BMJ Open

Qualitative investigation of the perceptions and experiences of nursing and allied health professionals involved in the implementation of an enriched environment in an Australian acute stroke unit

Ingrid C M Rosbergen,[1,2] Sandra G Brauer,[1] Sarah Fitzhenry,[3] Rohan S Grimley,[4] Kathryn S Hayward[1,5,6,7]

ABSTRACT

Objective An enriched environment embedded in an acute stroke unit can increase activity levels of patients who had stroke, with changes sustained 6 months post-implementation. The objective of this study was to understand perceptions and experiences of nursing and allied health professionals involved in implementing an enriched environment in an acute stroke unit.

Design A descriptive qualitative approach.

Setting An acute stroke unit in a regional Australian hospital.

Participants We purposively recruited three allied health and seven nursing professionals involved in the delivery of the enriched environment. Face-to-face, semistructured interviews were conducted 8 weeks post-completion of the enriched environment study. One independent researcher completed all interviews. Voice-recorded interviews were transcribed verbatim and analysed by three researchers using a thematic approach to identify main themes.

Results Three themes were identified. First, staff perceived that 'the road to recovery had started' for patients. An enriched environment was described to shift the focus to recovery in the acute setting, which was experienced through increased patient activity, greater psychological well-being and empowering patients and families. Second, 'it takes a team' to successfully create an enriched environment. Integral to building the team were positive interdisciplinary team dynamics and education. The impact of the enriched environment on workload was diversely experienced by staff. Third, 'keeping it going' was perceived to be challenging. Staff reflected that changing work routines was difficult. Contextual factors such as a supportive physical environment and variety in individual enrichment opportunities were indicated to enhance implementation. Key to sustaining change was consistency in staff and use of change management strategies.

Conclusion Investigating staff perceptions and experiences of an enrichment model in an acute stroke unit highlighted the need for effective teamwork. To facilitate staff in their new work practice, careful selection

Strengths and limitations of this study

► Qualitative evaluation using a descriptive thematic approach highlighted factors identified by staff that may be critical to successfully embed and sustain an enriched environment in an acute stroke unit.
► This study included a representative sample of staff directly involved in the implementation of an enriched environment.
► Data analysis was performed by three independent researchers enhancing validity of results.
► This study focused on nursing and allied health professionals, but did not include patient and family perceptions and experiences of engaging in the enriched environment.
► Interviews were conducted in one acute stroke unit in Australia, thus applicability of study findings may be limited.

of change management strategies are critical to support clinical translation of an enriched environment.

Trial registration number ANZCTN12614000679684; Results.

BACKGROUND

An enriched environment aims to enhance physical, social and cognitive activities through a stimulating, organised environment.[1] In animal models, environmental enrichment refers to housing conditions that stimulate sensorimotor, social and cognitive activities using environmental complexity and novelty.[1] Animal models of stroke have demonstrated that rodents engaged in an enriched environment show greater learning and functional recovery compared with standard housing conditions.[2–5]

BMJ

The first clinical study in a human stroke population translated an enriched environment into a subacute inpatient rehabilitation setting.[6] In this study, environmental enrichment included provision of stimulating resources in the rehabilitation ward and at the patient bedside to encourage activity.[7] Our group translated an enriched environment into an acute stroke unit.[8] Similar to animal models, both these clinical studies showed that environmental enrichment increased engagement in physical, social and cognitive activities.[6 8]

We adapted the enriched environment intervention based on findings in the subacute rehabilitation setting to tailor it to the unique context of an acute stroke unit. The acute stroke unit presents a multitude of new challenges that may impede clinical translation. Here, patients are often dependent on staff assistance[9] and require frequent medical investigations and interventions during the day.[10] In the subacute rehabilitation setting, where patient dependency is lower than in the acute stroke unit,[9] staff reported that providing assistance to patients was a key limiting factor in accessing communal enrichment areas.[11] To address this issue, we included structured communal activities with clear responsibilities for nursing and allied health professionals to enable 'mobility assistance' in our enrichment model. Furthermore, patients, carers and families are in a heightened emotional state early after stroke,[12] and there is a high turnover of patients in the acute setting.[13] These specific characteristics required that the embedded intervention was easy to modify and well communicated to patients and their families.

The enriched environment intervention in the acute stroke unit included three key elements: (1) a stimulating ward environment that included communal areas for socialising and structured mealtimes, group activities and resources on the ward and at the bedside, (2) patient and carer(s) involvement to encourage patient engagement in activities outside therapy hours and (3) the use of change management strategies to support staff in the delivery of this complex intervention.[14 15] To understand relationships between implementation, the unique context of the acute stroke unit, and how the delivered intervention created change,[16] investigating staff perceptions and experiences is one key component of process evaluation.[16] The primary aim of this study was to understand the perceptions and experiences of nursing and allied health professionals who implemented the enriched environment within the acute stroke unit. Staff reflections will contribute to the refinement of an enrichment model for the acute stroke unit to inform future clinical trials.

METHODS
Study background
The study reported here is a sub-component of a before–after pilot study that was registered with the Australian New Zealand Clinical Trials Registry (ANZCTR12614000679684). The study protocol[14] and the primary results have been published elsewhere.[8]

In brief, our pilot study observed patient activity levels during a usual care period and a subsequent enriched environment period and found that an enriched environment significantly increased activity levels of patients who had acute stroke.[8] We subsequently conducted all qualitative interviews 8 weeks post the enriched environment period. This study was conducted in accordance with the Declaration of Helsinki.

Author's relationship with participants
The principal investigator (ICMR) had a professional relationship with all participants and this study is part of her doctoral degree. An independent researcher conducted all interviews to allow staff to reflect their honest perceptions and experiences of the enriched environment intervention. The interviewer (SF) was a specialised neurology physiotherapist working in ambulatory rehabilitation. She received training in interview techniques and had recent experience undertaking in-depth interviews. SF had no relationship with the initial pilot study 'enriched environment in the acute stroke unit'[8] and no prior engagement with participants. ICMR and KSH (independent of the trial site) developed the interview guide for the interviewer. To overcome personal bias of IR to study and participants, three researchers (SF, KSH, ICMR) analysed all collected data independently. All authors contributed to the manuscript using reporting checklists for qualitative studies.[17]

Overview of design and participants
We used a descriptive qualitative design. Semistructured interviews with open questions and prompts were undertaken to collect individual staff perceptions and experiences.[18 19] The semistructured interviews were conducted with nursing and allied health professionals working on the acute stroke unit in a regional Australian hospital. Staff members were eligible to partake in a semistructured interview if they had worked in the acute stroke unit during the enriched environment period of the pilot study. We wanted to understand the experiences of a diversity of staff members to capture the complexity of embedding a new multidisciplinary intervention. We selected a purposive sample[20] and recruited participants with a variety in sex, age, educational level, nursing roles, allied health disciplines and work experience on the acute unit. Participant recruitment was ceased on saturation of the data, which was deemed to be the point where no additional information was added to identify new meaningful concepts. To enhance rigour, we focused on elements of trustworthiness using the framework of credibility, transferability, confirmability and dependability.[21]

Data collection
Semistructured interviews were performed in a quiet room within the hospital using an interview guide (box). No other people were present during interviews. The facilitator (SF) encouraged participants to share their personal experiences and meanings they attributed to

> **Box   Interview guide: main questions and prompts used to guide interview of all participants**
>
> **What was your understanding of the enriched environment intervention?**
> ► What changes did you notice during the enriched environment on the ward?
> ► Can you report on the changes that you noticed for patients, families, nursing staff, allied health staff and other staff?
> ► What were your expectations regarding the enriched environment?
>
> **Discuss the content of the enriched environment intervention.**
> ► How did you implement the different aspects of the intervention?
> ► How did you feel about the different aspects of the intervention?
> ► What guidance is needed to implement the intervention?
>
> **Were there any problems as well as rewarding situations during the enriched environment intervention?**
> ► Was there anything that stopped you from implementing the enriched environment?
> ► Did you experience any problems with increasing patient activity (physical, social and cognitive)?
> ► Have you found a way to cope with any barriers in enriching the environment?
>
> **Has the enriched environment changed any team dynamics?**
> ► Did the enriched environment change the communication within the team?
> ► How do you feel about these changes?
> ► Did the intervention change your communication with patients and families?
>
> **What advice do you have how we can sustain the enriched environment in the future?**
> ► What do you need to be able to sustain the enriched environment?
> ► What aspects do you think are hard to sustain?
> ► Do you have ideas how to solve this?

working within the enriched acute stroke unit and used probing techniques and prompts to achieve further in-depth reflection. Participants were asked to reflect on the recently completed enriched environment intervention and how this intervention impacted patients with stroke, their families and staff members (themselves and others). At the end of the interview, the facilitator rephrased main experiences and meanings expressed by the participant to ensure provided information reflected the participant's views accurately. Interviews were audio recorded and no field notes were made during interviews.

Enriched environment intervention
Usual care in the stroke unit has been described in the study protocol and result papers.[8 14] The enriched environment intervention embedded in the acute stroke unit focused on three key areas summarised briefly below.
1. Embedding a stimulating environment in the acute stroke unit through creation of public communal spaces and provision of stimulating resources, for example, newspapers, iPads, books and games throughout the ward and at the patient bedside. We commenced daily communal breakfast and lunch times, as well as group activities to provide opportunities for patients to increase their activity levels.
2. Encouraging patient and family involvement through provision of an information brochure and face-to-face education that explained why activity after stroke was important, how patients and families could contribute to increasing activity levels, and explained the day structure of the ward. We also provided individualised activity cards at the patient's bedside with suggestions for patients and families to increase activity that related to the patient's goals.
3. Educating staff to enhance patient activity through interactive educational workshops that were provided to nursing and allied health professionals in small groups prior to the commencement of the enriched environment. We explained the theoretical background of an enriched environment, and discussed key intervention strategies. Staff members were encouraged during these sessions to explore and discuss possible barriers and enablers of enrichment strategies. In addition, investigators explained the role of appointed nurse champions to facilitate enrichment on a day-to-day basis and transparent staff responsibilities were described in an intervention protocol.

During the implementation phase of the intervention, direct feedback to staff members was provided and we distributed newsletters every 3 weeks to repeat key intervention strategies. These newsletters also included patients and carers' feedback.

Data analysis
Interviews were transcribed verbatim by a professional transcription agency (Pacific Transcription, Australia). We used a thematic content approach to capture important information related to our research aim.[22]

The transcriptions were first reviewed by the interviewer (SF) to ensure the content accurately reflected each interview to enhance dependability. After initial review, three researchers performed data analysis to avoid any potential bias or personal motivations promoting confirmability. First, researchers (ICMR, KSH, SF) independently read and became familiarised with the complete data set. Second, investigators went through the transcripts line by line to obtain meaningful information and identified repeated topics and patterns. Researchers then interactively discussed interpretation of data to avoid bias in analysis, and collapsed data into categories. Credibility was enhanced through repeated discussions during the analysis process clarifying accurate interpretation of the data. Fourth, researchers re-read all transcripts to confirm that all data fitted into the identified categories and potential relations to key themes were identified. Researchers met a further three times to discuss and reframe key themes and subthemes ensuring consistency of findings between researchers, and that defined themes accurately reflected the expressions of the participants. Lastly, quotations and

Table 1 Characteristics of participants in order of interviews

n	Discipline	Age (years)	Work experience in ASU (years)	Participated in education session	Duration of interview (minutes)	Nurse champion
1	Nursing	>40	2–5	Yes	40	Yes
2	AH	>40	2–5	Yes	38	–
3	AH	>40	>5	Yes	48	–
4	Nursing	<40	<2	Yes	20	Yes
5	Nursing	>40	>5	Yes	36	Yes
6	Nursing	>40	>5	Yes	32	No
7	Nursing	>40	<2	No	16	No
8	AH	>40	<2	No	60	–
9	Nursing	>40	>5	Yes	28	Yes
10	Nursing	<40	<2	Yes	26	Yes

AH, allied health; ASU, acute stroke unit.

sections of text were extracted under thematic content and checked for consistency with the narrative theme. During the writing stage, further refinement of links and subthemes occurred to ensure consistency of themes. All changes were discussed at each step between the three researchers to achieve consensus. Final transcripts and results of the analysis were not discussed with participants.

RESULTS
We approached seven nursing staff, two senior allied health therapists and one allied health assistant face to face to participate in the study. No participants approached declined to participate and all invited individuals provided written consent. Two participants commenced working in the acute stroke unit after the interactive educational workshops were held. Participants' characteristics can be found in table 1. To protect the identity of our participants, we have not specified sex, roles, disciplines or educational background in detail. The study sample included two male participants. The mean interview duration was 34.4 min.

Overview of themes
Three main themes, each containing subthemes, were identified. A summary of the themes and subthemes are presented in table 2.

Theme 1: The road to recovery has started
Nursing and allied health staff expressed that the enriched environment created more opportunities for patients to be physically, socially and cognitively active during the day as compared with usual care. Staff perceived that the enriched environment positively contributed to patients' recovery. The following subthemes were constructed.

Focus shifted to 'acute care and recovery'
Staff perceived that the acute stroke unit shifted from 'acute care' to 'acute care and recovery' for patients.

Patients were sitting out of bed more frequently in a 'homely environment', and the daily structure was more like 'a normal day at home'. In addition, families were increasingly inclined to take patients outdoors or to communal areas for coffee or for social interactions in a less institutionalised environment.

> We have bridged the gap between the acute and rehabilitation setting, and we have started the rehabilitation process from day one. (Allied Health 8)

Improved psychological well-being
Staff reflected that the enriched environment improved psychological well-being of patients who had stroke and their families. Patients appeared to be more active, alert, positive and less bored. These positive observations reinforced staff to continue implementation of enrichment strategies. In addition, staff experienced that families and patients provided positive feedback about the enriched

Table 2 Summary of the themes related to nursing and allied health professionals' perception and experiences of implementing an enriched environment in an acute stroke unit

Main theme	Subthemes
'The road to recovery has started' for patients	Focus shifted to 'acute care and recovery' Improved psychological well-being Observed increased activity levels Empowering patients and families
'It takes a team' to successfully create an enriched environment	Impact on workload Team dynamics Importance of team education
'Keeping it going' requires building routine	Changing work routines challenging Impacting contextual factors Sustaining work practices

environment and expressed optimism in future outcomes after stroke.

> Patients have voiced that they've enjoyed interacting with other patients and that families reported to have enjoyed the interaction with other patients. They found it not so lonely being in hospital, because they have people to talk to. (Nurse 4)

> I am finding patients are a lot happier. I think because their day is not just taken up with lying around in bed. There is more to do. (Nurse 5)

Observed increased activity levels

Staff perceived that greater levels of patient activity were observed in the enriched acute stroke unit than prior to enrichment. Communal mealtimes were considered to enhance frequent physical activity, for example, walking to and from meals and sitting up for breakfast and lunch. Furthermore, mealtimes and group activities enabled social interaction as patients shared their personal stories. Staff stated that they received positive comments from patients and families regarding communal mealtimes.

> A major difference is the meal times, getting the patients out to socialise with other patients. They spend more time out of their bed. (Nurse 4)

Staff expressed that increased patient activity contributed to patients' recovery in a positive way. Structured activities such as mealtimes and group activities were perceived to be more successful in activating patients than non-structured activities such as stimulating resources at the bedside or in a communal area.

> Upper limb groups tended to be in the afternoon. We have taken them away from their bed, into the rehab room. That actually really helped the afternoon process. (Allied Health 8)

> The not really structured moments where we encourage that people are getting outside their room…it still could be better. (Allied Health 3)

However, it was noticed that some individuals preferred to stay in their own room. Staff found it challenging to enrich the environment for these patients and suggested that a larger variety of individually tailored activities at the bedside were needed to keep these patients active. Activities such as reading newspapers, doing games or therapy activities on the iPads gave patients cognitive stimulation during the day. While non-structured enrichment strategies relied on initiative of individual staff members, staff still valued these activities, as they created positive stimulating situations.

> A couple of nurses started on the big table with a jigsaw - and a couple of patients were coming up, and they were all putting pieces together. That was good, it was much more communal, normal. (Nurse 1)

Empowering patients and families

The enriched environment was perceived to empower patients and families to have greater autonomy in their recovery journey. Staff reported that patients could indicate their preferred activities for the day and if they desired to attend any group activities. Staff also commented that families had provided feedback that an enriched environment delivered individualised care, as patients preferred activities were taken into account. In addition, staff perceived that family involvement in patient activities resulted in families feeling useful in the patient's recovery.

> I will always ask for their hobbies … to get them active in the things they like. (Allied Health 3)

> Trying to give over the therapeutic role to the family so that they can carry on. (Allied Health 8)

In contrast, staff experienced that family members occasionally looked awkward when a patient was attending a communal mealtime and that many required encouragement to join group activities. Staff suggested during interviews that family and patient education was required to explain the enriched environment concept to change their outlook regarding the acute hospital environment.

Theme 2: It takes a team

Staff perceived that successful implementation of an enriched environment required involvement of all team members. Interdisciplinary teamwork became more visible within the enriched environment as staff worked cohesively to provide a stimulating environment for patients. Mealtimes or scheduled group activities required frequent communication between disciplines so patient care was kept running smoothly. Staff acknowledged that the enriched environment could be challenging at times of competing priorities. However, staff overall perceived that the enriched environment was well accepted and resulted in higher personal work satisfaction.

> I think there was more of a connection between nursing staff and therapy staff in terms of connecting around goals and activities that were provided to the patient. (Allied Health 8)

> It made us feel better because the patients seemed happier. I felt like I was doing my job as a nurse better because we were pushed more to do things that we should be doing anyway. (Nurse 10)

Impact on workload

Conflicting messages were reported regarding the impact of an enriched environment on staff workload within the team. A few nursing staff members indicated that the enriched environment contributed to a reduction in nursing staff workload, as they experienced support from allied health professionals.

> It kind of assisted us at the time with our workload, in a way, with the Physio's, OT's, taking patients down for lunches and breakfast. If they weren't in their

room for us to feed them during lunch, it obviously freed us up. (Nurse 7)

However, other nursing staff members experienced that implementing enrichment strategies was very challenging when high acuity patients were on the ward and during very busy shifts, for example, high patient turnover. Nursing staff reported that higher priorities at these times limited their capacity to embed enrichment strategies. No references within the data were found how allied health staff experienced impact on workload.

I think it is just dependent on the shift and the business of that shift. Just the acuity of the ward. If you got very unwell patients you are going to be focused on them and not getting someone out of bed for breakfast. (Nurse 4)

It was when the ward got incredible heavy; we had 16 stroke patients in the acute stroke unit and 16 throughout the hospital. The most sick and heavy stroke patients were in the acute stroke unit. It was really just trying to get through the workload of the day. Probably the enriched environment took a back foot because of clinical intensity. (Nurse 1)

Team dynamics
Staff perceived commencement of new graduate nurses and casual staff as challenging as it changed knowledge within the team. Team champions attempted to provide information regarding the enriched environment concept and key strategies to new staff. However, nursing staff noticed that it was difficult for new staff to incorporate enrichment strategies in their routine.

I think a lot of us who are permanent staff on the ward were mostly all into it, but it's harder when you get other staff come on, which are casual or haven't worked here before. (Nurse 9)

I think what impacted us the most especially at the beginning of the year are new grads. So we got four new grads, four new nurses on contracts and lots of casual staff. So it really changes the dynamics of knowledge of the people who are here. So they are struggling just to get through the clinical load safely. (Nurse 1)

Some staff members did not change work practice and continued their old work routines. Staff reflected that intrinsic motivation is different for each staff member and played a role in the amount of staff involvement.

Some staff really took to the project and were up and going, and others not. It is very person centered and it depends on how enthusiastic the person is with their role. (Nurse 6)

Staff expressed that positive team dynamics supported embedding an enriched environment in the acute stroke unit. On weekdays, higher numbers of nursing and allied health professionals were present creating a dynamic interdisciplinary team who were collectively enriching the stroke unit. On weekends, there was a lower nursing staff to patient ratio and no allied health professionals were available. This led to nursing staff perceiving that the enriched environment was a burden as it was 'on top of' usual practice.

I think there wasn't much support on weekends for nursing staff. It was basically up to us to do it. In all honesty, it's just something else added to our list of things that we have to do, got to make time for this as well on weekends when there is skeleton staff anyway. (Nurse 7)

Importance of team education
Education was perceived of great importance to successfully implement an enriched environment. Staff expressed that the interactive educational workshops that were provided prior to embedding the enriched environment created a basic understanding of the concept and awareness of the different components of an enriched environment. Education enhanced the capacity of staff to explain to patients and families why it is important to be active after a stroke. One staff member who commenced work in the acute stroke unit after the initial interactive workshops identified a lack of education for new staff members and perceived to be inadequately equipped to implement the intervention successfully.

I can't tell you about the different aspects of the intervention, not really, I don't think I was part of it enough. Not knowing enough about it as a new staff member. (Nurse 7)

Making sure that everyone is on board with it and that everyone is willing to participate; because if you are not all going to participate and do it as a team, it is not going to work, so educating everyone—especially when there is new staff. (Nurse 9)

Staff perceived that the interactive workshops led to consistency in information provision to patients and families, which contributed to successful implementation. One allied health staff member commented that medical staff were an important team player in creating an enriched environment.

Support from the medical team absolutely helped. The medical teams were to tell patients that it is important: 'you need to get up'. There is a brilliant program on the ward you need to attend to. Because they are the doctors, it is an important message. (Allied Health 3)

Yet, despite medical support of ward enrichment, staff acknowledged that education to patients and families was frequently required. Staff perceived that education should include what is expected regarding self-management and how patients and families can contribute to stimulation within an enriched stroke unit.

Theme 3: Keeping it going

The majority of staff expressed during interviews their preference to maintain the enriched environment within the acute stroke unit for the long term. Staff perceived that the enriched stroke unit was beneficial for patient-centred care and enhanced family involvement. However, staff experienced that it was easy to relapse into old work routine.

Changing work routines challenging

Staff repeatedly acknowledged that it was challenging to change work habits to incorporate a new and complex intervention. The consensus among nursing staff was that 'it takes time and effort' to change work routines, and they had to actively remind themselves to incorporate enrichment strategies.

> From a nursing perspective, it is still quite difficult in regards to getting that changed behavior, but certainly from family and that, I think we are getting there. It is going to be a slow process. (Nurse 6)

Staff expressed that continuous prompting and reminders were required during the implementation phase as enrichment was not part of their usual routine. To sustain an enriched environment in the long term, staff anticipated that leadership, continuous education, reminders and team champions were key elements, as staff feared they would regress back into old work practice.

> It took a long time for me to get into the habit of doing things with patients. It's just the prompts for me, somebody prompting or something to remind me. (Nurse 1)

The enriched environment intervention changed skills and competencies for some team members. Nursing assistants provided support to patients during interactive mealtimes in the enriched environment and were required to facilitate group communication. Staff indicated during interviews that nursing assistants were not sufficiently trained to perform these tasks and highlighted that targeted training for nursing assistants in facilitating group communication and enhancing patient independence would support changing their work practices.

> It's a lack of education. Some of them don't have the knowledge. Sometimes to help somebody you have to step back a little bit. (Allied Health 2)

Difficulties experienced by allied health professionals centred around family involvement, acknowledging that it was not routine practice to consistently involve family members in increasing patient activity in the acute stroke unit.

> Family involvement was an aspect that is still not sufficient enough. That is a big allied health change. We tend to be focusing on our half hour of treatment and then we leave. We should work towards education and training of family in what they can do. (Allied Health 3)

Staff members indicated that the biggest drive to changing work practice was to achieve best patient outcomes. Positive feedback received from patients and families regarding the enriched environment reinforced staff to change work routine. Staff members perceived the unit as research driven and clinical staff wanted the trial to be successful so the team contributed to stroke care evidence. Staff anticipated that stronger evidence of better patient outcomes as a result of embedding an enriched environment in the clinical setting would motivate staff to sustain changed work practices.

Impacting contextual factors

The acute stroke unit prioritises admission of patients who had stroke to the unit. However, allied health staff found it challenging when small numbers of patients who had stroke occupied beds in the acute stroke unit, resulting in beds getting allocated to general medical patients. Allied health professionals in the stroke unit were attached to the stroke team and were not involved in patients from other medical teams. Fewer patients who had stroke present on the stroke unit made it difficult to organise meal and group activities.

> We had some time in the enriched environment where we didn't have a lot of stroke patients. Where we were very slow, it makes it really hard to keep going. While when it is busy, when we have a lot of stroke patients, it's very easy. It's very easy to fill up the mealtimes and group sessions. (Allied Health 3)

Many staff members commented that the acute stroke unit lacked a physical design to support an enriched environment. Shifting furniture in the therapy room on a daily basis to support mealtimes was annoying and time consuming. Staff indicated that optimising hospital design would contribute to implementing and sustaining an enriched environment. Recommendations for an optimal hospital design included inviting communal areas, therapy rooms equipped with stimulating resources and green outdoor spaces.

> I suppose just the setting up of breakfast, it got me sometimes. Because I'd come on night shift and you had to set up the breakfast tables, because it wasn't a permanent set up. (Nurse 9)

> It would be lovely if we had an outdoor area. Every hospital should have a sunroom where patients can get outside and get fresh air, that would be wonderful, and a lounge area, we unfortunately don't have that. (Nurse 5)

Sustaining work practices

Staff provided advice on how to sustain the enriched environment model. Advice included consistency in leadership within senior allied health and nursing staff. Staff perceived that consistency positively contributed to team dynamics.

Especially from an allied health perspective you need to have consistency. You also need allied health assistants. They are imperative and I would love to see them across the board. (Nurse 6)

Nursing staff anticipated that including enrichment strategies within stroke protocols of care would create an expectation for new nursing staff to incorporate stimulation for patients during their workday as routine practice. Other factors repeatedly mentioned during interviews to sustain work practice were continuous education, reminders and champions who drive the enriched environment.

One of the things we were thinking—the nursing staff have a standard stroke protocol, how we manage temperatures, blood sugars, blood pressure. And this is how we mobilise, this is what we do on interventions. Putting it in there that it is standard practice, that it is not additional; it is standard. (Nurse 1)

I think it is ongoing education for nurse champions. Some people who say this is something that I believe in passionately and who want to see it happen. (Nurse 1)

Cultural change within the team was identified as necessary to sustain the enriched environment, which staff members perceived as: 'a slow process that takes time, is difficult at times, and the unit collective needs to drive this change'. Staff sensed that culture change was achieved when stimulating and activating patients on a daily basis became routine practice.

I think recognising that change is not always quick, that we keep doing it and we keep doing it and we just keep educating and we just keep moving forward then one day you will actually look back and go, this is just normal practice! (Nurse 6)

DISCUSSION

Staff perceived that an enriched environment embedded in the acute stroke unit positively contributed to patients' recovery, and that patients' focus shifted towards recovery. Teamwork was perceived as an essential factor for successful implementation of an enriched environment in an acute stroke unit. Consequently, staff changes affected interdisciplinary team dynamics, which highlighted the importance of leadership and regular education to keep focus and momentum. Staff acknowledged that it was easy to relapse into old work routines and emphasised that team champions, reminders, consistency in staff and an optimal physical design were important contributors to sustain the enriched environment. Interestingly, staff of the current study in the acute setting and the previous enrichment study in the subacute setting[11] both identified that the enriched environment provided increased opportunities for patients to be active. All other perceptions and experiences reported here are unique to the acute enrichment model.

Staff experienced that not all patients wanted to participate in communal activities, which made engagement of these patients in meaningful activities challenging. A recent systematic review that investigated experiences of stroke patients during acute and subacute rehabilitation found that patients felt bored, disempowered and wanted greater opportunities to engage in meaningful activity.[23] Self-driven therapy activities[24] and therapy apps using tablets in stroke rehabilitation have been found to be well accepted at a patient level and have demonstrated their ability to increase therapy time and intensity of practice.[24–26] Further development of self-driven interventions could strengthen meaningful individual enrichment and support activities outside therapy hours and during times of competing work priorities for staff. In addition, to facilitate individualised care within an enrichment model, early goal setting with patients and families could enhance staff focus towards meaningful activities tailored to each patient.[27]

Teamwork was highlighted as a key factor to successfully create an enriched environment. This aligns with a previous report that emphasised the strong role of teamwork in implementing complex interventions in acute stroke units.[28] Activities grounded in interdependence such as communal mealtimes have previously been identified to facilitate collaboration among team members from a variety of disciplines and contribute to building a team identity.[29] High interdependence tasks promote collective efficacy within a team, and support development of shared beliefs.[29 30] Our findings support this premise, where communal mealtimes required combined efforts of nursing and allied health professionals creating a feeling of 'team effort and sharing of workload'. Staff experienced that structured communal activities were easier to implement than individual enrichment strategies. This suggests that inclusion of interdependence activities within an enriched environment in an acute stroke unit could enhance team efficacy.

Another important team factor emphasised was consistency in staff members. It was viewed as critical to create a team specialised in stroke care that can incorporate and sustain innovations such as an enriched environment. Previous research suggests that a perception of collective efficacy within a team improves when individuals have a history of working together.[29] Constructs such as collective efficacy arise from individual staff members and through team processes as social interaction and interdependent task experiences transform collective efficacy into a team level construct.[29] In addition, specialisation in a particular patient population increases clinical efficiency within teams,[31] as well as cohesion and collaboration.[31] This suggests that successful implementation of complex interventions might rely on established team construct, and that team construct needs to be considered when designing implementation strategies.[31]

Beyond team aspects, it appeared that not all staff members were equally involved in facilitating the enriched environment and that person-related factors such as motivation played a role in changing practice and behaviour. This is not surprising; people have different levels and types of motivational drivers. Staff perceived that team champions had an important role in facilitating staff during implementation of an enriched environment. Staff members who have high intrinsic motivation, where they perform a task for the satisfaction it provides,[32] might perform the champion role more successfully. A recent qualitative study found that team champions were considered to be facilitators during implementation of an intervention as they provided support and motivation to team members.[33] In addition, the positive contribution of self-selected champions, who were highly motivated for their role, was also highlighted.[33] Staff who are more extrinsically motivated, where they show a behaviour to receive some reward such as getting approval or avoiding feeling guilty,[32] are likely to respond better to clear transparent task descriptions and the influence of champions. Nursing staff indicated that incorporating 'patient activity and stimulation' as a daily care task within the nursing stroke care protocol could act as an extrinsic motivator to individual staff members. Adherence to a nursing protocol has previously been shown to be effective in changing nursing staff work routine.[34 35] Taken together, future enriched environment studies should carefully consider implementation strategies that target both intrinsic and extrinsic motivators to maximise impact across the local team.

Allied health staff found it difficult to incorporate time within their day to educate families to support their involvement in enriching the environment. While this change in work routine to educate families may take time, it highlights a potential mechanism to further enhance the efficacy of an enriched environment. Given patients spend little time with therapists in acute stroke units to start early rehabilitation,[36] it is important to look at alternative strategies to promote activity after stroke. Families have been found to be a resource-efficient method that may augment intensity of rehabilitation activities.[37 38] Families are often willing to be involved in providing activities to patients who had stroke, but factors such as work commitments and lack of confidence impact their ability.[39] Availability of information brochures for patient and families, self-driven exercise programme and conjoint activity opportunities with staff while in the acute stroke unit could enhance family involvement. Using a theory of change model,[15] including barrier and facilitator exploration with allied health staff and families, may provide further insight into how family involvement can be promoted.

Contextual factors such as hospital design were highlighted as important in facilitating and sustaining an enriched environment from an organisational perspective. There remains limited evidence available about which hospital design has a positive effect on patient activity levels. Further studies investigating optimal health design in acute hospitals to support stroke recovery are needed.

Finally, all staff highlighted during interviews that change management strategies such as knowledge of the enriched environment concept, transparent responsibilities, reminders, feedback, drivers and education were important to keep new and existing staff members involved and educated. Developing online mandatory educational packages to educate new staff members might be beneficial to support the enriched environment intervention. It is unknown to what extent and which type of our selected change management strategies contributed to successful translation of the enriched environment.

Strength and limitations

Our qualitative study included a representative sample of staff involved in the daily delivery of the enriched environment intervention. In addition, interviews with new staff who became part of the team during the recruitment phase provided additional valuable information for future clinical translation. However, this study had several limitations. First, we focused only on staff perception and experiences and did not include patients or carers. Second, our study was not underpinned by a specific qualitative methodology, involved a small sample and was conducted in one acute stroke unit limiting applicability of findings. Third, it appeared that data saturation was reached, but it is possible that a larger study sample could have led to additional perspectives being raised. Fourth, our interview schedule did not include detailed questions regarding the different elements of the intervention. We therefore recommend that future studies inquire in more detail about strengths and weaknesses of the intervention. Last, participants were only interviewed once after recruitment was finalised limiting evaluations of experiences and perceptions throughout the course of implementing the enriched environment.

CONCLUSION

Staff in an acute stroke unit perceived an enrichment model to have a positive effect on patient recovery and family involvement. They indicated that the enriched environment made the interdisciplinary team more visible and that structured tasks involving interdependence of professional streams facilitated teamwork and contributed to team identity. Optimal hospital design and access to a variety of self-driven exercise interventions and resources were perceived to support embedding and sustaining an enriched environment. Lastly, prolonged use of change management strategies to support individuals in adapting and maintaining new work practices was deemed critical in achieving a long-term culture change on the unit.

Author affiliations
[1]Division of Physiotherapy, School of Health and Rehabilitation Sciences, The University of Queensland, Brisbane, Queensland, Australia
[2]Allied Health Services, Sunshine Coast Hospital and Health Service, Birtinya, Queensland, Australia

[3]Community Integrated Services and Subacute Services, Sunshine Coast Hospital and Health Service, Nambour, Queensland, Australia
[4]Sunshine Coast Clinical School, The University of Queensland, Birtinya, Queensland, Australia
[5]Stroke Division, Florey Institute of Neuroscience and Mental Health, University of Melbourne, Melbourne, Victoria, Australia
[6]Stroke Rehabilitation and Brain Recovery, NHMRC Centre of Research Excellence, Melbourne, Australia
[7]Department of Physical Therapy, University of British Columbia, Vancouver, Canada

REFERENCES

1. Nithianantharajah J, Hannan AJ. Enriched environments, experience-dependent plasticity and disorders of the nervous system. *Nat Rev Neurosci* 2006;7:697–709.
2. Johansson BB. Functional and cellular effects of environmental enrichment after experimental brain infarcts. *Restor Neurol Neurosci* 2004;22:163–74.
3. Janssen H, Bernhardt J, Collier JM, et al. An enriched environment improves sensorimotor function post-ischemic stroke. *Neurorehabil Neural Repair* 2010;24:802–13.
4. Zhang X, Chen XP, Lin JB, et al. Effect of enriched environment on angiogenesis and neurological functions in rats with focal cerebral ischemia. *Brain Res* 2017;1655:176–85.
5. Ohlsson AL, Johansson BB. Environment influences functional outcome of cerebral infarction in rats. *Stroke* 1995;26:644–9.
6. Janssen H, Ada L, Bernhardt J, et al. An enriched environment increases activity in stroke patients undergoing rehabilitation in a mixed rehabilitation unit: a pilot non-randomized controlled trial. *Disabil Rehabil* 2014;36:255–62.
7. Janssen H, Ada L, Karayanidis F, et al. Translating the use of an enriched environment poststroke from bench to bedside: study design and protocol used to test the feasibility of environmental enrichment on stroke patients in rehabilitation. *Int J Stroke* 2012;7:521–6.
8. Rosbergen IC, Grimley RS, Hayward KS, et al. Embedding an enriched environment in an acute stroke unit increases activity in

people with stroke: a controlled before–after pilot study. *Clinical Rehabil* (Epub ahead of print 1 Apr 2017).
9. Nursiswati N, Halfens RJG, Lohrmann C. Change in care dependency of stroke patients: A longitudinal and multicenter study. *Asian Nurs Res* 2017;11:113–8.
10. Clarke DJ, Forster A. Improving post-stroke recovery: the role of the multidisciplinary health care team. *J Multidiscip Healthc* 2015;8:433–42.
11. White JH, Alborough K, Janssen H, et al. Exploring staff experience of an "enriched environment" within stroke rehabilitation: a qualitative sub-study. *Disabil Rehabil* 2014;36:1783–9.
12. Lutz BJ, Young ME, Cox KJ, et al. The crisis of stroke: experiences of patients and their family caregivers. *Top Stroke Rehabil* 2011;18:786–97.
13. Australian Institute of Health and Welfare. Stroke and its management in Australia: an update. Cardiovascular disease series 37.Cat. no. CVD 61; 2013.
14. Rosbergen ICM, Grimley RS, Hayward KS, et al. The effect of an enriched environment on activity levels in people with stroke in an acute stroke unit: protocol for a before-after pilot study. *Pilot Feasibility Stud* 2016;2:1–6.
15. Grol R, Grimshaw J. From best evidence to best practice: effective implementation of change in patients' care. *Lancet* 2003;362:1225–30.
16. Moore GF, Audrey S, Barker M, et al. Process evaluation of complex interventions: medical research council guidance. *BMJ* 2015;350:h1258.
17. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19:349–57.
18. Patton M. *Qualitative research & evaluating methods*: SAGE Publications Inc, 2015.
19. Grossoehme DH. Overview of qualitative research. *J Health Care Chaplain* 2014;20:109–22.
20. Palinkas LA, Horwitz SM, Green CA, et al. Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Adm Policy Ment Health* 2015;42:533–44.
21. Shenton AK. Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information* 2004;22:63–75.
22. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006;3:77–101.
23. Luker J, Lynch E, Bernhardsson S, et al. Stroke survivors' experiences of physical rehabilitation: a systematic review of qualitative studies. *Arch Phys Med Rehabil* 2015;96:1698–708.
24. Harris JE, Eng JJ, Miller WC, et al. A self-administered Graded Repetitive Arm Supplementary Program (GRASP) improves arm function during inpatient stroke rehabilitation: a multi-site randomized controlled trial. *Stroke* 2009;40:2123–8.
25. White J, Janssen H, Jordan L, et al. Tablet technology during stroke recovery: a survivor's perspective. *Disabil Rehabil* 2015;37:1186–92.
26. Mallet KH, Shamloul RM, Corbett D, et al. Recovernow: Feasibility of a mobile tablet-based rehabilitation intervention to treat post-stroke communication deficits in the acute care setting. *PLoS One* 2016;11:e0167950.
27. Rosewilliam S, Roskell CA, Pandyan AD. A systematic review and synthesis of the quantitative and qualitative evidence behind patient-centred goal setting in stroke rehabilitation. *Clin Rehabil* 2011;25:501–14.
28. Luker JA, Craig LE, Bennett L, et al. Implementing a complex rehabilitation intervention in a stroke trial: a qualitative process evaluation of AVERT. *BMC Med Res Methodol* 2016;16:52.
29. Katz-Navon TY, Erez M. When collective-and self-efficacy affect team performance: The role of task interdependence. *Small Group Research* 2005;36:437–65.
30. Stajkovic AD, Lee D, Nyberg AJ. Collective efficacy, group potency, and group performance: meta-analyses of their relationships, and test of a mediation model. *J Appl Psychol* 2009;94:814–28.
31. Lemieux-Charles L, McGuire WL. What do we know about health care team effectiveness? A review of the literature. *Med Care Res Rev* 2006;63:263–300.
32. Ryan RM, Deci EL. Intrinsic and extrinsic motivations: classic definitions and new directions. *Contemp Educ Psychol* 2000;25:54–67.
33. Munce SEP, Graham ID, Salbach NM, et al. Perspectives of health care professionals on the facilitators and barriers to the implementation of a stroke rehabilitation guidelines cluster randomized controlled trial. *BMC Health Serv Res* 2017;17:440.

34. Brooks W. The use of practice guidelines for urinary incontinence following stroke. *Br J Nurs* 2004;13:1176–9.

35. Drury P, Levi C, D'Este C, *et al*. Quality in Acute Stroke Care (QASC): process evaluation of an intervention to improve the management of fever, hyperglycemia, and swallowing dysfunction following acute stroke. *Int J Stroke* 2014;9:766–76.

36. Bernhardt J, Chan J, Nicola I, *et al*. Little therapy, little physical activity: rehabilitation within the first 14 days of organized stroke unit care. *J Rehabil Med* 2007;39:43–8.

37. Vloothuis JD, Mulder M, Veerbeek JM, *et al*. Caregiver-mediated exercises for improving outcomes after stroke. *Cochrane Database Syst Rev* 2016;12:Cd011058.

38. Harris JE, Eng JJ, Miller WC, *et al*. The role of caregiver involvement in upper-limb treatment in individuals with subacute stroke. *Phys Ther* 2010;90:1302–10.

39. Galvin R, Cusack T, Stokes E. A randomised controlled trial evaluating family mediated exercise (FAME) therapy following stroke. *BMC Neurol* 2008;8:22.