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Staff perspective of working in an enriched environment embedded in the Acute Stroke Unit: A qualitative process evaluation

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+nriched environment, stroke rehabilitation, qualitative, environment design

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! An enriched environment embedded in an acute stroke unit can increase activit# levels of stroke patients, with changes sustained si; months post< implementation, .o understand processes underpinning changes in staff that ma# have contributed to these findings, we evaluated the perceptions and e;periences of staff involved in the da#<to<da# deliver# of the enriched environment,

" A descriptive qualitative approach,

An acute stroke unit in a regional Australian hospital,

=e purposivel# recruited three allied health and seven nursing professionals involved in the deliver# of the enriched environment, 8ace<to<face, in< depth interviews were conducted eight weeks post<completion of the enriched environment trial, >ne independent researcher completed all interviews, ?oice< recorded interviews were transcribed and anal#sed b# three researchers using an inductive thematic approach to identif# main themes,

.hree themes emerged, 8irst, *'the road to recovery had started'*, An enriched environment was described to shift the focus to recover# in the acute setting, which was demonstrated b# increased activit# levels, building optimism, empowering patients and carers and enhancing patient well being, Second, *'it takes a team'* to successfull# create an enriched environment, Integral to building the team were leadership, education, transparent responsibilities, and positive interdisciplinar# d#namics between team members, .hird, *'keeping it going'* was perceived to be challenging, Staff reflected that it was eas# to relapse into old work habits, :e# to sustaining change were team

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champions, feedback, reminders, consistenc# in staff and a supportive ph#sical environment,

+;ploring staff perceptions of a new enrichment model post<stroke in an acute stroke unit highlighted the need for effective teamwork, .o support staff in their new work practice careful selection of change management strategies will be critical to include in clinical translation of the enriched environment model,

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- **5**rocess evaluation highlighted factors that ma# be critical to successfull# embed and sustain an enriched environment in an acute stroke unit**,**
- **.**his stud# contributed to refinement of implementation strategies for future trials of an environmental enrichment model in human stroke populations**,**
- Interviews were conducted in one acute stroke unit in Australia, thus generali**9**abilit# of stud# findings ma# be limited**,**

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An enriched environment aims to enhance activit# across the domains of ph#sical, social and cognitive activit# through a stimulating, organised environment,C1D .he enriched environment is well investigated in animal models of stroke, where it has been shown that rodents engaged in an enriched environment show greater functional recover#,C2< &D .he first clinical studies implementing an enriched environment in human stroke populations span the acute to subacute inpatient spectrum,C0,'D Similar to animal models, studies in human stroke patients also demonstrate that environmental enrichment can increase activit# levels in ph#sical, social and cognitive domains,C0,'D

=hile an intervention can be clinicall# beneficial, it is important to understand the perspective of individuals who are responsible for deliver# of the intervention,C4D A previous qualitative stud# investigated the e;perience of nursing staff within an enriched environment in a sub<acute inpatient rehabilitation setting, Here it was revealed that nursing staff perceived an enriched environment to be worthwhile in providing opportunities for stroke patients to be active,CBD However, nursing staff also e;pressed that @the# were too bus#E and felt that @providing assistance in mobilit# for patients to access enriched areasE were ke# limiting factors to support participation in an enriched environment,CBD .his highlights a possible disconnect between the value of a beneficial intervention and practicalities of delivering an intervention, which ma# ultimatel# impede clinical translation,

>ur group completed the first investigation of an enriched environment in an acute stroke unit,C'D .o support staff in the deliver# of the enriched environment

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intervention we used change management strategies and a transparent intervention protocol outlining staff responsibilities,[13] The enriched environment intervention was tailored to the unique context of an acute stroke unit. The acute setting presents a multitude of new challenges that may impede clinical translation. Here, patients are more dependent on staff assistance and require frequent medical investigations and interventions during the day. Furthermore, patients, carers and families are in a heightened emotional state and there is a high turnover of patients in the acute setting.

To understand the unique perspective of the acute stroke unit and evaluate potential links between the delivered enriched environment intervention and observed outcomes, evaluation of staff responsible for intervention delivery was undertaken. The primary aim of this study was to explore staff perceptions and experiences of embedding and participating in an enriched environment within the acute stroke unit. Reflecting on staff experience will contribute to the refinement of a model of environmental enrichment that has clinical support to inform future clinical trials.

Methods

In-depth, one-on-one interviews captured staff experiences of embedding and participating in an enriched environment within an acute stroke unit. This study is a sub-component of a pilot study that was registered with the Australian New Zealand Clinical Trials Registry (ANZCTR 12613000304senior and the primary results have been published elsewhere.[13] Ethical approval was obtained from The Prince Charles Hospital and the University of Queensland ethics committees (HREC/13/QPCH/121 and

R+"I231%3337'1H, .his stud# was conducted in accordance with the *eclaration of Helsinki,

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5rincipal Investigator GIRH had a professional relationship with all participants and this stud# is part of her 5h*, Interviewer GS8H is a specialised neurolog# ph#siotherapist working in ambulator# rehabilitation, She received training in interview techniques and had recent e;perience undertaking in<depth interviews, S8 had no relationship with the initial pilot stud# @enriched environment in the acute stroke unitEC'D and no prior engagement with participants, IR and :H Gindependent of the trial siteH developed the interview guide with open questions and specified prompts for the interviewer, .o overcome personal bias of IR to stud# and participants, three researchers GS8, :H, IRH anal#sed all collected data independentl#, All authors contributed to the manuscript using reporting checklists for qualitative studies,C11D

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In<depth interviews were conducted with staff members working on the acute stroke unit in a regional Australian hospital, Staff members were eligible to partake in an in< depth interview if the# worked in the acute stroke unit during the enriched environment phase of the pilot stud#, 5urposive sampling was used to capture a broad spectrum of e;periences from a diversit# of staff members and to capture the comple;it# of embedding a new multidisciplinar# intervention,C12D IR and :H selected individuals to

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achieve a variet# in gender, discipline, age, educational level, roles and work e;perience in the acute stroke unit,

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In<depth interviews were conducted b# one facilitator GS8H, Interviews were performed in a quiet room within the hospital using an interview guide G.able 1H, All interviews occurred 4<weeks post<completion of the enriched environment recruitment phase, !o other people were present during interviews, .he facilitator GS8H encouraged participants to share their personal e;periences and meanings the# attributed to working within the enriched acute stroke unit, and used probing techniques and prompts to achieve further in<depth reflection, At the end of the interview the facilitator rephrased main e;periences and meanings e;pressed b# the participant to ensure provided information reflected the participantEs views accuratel#, Interviews were audio recorded and no field notes were made during interviews,

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.able **1,** Interview guide: ain questions and prompts used to guide interview of all participants**,**

=hat was #our understanding of the enriched environment intervention**J**

- *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?*

***i**scuss 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?*

=ere there an# problems as well as rewarding situations during the enriched environment intervention**J**

- *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 an# team d#namics**J**

- *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?*

=hat advice do #ou have how we can sustain the enriched environment in the future**J**

- *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?*

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5articipants were encouraged to reflect on the recentl# completed enriched environment intervention and how this intervention impacted on stroke patients, their families and staff members**, .**he enriched environment intervention embedded in the acute stroke unit**C',13D** focused on three ke# areas summarised briefl# below**,**

1H **+**ducating staff to enhance patient activit#: **5**rior to the commencement of the enriched environment interactive education sessions were provided to all staff in small groups to e;plain the theoretical background of an enriched environment, and discuss ke# intervention strategies**,** Staff members were encouraged during these sessions to e;plore and discuss possible barriers and enablers of enrichment strategies**,** In addition, investigators e;plained the role of appointed nurse champions to facilitate enrichment on a da#<to<da# basis and transparent staff responsibilities were described in the intervention protocol**,**

2H **+**mbedding a stimulating ph#sical, social and cognitive environment in the acute stroke unit: A stimulating environment was achieved through creation of communal spaces and provision of stimulating resources throughout the ward and at the patient bedside**, =**e commenced dail# communal breakfast and lunch times, as well as group activities to provide opportunities for patients to increase their activit# levels**,**

7H **+**ncourage patient and famil# involvement to increase activit# levels: **5**atient and famil# involvement was enhanced through provision of an information brochure and face to face education that e;plained wh# activit# after stroke was important, how patients and families could contribute to increasing activit# levels, and e;plained the da#

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structure of the ward, =e also provided individualised activit# cards at the patient's bedside with suggestions for patients and families to increase activit#,

*uring the implementation phase of the intervention direct feedback to staff members was provided and we distributed newsletters ever# three weeks to repeat ke# intervention strategies, .hese newsletters also included patients and carer feedback,

"

Interviews were transcribed verbatim b# a professional transcription agenc# GSacific .ranscription, AustraliaH, .he transcriptions were first reviewed b# the interviewer GS8H to ensure the content reflected each interview, 8inal transcripts and results of the anal#sis were not discussed with participants,

=e used a thematic content approach to anal#se our data to capture important information related to our research aim,C17D 8irst, researchers GIR, :H, S8H independentl# read and became familiarised with the complete data set, Second, investigators went through the transcripts line b# line to obtain meaningful information and identified repeated topics and patterns to ensure credibilit# of anal#sis, Researchers then interactivel# discussed interpretation of data to avoid bias in anal#sis, and collapsed data into categories, 8ourth, researchers re<read all transcripts to confirm that all data fitted into identified categories and potential relations to ke# themes were identified, Researchers met a further three times to discuss ke# themes and subthemes ensuring consistenc# of findings between researchers, .o ensure rigor and saturation of data multiple rounds of reading transcriptions were performed between meetings,

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Researchers discussed and re<framed earlier identified ke# themes to ensure defined themes accuratel# reflected the e;pressions of the participants,)astl#, quotations and sections of te;t were e;tracted under thematic content and checked for consistenc# with the narrative theme, *uring the writing stage further refinement of links and subthemes occurred to ensure consistenc# of themes, All changes were discussed at each step between the three researchers,

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=e approached seven nursing staff, two senior allied health therapists and one allied health assistant face<to face to participate in the stud#, All invited individuals provided written consent, .wo participants started working in the acute stroke unit while the stud# was activel# recruiting participants in the enriched environment phase, .hese two staff members didn't participate in the interactive educational workshop, which occurred prior to recruitment, 5articipant's characteristics can be found in .able 2, .o protect the identit# of our participants we have not specified gender, roles or educational backgrounds in detail, .he stud# sample included two male sub}ects,

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.able **2, "**haracteristics of participants in order of interviews

n	*iscipline	Age G#earsH	=ork e;perience in ASU	5articipated in education session	*uration of interview GminutesH	!urse "hampion
1	**!** ursing	**L %3**	**2<&** #ears	Mes	**%3**	Mes
2	AH	**L %3**	**2<&** #ears	Mes	**74**	<
7	AH	**L %3**	**L &** #ears	Mes	**%4**	<
%	**!** ursing	**N %3**	**N 2** #ears	Mes	**23**	Mes
&	**!** ursing	**L %3**	**L &** #ears	Mes	**70**	Mes
0	**!** ursing	**L %3**	**L &** #ears	Mes	**72**	**!** o
'	**!** ursing	**L %3**	**N 2** #ears	**!** o	**10**	**!** o
4	AH	**L %3**	**N 2** #ears	**!** o	**03**	<
B	**!** ursing	**L %3**	**L &** #ears	Mes	**24**	Mes
13	**!** ursing	**N %3**	**N 2** #ears	Mes	**20**	Mes

Abbreviations: ASU Acute Stroke Unit**,** AH Allied Health

.hree main themes, each containing subthemes were identified**, .**hemes related to perceived staff e;perience of embedding and participating in the enriched environment are presented in **.**able **7,**

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.able **7,** Summar# of staff perception: embedding and participating in an enriched environment in an acute stroke unit**,**

ain theme	Sub<themes
'The road to recovery has started' for patients	**8**ocus shifted to @acute care and recover#E Improved ps#chological wellbeing **>**bserved increased activit# levels **+**mpowering patients and families
'It takes a team' to successfull# create an enriched environment	Impact on workload **.**eam d#namics Importance of team education
'Keeping it going' requires building routine	**"**hanging work routines challenging **"**hallenging moments Sustaining work practices

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! ursing and allied health staff e**;**pressed that the enriched environment created more opportunities for patients to be ph#sicall#, sociall# and cognitivel# active during the da# as compared with usual care**,** Staff elaborated that the enriched environment positivel# contributed to patientEs recover#**, .**he following sub<themes emerged**,**

8ocus shifted to @acute care and recover#E

Staff reported that the stroke unit shifted from @acute careE to @acute care and recover#E for patients**, 5**atients were sitting out of bed more frequentl# in a @homel#

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environment, and the daily structure felt more like a normal day at home. In addition, families were increasingly inclined to take patients outdoors, 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'. (P8)*

Improved psychological wellbeing

It was commonly acknowledged that the enriched environment improved psychological wellbeing of stroke patients and their families. Patients appeared to be more active, alert, happier, positive and less bored. These observations provided reinforcement for staff to continue implementation of enrichment strategies. In addition, staff reported that families and patients provided positive feedback about the enriched 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'. (P4)*

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>bserved increased activit# levels

.here was overall consensus that greater levels of patient activit# were observed in the enriched acute stroke unit than prior to enrichment**, "**ommunal mealtimes were considered to enhance frequent ph#sical activit# e,g**,** walking to and from meals and sitting up for breakfast and lunch**, 8**urthermore, social interaction was high as patients shared their e**;**periences and listened to each other**E**s ⟨ourne#s during meal times or group activities**,** Staff stated that the# received positive comments from patients and families regarding 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'. (P4)

Staff felt that increased patient activit# contributed to patients**E** recover# in a positive wa#**,** 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'. (P8)

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'The not really structured moments where we encourage that people are getting outside their room…it still could be better'. (P3)

However, it was noticed that some individuals preferred to sta# in their own room**,** Staff found it challenging to enrich the environment for these patients and suggested that a larger variet# of individuall# tailored activities at the bedside were needed to keep these patients active**,** Activities such as reading newspapers, doing games or therap# activities on the i**5**ads gave patients cognitive stimulation during the da#**, !** on‹structured enrichment strategies relied on initiative of individual staff members, but did create 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'. (P1)

+mpowering patients and families

.he enriched environment empowered patients and families to have greater autonom# in their recover# ĸourne#**,** Staff commented that patients were able to indicate their preferred activities for the da# and if the# desired to attend an# group activities**,** Staff reported that families provided feedback that an enriched environment delivered individualised care, as patients preferred activities were taken into account**,** In addition,

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families felt that being involved in patient activities resulted in families feeling useful in the patient's recover#,

'I will always ask for their hobbies…to get them active in the things they like'. (P3)

'Trying to give over the therapeutic role to the family so that they can carry on'. (P8)

In contrast, staff indicated that famil# members occasionall# looked awkward when a patient was attending a communal mealtime and that man# required encouragement to join group activities, Staff suggested during interviews that famil# and patient education was required to explain the enriched environment concept to change their outlook regarding the acute hospital environment,

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Staff elaborated on the fact that successful implementation of an enriched environment required the whole team to be on board, Interdisciplinar# teamwork became more visible within the enriched environment as staff worked cohesivel# to provide a stimulating environment for patients, ealtimes or scheduled group activities required regular communication between disciplines so patient care was kept running smoothl#, Staff acknowledged that the enriched environment could be challenging at times of

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competing priorities**,** However, overall 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.' (P8)*

> *'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'. (P10)*

Impact on workload

"onflicting messages were reported regarding the impact of an enriched environment on staff workload within the team**,** A few nursing staff members reported that the enriched environment contributed to a reduction in nursing staff workload, as the# felt supported b# 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'. (P7)*

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However, man# nursing staff members indicated that implementing enrichment strategies was ver# challenging in periods with high acuit# patients on the ward or during ver# bus# shifts e,g,, high patient turnover, Staff reported that higher priorities at these times limited embedding enrichment strategies, Allied health staff didn't make an# comments on impact on workload during interviews,

> *'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.' (P1)*

.eam d#namics

.he start of new graduate nurses and casual staff within the enriched environment phase was challenging as it changed the d#namics of knowledge within the team, Staff reported that it was difficult for new staff to incorporate enrichment strategies in the dail# 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'. (P9)*

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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 pla#ed 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'. (P6)*

Staff commented that positive team d#namics supported embedding an enriched environment in the acute stroke unit, >n weekda#s, higher numbers of nursing and allied health professionals were present creating a d#namic team who were collectivel# enriching the stroke unit, In contrast, on weekends lower nursing staff to patient ratio and no allied health professionals were available meant the team felt time challenged, .his led to nursing staff feeling that the enriched environment was a burden as it was @on top of: things,

> *'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'. (P7)*

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Importance of team education

+ducation was of great importance to successfull# implement an enriched environment, Staff e;pressed that interactive educational workshops prior to embedding the enriched environment provided a basic understanding of the concept and created awareness of the different components of an enriched environment, +ducation enhanced the capacit# of staff to e;plain to patients and families wh# it is important to be active after a stroke, >ne staff member who started to work in the acute stroke unit during the enriched environment recruitment phase identified a lack in education for new staff members and felt ill<equipped to implement the intervention successfull#,

> *'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'. (P7)*

Staff perceived that reinforcement and consistenc# in information provided to patients and families b# all team members contributed to successful implementation, >ne staff member commented that medical staff were an important team pla#er 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*

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on the ward you need to attend to. Because they are the doctors, it is an important message'. (P3)

*espite medical support of ward enrichment, staff acknowledged that education to patients and families was still frequentl# required, Staff commented that education should include what is e;pected regarding self<management and how patients and families can contribute to stimulation within an enriched stroke unit,

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.he ma\orit# of staff e;pressed during interviews their preference to keep the enriched environment going within the acute stroke unit for the long term, Staff felt that the enriched stroke unit was beneficial for patient centered care and enhanced famil# involvement, but confessed that it was eas# to relapse into old work routine,

"hanging work routines challenging

Staff repeatedl# acknowledged that it was challenging to change work habits to incorporate a new and comple; intervention, .he consensus amongst nursing staff was that @it takes time and effort: to change work routines and nursing staff had to activel# remind themselves to incorporate enrichment strategies, Staff indicated that continuous prompting and reminders were required during the implementation phase as it was not part of usual routine practice, Sustaining an enriched environment in the long term

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would require leadership, continuous education, reminders, and champions as staff feared the# would slide back into their old habits,

' 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'. (P1)

.he enriched environment intervention changed skills and competencies for some team members, !ursing assistants were providing support to patients during interactive mealtimes and were required to facilitate group communication, but were not sufficientl# trained to perform these tasks, Staff highlighted that targeted training for nursing assistants in facilitating group communication, and enhancing patient independence would contribute to 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'. (P2)

*ifficulties e;perienced b# allied health professionals centered around famil# involvement, acknowledging that it was not routine practice to consistentl# involve famil# members in increasing patient activit# in the acute stroke unit,

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'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'. (P3)

Staff members indicated that the biggest drive to changing work practice was to achieve best patient outcomes**, 5**ositive feedback received from patients and families regarding the enriched environment reinforced staff to continue to change work routine**,** Staff members commented that the unit was research driven and clinical staff wanted the trial to be successful so the team contributed to stroke care evidence**,** Staff reported that stronger evidence supporting the clinical enriched environment in achieving better patient outcomes would be a big driver for staff to sustain changed work practices**,**

"hallenging moments

.he acute stroke unit prioritises admission of stroke patients into the unit**,** However, allied health staff found it challenging when small numbers of stroke patients 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**, 8**ewer stroke patients present in the stroke unit made it difficult to organise meal and group activities**,**

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'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'. (P3)

Sustaining work practices

Staff provided advice on how to sustain the enriched environment model in the future, Advice included consistenc# in leadership within senior allied health and nursing staff, Staff felt that consistenc# positivel# contributed to team d#namics,

'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'. (P6)

In addition, nursing staff suggested that including enrichment strategies within stroke protocols of care would create an e;pectation for new nursing staff to incorporate stimulation for patients during their workda# as routine practice, >ther factors repeatedl# mentioned during interviews 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

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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'. (P1)

an# staff members mentioned that the acute stroke unit lacked a ph#sical design to support an enriched environment**,** Shifting furniture in the therap# room on a dail# basis to support mealtimes was perceived as anno#ing and time consuming**,** Staff indicated that optimising hospital design would contribute to implementing and keeping an enriched environment going in the acute stroke unit**,** Recommendations emphasised for an optimal hospital design were inviting communal areas and therap# 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'. (P9)

.o sustain the enriched environment a culture change within the team and the stroke unit is needed, which staff members e**;**pressed ﷺis a slow process that takes time, is difficult at times, and the unit collective needs to drive this changeɆ**,** Staff commented that culture change was achieved when stimulating and activating patients on a dail# basis is routine practice for staff within a unique enriched ward design**,**

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'I think recognizing 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!' (P6)

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>ur qualitative stud# showed that staff accepted and supported the enriched environment within the acute stroke setting, Staff reported that patients in the enriched environment were more active, alert and positive about their post<stroke pathwa#, which in their opinion contributed to patients moving their focus towards recover#, .eamwork was perceived as a ke#<contributing factor for successful embedding of an enriched environment, "onsequentl#, staff changes affected interdisciplinar# team d#namics, which highlighted the importance of leadership and regular education to keep focus and momentum, Staff acknowledged the ease of relapsing into old work habits and emphasised that work champions, reminders, consistenc# in staff and an optimal ph#sical design were important contributors to sustain the enriched environment,

Staff reported challenges with communal enrichment activities, !ot all patients wanted to participate in communal activities, which made engagement of these patients in meaningful activities challenging for staff, A recent s#stematic review that investigated e;periences of stroke patients during acute and sub<acute rehabilitation found that patients felt bored, disempowered and wanted greater opportunities to increase meaningful activit#,C1%D Self< driven therap# activities C1&D and therap# apps

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COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
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Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	8
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Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	12
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Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	33
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Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	12
Description of the coding tree	25	Did authors provide a description of the coding tree?	15
Derivation of themes	26		12
Software	27	What software, if applicable, was used to manage the data?	NA
Participant checking	28		12
Reporting			
Quotations presented	29	Was each	15-29
	30		15-29
Clarity of major themes	31		15-29
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	29-33

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 357

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- *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?*

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- *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?*

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- *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?*

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- *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?*

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- *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?*

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

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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)

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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)

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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)

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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)

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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)

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Participant checking	28	Did participants provide feedback on the findings?	14
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Yes
Data and findings consistent	30	Was there consistency between the data presented and the findings?	Yes
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Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	Yes

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Title:

A 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

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Word Count: 6014

Key words: Enriched environment, stroke rehabilitation, qualitative, environment design

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ABSTRACT

Objective: An enriched environment embedded in an acute stroke unit can increase activity levels of stroke patients, with changes sustained six 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, semi-structured interviews were conducted eight 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 wellbeing, 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

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

Trial registration number: ANZCTN12614000679684

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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.

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BACKGROUND

An enriched environment aims to enhance physical, social and cognitive activity through a stimulating, organised environment.[1] In animal models, environmental enrichment refers to housing conditions that stimulate sensorimotor, social and cognitive activity 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]

The first clinical study in a human stroke population translated an enriched environment into a sub-acute 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 sub-acute 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 sub-acute 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

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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.

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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 acute stroke patients.[8] We subsequently conducted all qualitative interviews 8-weeks post the enriched environment period. Ethical approval was obtained from The Prince Charles Hospital and the University of Queensland ethics committees (HREC/14/QPCH/21 and MREC/2014000371). This study was conducted in accordance with the Declaration of Helsinki.

Author's relationship with participants

The principal investigator (IR) had a professional relationship with all participants and this study is part of her PhD. 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

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relationship with the initial pilot study 'enriched environment in the acute stroke unit'[8] and no prior engagement with participants. IR and KH (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, KH, IR) 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. Semi-structured interviews with open questions and prompts were undertaken to collect individual staff perceptions and experiences.[18,19] The semi-structured 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 semi-structured 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 stroke unit. Participant recruitment was ceased upon saturation of the data, which was deemed to be the point where no additional information was added to identify new meaningful concepts. To enhance rigor we focused on elements of trustworthiness using the framework of credibility, transferability, confirmability and dependability.[21]

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Data collection

Semi-structured interviews were performed in a quiet room within the hospital using an interview guide (Table 1). No other people were present during interviews. The facilitator (SF) encouraged participants to share their personal experiences and meanings they attributed to 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 stroke patients, 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.

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Table 1. 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?*

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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 e.g. 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

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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 three 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 (IR, KH, 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

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key themes and subthemes ensuring consistency of findings between researchers, and that defined themes accurately reflected the expressions of the participants. Lastly, quotations and 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 2. 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 minutes.

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Table 2. Characteristics of participants in order of interviews

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

Abbreviations: ASU Acute Stroke Unit. AH Allied Health

Overview of themes

Three main themes, each containing subthemes, were identified. A summary of the themes and sub-themes are presented in Table 3.

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Table 3. 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	Sub-themes
'The road to recovery has started' for patients	Focus shifted to 'acute care and recovery'
	Improved psychological wellbeing
	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

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 sub-themes were constructed.

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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 wellbeing

Staff reflected that the enriched environment improved psychological wellbeing of stroke patients 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 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)*

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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 e.g. 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.

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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

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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

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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.

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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 e.g., 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)

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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.

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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.

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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*

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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 centered 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 amongst nursing staff was that 'it takes time and effort' to change work routines, and they had to actively remind themselves to incorporate enrichment strategies.

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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.

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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 centered 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.

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Impacting contextual factors

The acute stroke unit prioritises admission of stroke patients to the unit. However, allied health staff found it challenging when small numbers of stroke patients 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 stroke patients 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.

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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.

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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)

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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 sub-acute 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 sub-acute 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-

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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

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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, specialization 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

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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 stroke patients, 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 programs and conjoint activity opportunities with staff while in the acute stroke unit could enhance family involvement. Utilising 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.

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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

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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.

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Contributors

IR, RG, SB and KH designed the study. SF conducted the semi-structured interviews. IR, SF and KH performed data analysis. All authors contributed to the manuscript and approve the manuscript.

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Disclaimer

The views expressed in the publication are those of the authors.

Disclosures

We have read and understood BMJ policy on declaration of interests and declare that we have no competing interest.

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Ethics approval

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Data sharing statement

Staff level data are available from the corresponding author. Informed consent for data sharing was not obtained, but presented data are de-identified and the risk of identification is low.

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COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	8
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	1
Occupation	3	What was their occupation at the time of the study?	1
Gender	4	Was the researcher male or female?	1
Experience and training	5	What experience or training did the researcher have?	8
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	8
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	8
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	8-9
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	9
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	9
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	14
Sample size	12	How many participants were in the study?	14
Non-participation	13	How many people refused to participate or dropped out? Reasons?	14
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	10
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	10
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	15
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	10
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	37
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	10
Field notes	20	Were field notes made during and/or after the inter view or focus group?	10
Duration	21	What was the duration of the inter views or focus group?	14-15
Data saturation	22	Was data saturation discussed?	9
Transcripts returned	23	Were transcripts returned to participants for comment and/or	14

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Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	13
Description of the coding tree	25	Did authors provide a description of the coding tree?	16
Derivation of themes	26	Were themes identified in advance or derived from the data?	13
Software	27	What software, if applicable, was used to manage the data?	NA
Participant checking	28	Did participants provide feedback on the findings?	14
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Yes
Data and findings consistent	30	Was there consistency between the data presented and the findings?	Yes
Clarity of major themes	31	Were major themes clearly presented in the findings?	Yes
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	Yes

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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