaching stroke survivors, (2) weekly audits conducted by staff on the presence and use of ward-based practice books and (3) weekly ward sessions which included nursing staff, therapists and stroke survivors (for approximately 45 min) to review the ward-based practice books, facilitate skill-sharing, review audit results, and action planning. Findings from our outcome evaluation showed that post-intervention, the number of participants with practice books increased from one to six (OR = 11, 95% CI = (0.9, 550.7)), but this change was not statistically significant ($p = 0.069$) [12]. We therefore wanted to explore what aspects of the implementation process had facilitated or inhibited implementation of the ward-based practice books.

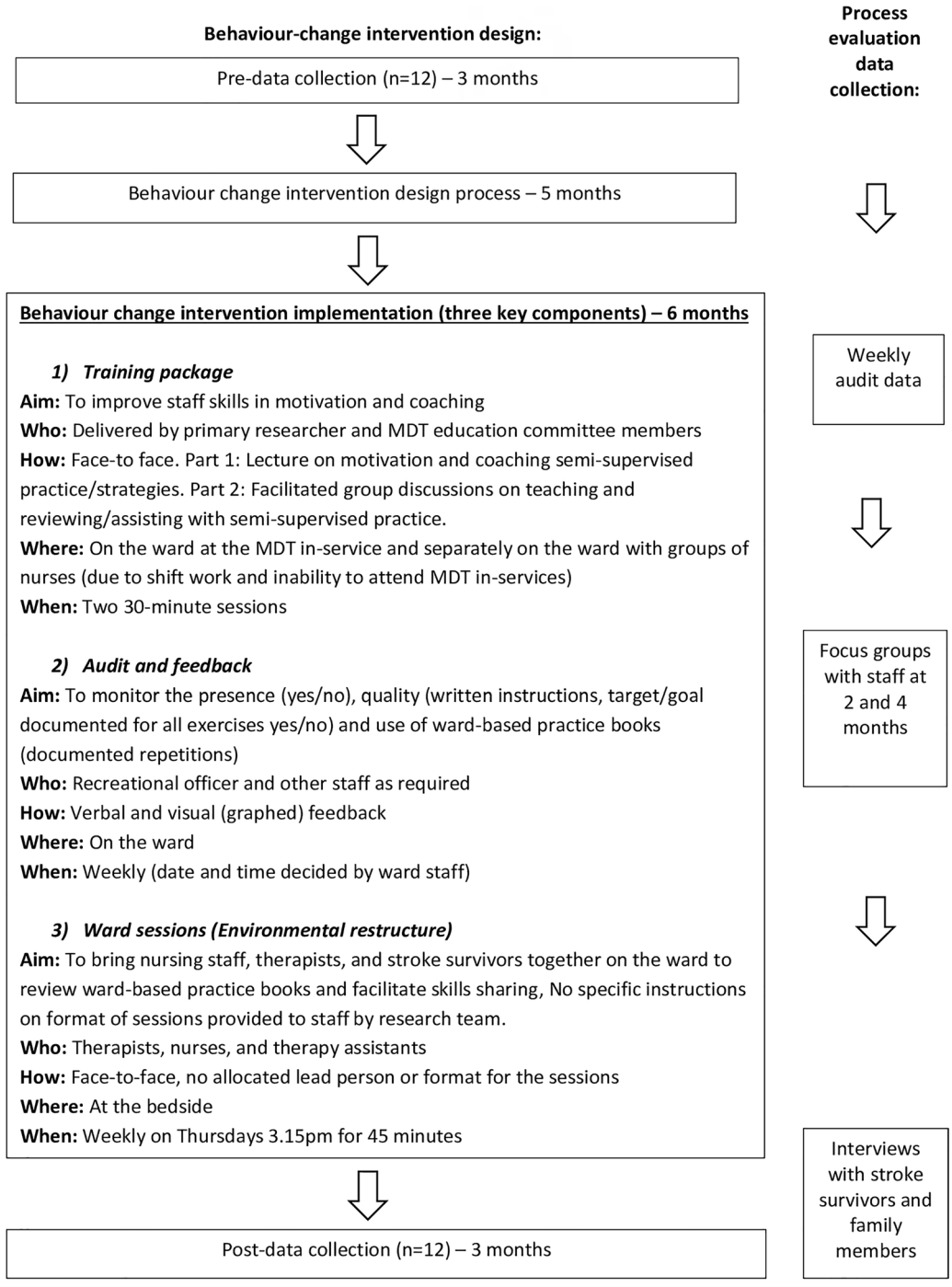

Figure 1. Behaviour change intervention design and implementation with parallel data collection for the process evaluation

Figure 1. Behaviour change intervention design and implementation with parallel data collection for the process evaluation.

Implementation research aims to improve the uptake of research evidence into clinical practice through a process of systematic enquiry and evaluation [13]. The Medical Research Council (MRC) recommends including a process evaluation alongside outcome evaluation of complex interventions [14]. Process evaluations provide an understanding of the implementation process when a new intervention is introduced (e.g., fidelity, dose, adaptation and reach), the mechanisms of action (e.g., how participants interact with the intervention), and contextual factors that may affect uptake of the intervention [15]. Outcomes from small implementation feasibility studies are not always replicated when interventions are upscaled and evaluated in larger, cluster-randomised controlled trials involving multiple teams and contexts [16,17]. It is therefore critical to conduct process evaluations alongside early studies to explore aspects of the implementation process that facilitated or inhibited implementation and uptake of the intervention. Thus, findings from the current process evaluation will inform future strategies for increasing the amount of practice completed by stroke survivors. Our process evaluation was guided by three questions:

1. Were key components of the staff behaviour change intervention adhered to, and implemented by the team? (implementation)
2. What contextual factors facilitated or inhibited the regular use/normalization of ward-based practice books? (mechanisms of action and context)
3. What were stroke survivors' experiences of practicing in rehabilitation and using ward-based practice books? (mechanisms of action and context)

Materials and methods

Design

A mixed-methods process evaluation was conducted. Quantitative data on the fidelity and reach of key components of the behaviour change intervention were collected and used to prompt focus group discussions with staff about contextual factors that facilitated and inhibited the use of the ward-based practice books. Qualitative interviews were also conducted with stroke survivors and family members to understand their experience of using ward-based practice books. All findings were then integrated to develop an explanatory model describing factors associated with successful ward-based practice. Figure 1 illustrates the parallel nature of the process evaluation, the staff behaviour change intervention design and implementation.

Three sources were used to inform the design and reporting of this study: the National Institute of Health's best practice for reporting mixed methods research in the health sciences [18], the Medical Research Council guidelines on designing process evaluations of complex interventions [15] and the COREQ recommendations for qualitative studies [19]. Ethical approval was gained from the institutional research and ethics committee (HREC/15/QWMS/34).

Setting

The setting was a 29-bed acute stroke and rehabilitation ward in Queensland, Australia. Typically 40% of rehabilitation inpatients in that unit have a diagnosis of stroke. The first author had previously worked on the ward and with some members of the ward multidisciplinary team.

Sample/recruitment

Three categories of participant were recruited to the study. First, key multidisciplinary staff working on the ward were purposively selected to participate in focus groups as they had been involved in the design and implementation of the behaviour change intervention. Next, whilst all staff were responsible for implementation of ward-based practice books, nursing staff were the predominant discipline required to assist stroke survivors to use their practice books on the ward. Therefore, nursing-specific focus groups were conducted with a convenience sample of nurses working on the same day as the multidisciplinary staff focus group. Finally, a convenience sample of stroke survivors (who did or did not use a ward-based practice book) and/or their family members were invited to participate in an interview at the end of the intervention period to understand their experience of using the ward-based practice books. All participants provided written informed consent and were invited to participate by a staff member.

Data collection

Demographic data were collected to describe the characteristics of staff (e.g., professional discipline and time since graduation), and stroke survivor participants (e.g., age, gender and Functional Independence Measure (FIM) scores on admission [20]). FIM data were collected to indicate the level of disability on admission. No demographic data were collected about family members.

To understand how the key components of the behaviour change intervention were implemented and adhered to (or not) by the team (research question 1), we collected quantitative and qualitative data. Information collected included, attendance by staff at motivation training sessions, and weekly audit data on the presence and quality of ward-based practice books. The quality of practice books was assessed by recording whether they included: written instructions, and a goal stating how much practice/how many repetitions were to be completed, and documentation of daily repetitions (five workdays per week), for at least one exercise.

To understand how local contextual factors facilitated or inhibited the use of ward-based practice books, and how the key components of the intervention were implemented (research question 2), face-to-face staff focus groups were conducted at two- and four-months following commencement of the behaviour change intervention in a private room on the ward. A focus group topic guide was developed based on Normalization Process Theory (NPT) [21], and previous research using NPT to explore the implementation of a stroke rehabilitation intervention [22]. The NPT is a sociological theory used to explore how individuals and teams embed new interventions in clinical practice. We chose this theory to help describe the context in which the behaviour change intervention was being implemented, and to help understand factors that facilitated or inhibited use of ward-based practice books by staff. The NPT has been used in other published process evaluations [23] and comprises four main constructs:

- Coherence: The sense-making work that people do individually and collectively when implementing a new set of practices. For example, understanding their role in (individually and collectively), and the importance and value of, that new set of practices.
- Cognitive participation: The shared work that people do to implement a new set of practices, including leading and engaging with the new work practices.

- Collective Action: The operational work that people do when implementing new practices. This work can include allocating tasks to people with appropriate skills and organising appropriate resources.
- Reflexive monitoring: The appraisal work that people do (individually and collectively) to evaluate and understand how the new set of practices affect them and others around them, and changes that may need to be made.

During focus groups, audit feedback was presented to staff about the presence, quality, and use of ward-based practice books to facilitate discussion. Participants were prompted, by the researcher, to explore reasons for low or high performance in the audit results. The focus groups were audiotaped then transcribed by a transcription service to ensure the accuracy of data collected, no field notes were taken and the duration of focus groups were not limited but aimed to be approximately 30 min duration.

To explore stroke survivors' experiences of using ward-based practice books and practicing on the ward (research question 3), face-to-face semi-structured interviews were conducted with stroke survivors and/or family members following delivery of the staff behaviour change intervention. An interview schedule developed by the research team invited stroke participants to describe their exercises, and factors that helped or prevented them from practicing. If a ward-based practice book had been provided, the book was reviewed during the interview with individual stroke participant to further prompt discussion. Interviews were conducted in a private room on the ward and were audio-recorded and transcribed verbatim by a transcription service, and checked by the first author. No field notes were taken and the duration of the interview was not limited.

Reflexivity

All focus groups and interviews were conducted by the first author who was a female Physiotherapist, undertaking a PhD. The first author had previously worked on the unit and conducted the initial focus groups with staff as part of the behaviour change intervention design. The first author was interested in the research topic and wanted to identify areas for improvement if the study was to be replicated. At the beginning of the focus groups the first author introduced the purpose of the focus groups which was to explore contextual factors that facilitated or inhibited the uptake of ward practice books. Participants were encouraged to speak openly and discuss together factors that affected the use of the ward-based practice books. The first author explained that results would be used to recommend changes or improvements if the study were to be repeated or replicated. Stroke survivors and family members were made aware of the profession of the first author and the purpose of the interviews, to explore their experience of ward-based practice. The remaining authors are senior female academics in the Physiotherapy, Occupational Therapy and Speech and Language Therapy fields, all with PhD qualifications, an interest in rehabilitation and clinical implementation and experienced in mixed method research. None of these researchers knew any of the participants.

Data analysis

Descriptive statistics were used to summarise all quantitative data, including participant characteristics, attendance at staff motivation and coaching training sessions, and audit data on the quality, presence, and use of ward-based practice books.

The NPT [21] and framework analysis [24] were used to guide the focus group analysis and explore contextual factors. Framework analysis [24] was used to analyse data from the staff focus groups. The steps in framework analysis include familiarisation, identifying a thematic framework, indexing, charting, and mapping and interpretation. The early use of a framework (NPT) helped guide the categorisation of data. Transcribed data from the staff focus groups were imported into NVivo software for analysis (version 12 produced by QSR International, Melbourne, VIC, Australia) for coding. The research team then met and reviewed the data, and a coding map was developed. The coding map was then applied systematically to all future data by the first author.

Thematic analysis was used to code data from the stroke participant and family member interviews, to gain an understanding of their experiences of ward practice [25]. Thematic analysis is a systematic process of sorting and classifying data involving four steps: immersion in the data (i.e., reading and re-reading the data), coding, creating categories, and identification of themes. Transcribed data from each interview were imported into NVivo for coding. The first two interviews were coded by two authors and compared. The remaining interviews were then coded by the first author with themes identified and discussed within the research team. Given the in-depth processes and considerations involved when considering member checking methods [26,27], and the limited resourcing available, it was not feasible to conduct member checking of findings in this study. As recommended in mixed methods research [28], we integrated our findings to develop a visual explanatory model describing the factors associated with successful ward practice.

Results

Staff participants

Five focus groups were conducted during the six-month intervention period. Two multidisciplinary focus groups were conducted, at two- and four-months following commencement of the intervention. Three nurse-specific focus groups were held, one at two months, and two at four months into the intervention period. Nineteen staff attended the focus groups including 14 nurses, two occupational therapists, one physiotherapist, a recreation officer and a speech pathologist. Seven staff members attended more than one focus group. The average time since graduation was 8.7 years (SD 7.5) (see Table 1).

Stroke survivor participants

Four interviews were conducted and included three stroke participants and four family members. Two stroke participants were interviewed alone, and one was interviewed with a family member

Table 1. Sample characteristics.

Participants and key demographics	
Stroke survivor:	
Age in years (mean, SD)	61 (15)
Admission FIM score (/126)	56 (18)
Staff participants	
Years since graduation (mean, SD)	8.7 (7.5)
Profession (n/%)	
Nursing	14 (74)
Occupational therapy	2 (11)
Physiotherapy	1 (5)
Recreation officer	1 (5)
Speech pathologist	1 (5)

Notes. FIM: functional independence measure; SD: standard deviation.

present. Three family members of one stroke participant were also interviewed (two daughters and a granddaughter). Stroke participants had an average age of 61 years (SD 15). The average admission FIM score was 56 (SD 18) (see Table 1). We present our findings below according to the three research questions drawing on both quantitative and qualitative data where relevant.

Implementation of and adherence to the behaviour-change intervention (research question 1)

Motivation and coaching training sessions

The training sessions were conducted in two parts. In part one, all physiotherapists ($n = 3$), occupational therapists ($n = 2$), speech pathologists ($n = 1$), and 24 nursing staff working on the ward attended motivation and coaching training sessions. One multidisciplinary session was run by the first author; six subsequent sessions were conducted by a senior nurse on the ward. Part two of the training was conducted once only. This session was facilitated by senior staff (occupational therapist and nurse) working in the rehabilitation service. All therapists ($n = 6$) and six nurses working in the ward attended part two of the training.

During focus groups, which were conducted approximately two and four months after the training sessions, nursing staff demonstrated an understanding of factors that negatively influenced motivation after stroke, such as stroke survivors being medically unwell. Conversely, staff discussed the positive impact of family assisting with practice and seeing progress, with one nurse stating that *"progress is a massive motivator"*. Nursing staff also discussed strategies they used to motivate stroke survivors such as providing education on the importance of exercise, providing reminders, and prompting (coded as collective action on the NPT).

Weekly audits

Weekly audits were conducted, and feedback provided as intended, to monitor the quality, presence, and use of ward-based practice books. Audit data showed that in the first month of implementation, the quality and presence of practice books was low, but improved and remained at 100% for the rest of the 5-month audit period. In contrast, the recording of active practice in ward-based practice books fluctuated throughout the intervention period.

During focus groups, staff reported fluctuating levels of understanding of the audit results (coded as coherence using the NPT). Staff reported that the amount of stroke survivor practice observed and documented during the audits, was less than had occurred because of non-recording by staff, stroke survivors and family members (coded as collective action on the NPT). That is, staff believed that data recorded during the audits was inaccurate and did not reflect actual practice completed by stroke participants.

> *"How is this getting assessed? … One week had a 100% and then, was it…. last week that we got 50%?… How is that? How do we know?" (Nurse 11)*

> *"…the report says that is what we did, but actually it's not what we did because we didn't document it…." (Nurse 12)*

At the end of the six-month intervention period, ward staff stopped conducting audits although some staff had mentioned that the audits and feedback *"helped keep us motivated" (Nurse 20)* (coded as reflexive motivation on the NPT).

Weekly ward sessions

Weekly sessions were conducted on the ward at the same time and day each week, at the stroke survivor's bedside. These sessions involving nursing staff, therapists, and assistants aimed to share skills and enable, action planning, to improve the quality and use of the ward-based practice books. When reflecting on these sessions during focus groups, staff described practical difficulties with attendance and meeting together. Several months passed before most of the nurses had attended a session due to changing work rosters. This slow process of training staff affected their confidence when asked to assist with ward-based practice (coded as collective action on NPT).

> *"I know that I've learnt a lot personally with doing the 3.15 afternoon round and how each of the exercises works and what the goal is, but for those staff that don't attend, participating in those sort of activities that we don't normally participate in, would be quite daunting" (Nurse 16)*

> *"…we've had enough Thursday huddles, that most people have been to at least one. But also that takes time… it does you know. It takes time to capture everyone on a roster who hasn't been on leave and who hasn't been there on an afternoon roster." (Therapist 2)*

Staff reflected on the benefits of meeting together as a team on the ward. They liked, watching other disciplines coach and train stroke survivor (mapped to collective action on the NPT).

> *"…exposure to it I think is a good thing as well, like (OTs name), for that particular person, went through the physio exercise and the speech, and for me, I was like, she knows everything, I could do that." (Nurse 14)*

> *"….even though we are a multi-disciplinary team, […] I think we do quite separate therapies, so I think, I really enjoy seeing what the patients are working on from the other discipline perspective and the progress they are making. Some times that gives me ideas on how we can link it and cross over [….] I think it is a nice opportunity to come together as a team, from a clinical perspective." (Therapist 4)*

Initially, the focus of the weekly review and planning sessions was on teaching the exercises, and not reviewing audit results or action planning, as initially intended during the design of the intervention.

> *"We've been utilising those sessions as truly teaching* exercises *I guess, rather than as reviewing how to do things better." (Therapist 2)*

In later focus groups, staff discussed the evolution and change in the structure of weekly ward sessions, as staff needs changed over time. While initial meetings were therapist-led, and involved the teaching of exercises to large groups of staff, later sessions involved smaller, more interactive groups of staff and stroke survivors. Smaller group sessions were preferred by the nursing staff because they could physically practice exercises with individual stroke survivors, rather than simply being a passive observer (coded to reflexive monitoring on the NPT).

> *"I've been to two [sessions] and it was good. Like, there was one I didn't really get anything out of, but another one, I did a whole bunch of stuff with (person's name), like learning the exercises and actually knowing what's a part of her practice books in terms of the physio stuff." (Nurse 10)*

Despite the benefits, several nursing staff still found the time required to attend the weekly ward sessions reduced time for other nursing tasks. Furthermore, lack of handover between nursing staff during shift changes limited the transfer of knowledge gained during the weekly ward sessions to other nursing staff on the ward.

> *"…then you've got to catch up on your workload before dinner…" (Nurse 10)*

> *"If that information is not getting handed over from staff to staff, sometimes I kind of think what's the point?" (Nurse 20)*

In summary, audits were conducted weekly as intended but staff reported poor understanding of, and disagreement with, the audit results. Motivation and training sessions were well attended. Weekly ward sessions were held regularly but with limited reach to all nursing staff due to shift work. Nursing staff preferred smaller group sessions where they could physically practice exercises with stroke survivors. However, due to the limited reach, poor handover across/between shifts, and the time required to attend meetings, staff were not convinced of the benefits of attending training.

Contextual factors facilitated or inhibited regular use of ward-based practice books (research question 2)

Regular use of ward-based practice books was influenced by all four constructs of the NPT. In addition, personal (patient-related) factors not captured by the NPT were also identified.

Coherence: Understanding their role in implementing practice books

Staff turnover during the project was high, with five of the six therapists leaving before the first month of implementation of the behaviour-change intervention. By the end of the intervention period, all six therapists and seven nurses had left the ward. These people were replaced by new staff. Many participants that left were senior staff who had helped develop the behaviour change intervention. This turnover influenced staff understanding of each professional's role in implementing the practice books. During the early focus groups, new employees reported not knowing which patients should have practice books, or what content should be included.

> *"I was completely new at that point in time…new to the organisation… new to the project. I truly didn't feel like I had enough information…" (Therapist 2)*

Nursing staff reported that new employees and agency staff did not know about the practice books. One nurse reported: *".if you've got a lot of agency (staff), well, they don't have a clue about it either." (Nurse 13).*

Cognitive participation: Engaging with using practice books

Staff reported that some team members consistently found time to help stroke survivors complete their exercises and championed the use of practice books. A belief in the benefit of practice books often motivated staff.

> *"I think that there are key players who actually led it on the ward most definitely in terms of people who are committed to doing it and driving it." (Therapist 2)*

> *"For those staff that champion it, their motivation has been the improvement of the patient." (Nurse 16)*

In contrast, some nursing staff believed that stroke survivors did not need to complete extra practice outside of therapy sessions, and that helping with practice was not part of their role.

> *"…one comment was 'They've done physio all day, they really don't need to do that at night. They have done physio already'…" (Nurse 2)*

> *"It depends on who you work with too […] some people don't push for it because they go 'No it's out of our duty'.…' (Nurse 1)*

Collective action: Using practice books in clinical practice

Using the practice books was challenging for some staff, particularly when they had to help stroke survivors with language or cognitive impairments.

> *"For some who have cognitive or speech or language deficits or perceptual deficits …. for some, that's really challenging to actually try and set up, and they might be too hard, so we might do these ones [exercises] we feel confident about." (Therapist 1)*

Nursing staff reported difficulty finding time to help stroke survivors with their exercises. They used strategies to fit the practice into their daily routines, such as prompting stroke survivors to practice while taking medical observations. Working with a consistent group of people for a few consecutive days helped nursing staff; they became more familiar with exercises in the practice books.

> *"…even though we are rehab nurses, if we're busy on the floor, our priorities would fall to doing care, and toileting patients, instead of doing practice books" (Nurse 10)*

> *".I had a couple of pm shifts when I was on when it was quite heavy. I think there were two people with practice books, but you just physically couldn't get there…" (Nurse 10)*

> *"The nurses that have done the practice books, have been those people that have been in an allocated area not just a one-off. They've been there for three or four days. So they know the patient …. they know the practice books. It's not something new, and it does help…" (Nurse 3)*

Reflexive monitoring: Evaluating and refining the use and implementation of ward-based practice books

Staff reflected on their experience of implementing ward-based practice books. Based on their early experiences, therapists learned how to improve their teaching skills by using clear written instructions. They used less jargon, more pictures and a consistent template. At times online resources and websites were used (see Figure 2).

> *"I think that's evolved as well… the way we teach… the way we write up programs… what we expect. We need to share and are able to share that knowledge. So I think that's been a journey for us therapists too." (Therapist 4)*

Therapists found that a consistent presentation of exercises in the practice books by each discipline was beneficial for stroke survivors. Nursing staff echoed this view, stating that:

> *"The practice books themselves have improved from where we started. They are in the same format, with the same template. There's lots of prompting and reasons to practice. So I think the explanation is a lot better than it was to begin with" (Nurse 3).*

When explicitly asked whether the team would continue using the ward-based practice books, therapists had mixed feelings due to the limited practice completed by some stroke survivors.

> *".. yes, it needs to happen in terms of the overall concept, but the minimal amount of practice and the level of exercise that is being set from my point of view at the moment, well it may as well not be happening. So I'm sitting in both camps, because I am not prescribing something at a level that is making a difference, and the amount of practice that is being done is not making a difference. But if we can get to a level where people are happy, comfortable, competent that I can see things that are…, most definitely. Because that's the only way that people are going to improve. So overall, yes, but that's not where we are at." (Therapist 2)*

Nursing staff believed the practice books were beneficial, but some recognised a need for nursing culture to change if practice book use was to become more routine on the ward/outside of therapy sessions.

> *".some kind of culture within nursing is going to change, if it is going to remain a primary nursing responsibility to get the practice books done. There might need to be a change in how we set our priorities through the day" (Nurse 10)*

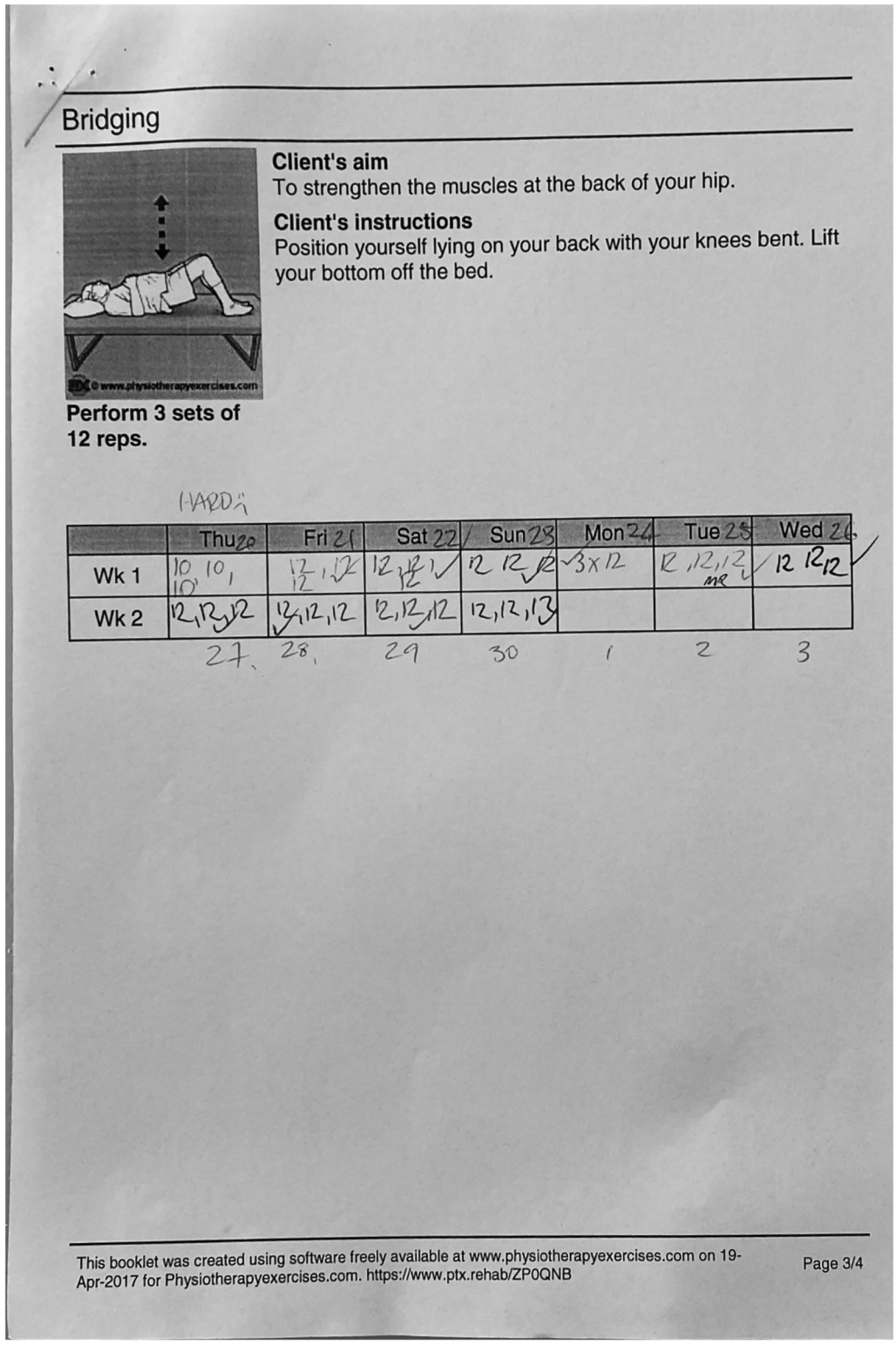

Figure 2. Example of an exercise sheet pasted into a stroke survivor practice book showing the goal or aim, instructions and amount of daily practice completed (copied with permission from www.physiotherapyexercises: freely available exercise prescribing software).

Personal (patient-related) factors

Staff reported several personal (patient-related) factors that affected use of practice books, including the stroke survivor's medical status and motivation to practice. Stroke survivors with language and cognitive impairments or severe weakness were harder to assist with ward practice.

"I think …it's easy to work with the patients who can communicate and who can understand you and it's more hard with someone, like (person's name), who is aphasic. That is a challenge. You really have to show the book and describe… …. sometimes his yes and no's can be different…" (Nurse 12)

"He gets distracted quite easily, but you can sit down and tell him to do that and if you go away for a minute, he'll be doing something else." (Nurse 11)

In summary, staff (both nurses and therapists) had a limited understanding of their expected role in implementing the ward-based practice books (Coherence). Engagement varied across staff (Cognitive participation). The confidence and skills of staff about motivating and coaching stroke survivors affected the use of ward-based practice books, particularly for stroke survivors with cognitive or language impairments (Collective action). Staff recognised that it was beneficial to have consistent formatting of exercises, which improved over time (reflexive monitoring). Staff were unsure if they would continue using the practice books in the same way after the intervention period finished, as the amount of practice being completed was low (reflexive monitoring). Nursing staff also recognised that nursing culture may need to change.

Stroke survivors' experiences of using ward-based practice (research question 3)

Several themes were identified from interviews with stroke survivors and family members. Key themes included: trying to move, evaluating movement performance, emotional influence of performance, belief in the importance of practice, having help, and personal (patient-related) factors. Stroke survivors reported trying to elicit movement or practice an activity with their affected upper or lower limb, then evaluating their performance.

> *"But I'm writing my numbers a bit neater too now and I can actually get them inside the Sudoku squares" (Stroke survivor 1)*

> *".See that arm push [pointing to exercise on the ward-based practice book], that's one because I can't get me left arm working, you've got to repeat it 50 times but me arm just won't work, the simplest way of putting it. (Stroke Survivor 3)*

Evaluation of performance, whether positive or negative, affected stroke survivors' emotional response and willingness to continue with their practice.

> *"…my arm's moving […] and I love it, and you know, just thinking, wow, that means I should be able to do something with my hand". (Stroke survivor 2)*

> *"…any little thing, you know, I'd end up bawling with him, like, he was crying and so was I, because it was such a huge great achievement, no matter what he did." (Family member)*

Stroke survivors also talked about the importance of exercise and their beliefs in the benefits to recovery.

> *"If I'm not completely recovered, then I need to keep doing it to completely recover." (Stroke survivor 1)*

> *"If you don't want to do it, you're just going to be in here longer. If you want to do it, you've got more chance of getting out earlier." (Stroke Survivor 3)*

Stroke survivors and family members also discussed the importance of having help from therapists, nurses, doctors, and family members. These helpers encouraged and assisted with practice. Most interactions were positive, although some were not.

> *"So I said to the specialist, 'Could I do my crocheting?"…I asked and they said, "You can bring it in, but I don't think you can do it, dear". So I tried and I managed to do it quite easily. I was quite surprised." (Stroke survivor 1)*

One stroke survivor reported that not all staff were able to help with ward-based practice as much as others. They attributed this difference in ability to time working on the unit, having the appropriate skills and time to assist.

> *"I'd say most nurses don't know how to do it, but some do. So the ones that have been here a long time, they know what they are doing. They know what to do and they go on and help and do it" (Stroke survivor 2)*

As reported by staff, stroke survivors also identified personal (patient-related) factors influencing their use of practice books. Factors included a positive attitude/motivated to get better and being unwell.

> *"He wants to learn. He wants to do it. And he's got the right attitude to do it" (Family member)*

> *"… but ever since I've been crook because all I've been doing is laying down. Because I've been in isolation, I couldn't go anywhere, so there wasn't anything to do, and I've got that unfit, it's going to take a long time for me to get back to peak fitness." (Stroke survivor 3)*

Model for successful implementation of ward-based practice books

When integrating the data from interviews and focus groups, a model of successful implementation of ward-based practice was created (see Figure 3). Stroke survivors reported trying to move, then evaluating performance and having an emotional response (positive or negative) based on their evaluation. Emotions influenced stroke survivors' belief in their ability to improve and regain movement, and whether they would try to move again or not. Personal (patient-related) factors impacted negatively on the stroke survivor's ability to keep trying to practice outside of therapy, and use ward-based practice books. These personal (patient-related) factors included: low intrinsic motivation, severe weakness, cognitive and language impairments, and medical instability. However, attributes of the helper counteracted these factors and enabled stroke survivors to practice successfully. Staff factors that influenced stroke survivors' ability to complete ward-based practice included: an understanding of their role in using ward-based practice books (coherence), belief in the importance of practice books (cognitive participation), skills of the therapists when prescribing an appropriate level of exercise, and coaching skills of the helpers (collective action).

Discussion

Despite good adherence to key components of the behaviour change intervention, several contextual factors affected the use and implementation of ward-based practice books. First, staff had a limited understanding of audit results and their role in implementing the ward-based practice books. Second, staff engagement when using the practice books varied. Some nursing staff did not believe it was their role to set up and assist stroke survivors with their practice. Third, in focus groups some staff reported lacking the confidence and/or skills to assist with/or set up practice, partly because weekly ward sessions did not reach all nursing staff. Fourth, personal (patient-related) factors such as severe weakness, medical instability, cognitive and language deficits affected stroke survivors' ability to practice unassisted on the ward. Finally, progress (i.e., more movement or improved function) was a great motivator for staff, stroke survivors and family members. Staff that understood their role in supporting ward practice, and had the necessary belief and skills were able to overcome personal (patient-related) factors (e.g., severe weakness) and prescribe appropriately targeted exercises, or assist/motivate stroke survivors to continue to practice on the ward.

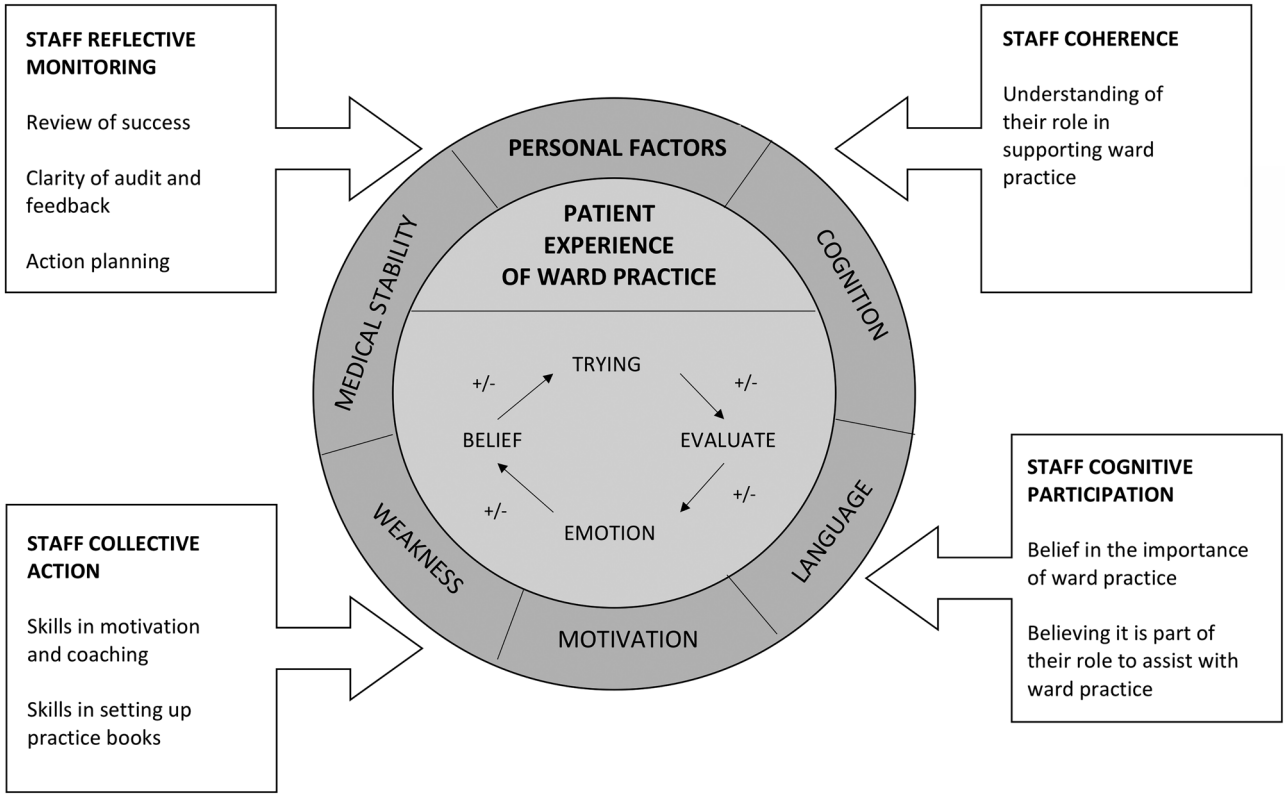

Figure 3. Proposed model for successful implementation of ward-based practice books.

Staff had a limited understanding of audit results, their role in implementing the ward-based practice books, and the need to review audit results and action plan during weekly ward sessions. Audit and feedback are likely to be most effective when the person providing the feedback is a supervisor or colleague, when feedback is provided in both written and verbal formats and includes explicit targets and an action plan [29]. In this study, feedback was provided in written and verbal formats, but staff reported limited action planning during weekly ward sessions, which were reserved for skill sharing. Furthermore, new therapists were uncertain what content should be included in ward-based practice books. To improve the quality and use of practice books in future, clearer instructions are needed about timing (i.e., when to complete action plans) and staff roles (especially for new staff). Instructions could be incorporated into existing orientation processes using orientation folders/manuals with clear instructions on the role each person plays in implementing ward-based practice books.

Levels of nursing staff engagement varied when assisting stroke survivors to practice on the ward. Nursing staff that championed use of the practice books were motivated by improvements in the stroke survivors' function. Many nursing staff continued to believe that it was not their role to assist stroke survivors to practice on the ward, and that other nursing duties should take priority. Similarly, in other studies, nursing staff have reported a lack of time to integrate rehabilitation principles into their practice [30–32]. Greater role clarity, increased interdisciplinary work, and training programs with a whole of team focus on rehabilitation principles have been proposed to enhance the rehabilitation nursing role [30]. In light of our study findings, training sessions could emphasise the progress that can be achieved by stroke survivors and may motivate less engaged staff to integrate/prioritise rehabilitation principles in their work.

Staff turnover and shift work limited nursing attendance at the weekly ward sessions and nursing skill development. Furthermore, nursing staff preferred smaller groups which allowed time to physically practice skills. Our findings are similar to a qualitative study by Bayley et al. [33] which investigated barriers to the implementation of stroke rehabilitation evidence at multiple Canadian sites. In that study, nursing staff felt they had received insufficient training sessions and preferred hands-on demonstrations. Staff turnover and training that did not reach all staff has also affected the success of other implementation research [16,17, 22]. In our study, training was conducted weekly, but staff opinions varied about the benefit of training due to time away from clinical work to attend the sessions. Rehabilitation staff have previously reported that informal ward-based training is increasingly difficult to deliver due to workload demands [34]. Further research is required into the models of education and training that best support all rehabilitation staff to develop rehabilitation specific skills and how this training can be supported by health services to balance competing clinical demands and high staff turnover.

Progress and functional improvement were identified by staff, stroke survivors and family members as a great motivator for continuing to practice, with severely impaired stroke survivors requiring assistance to succeed. Severely impaired stroke survivors have previously reported frustration at repeated failure, the need for support from others, and dismissive/negative attitudes that reduce their motivation to practice [35,36]. Findings from these qualitative studies, and the current study are consistent with theoretical constructs from Bandura's social cognitive theory [37]. Self-efficacy (how confident someone feels about their ability to achieve a desired goal) is a key component of social cognitive theory which directly affects a person's motivation to pursue goals. Self-efficacy can be enhanced by the successful completion of a task or skill. Chronic disease self-management programs often use social cognitive theory as the framework for

designing the program [38]. Further research using similar frameworks and principles may help support stroke survivors to develop the confidence, skills and motivation to continue practicing with less supervision. Clinically, staff need to be aware that their interactions with a stroke survivor can directly influence that person's motivation to practice and improve.

There are several limitations to this study. First, the same authors that conducted this process evaluation also conducted the primary outcome study, which may have influenced data interpretation. Second, the study was conducted with one rehabilitation team, limiting generalisability of findings to other teams. Third, the convenience sample of stroke survivors and family members was small, and we did not reach data saturation. Fourth, the use of the NPT may have limited our data interpretation, however an additional theme of 'personal (patient-related) factors' was also identified. Finally, due to resource constraints, focus groups with staff were only conducted at 2 and 4 months during the intervention and not at the end of the intervention which may have impacted the findings. Additionally, the focus groups were run in parallel to the implementation of the behaviour-change intervention and may have affected the behaviour of staff during the intervention.

The strengths of this study include the systematic use of the Medical Research Council framework [15] when designing the process evaluation, and concurrent collection of qualitative data at two and four months during the intervention. Systematically integrating multiple strands of quantitative and qualitative data provided a more thorough understanding of the implementation and use of ward-based practice books.

In conclusion, this process evaluation highlighted several key components of the behaviour change intervention that need to be adapted if a larger study is conducted. Clearer instruction is needed on the layout of ward-based practice books, and the role of each staff member when implementing practice books. Feedback on audit results should be accompanied by action planning. Weekly ward sessions should be conducted with smaller groups, allowing more time to review audit results, celebrate the progress of stroke survivors, and may need to be run more frequently to include more nursing staff.

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Ethical approval

The West Moreton Ethics Committee approved this study

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