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RESEARCH - QUALITATIVE

Nurses' harm prevention practices during admission of an older person to the hospital: A multi-method qualitative study

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Abstract

Background: Nurses' harm prevention practices during the admission of older persons to hospital have important consequences for patient safety, preventable patient harm and length of hospital stay. Novel solutions are needed to assist nurses to balance complexity, high workload burden and patient safety during admission processes.

Aim: Explore the nurses' experiences of harm prevention practices during the admission of an older person to the hospital.

Design: A multi-method qualitative study informed by frameworks of behaviour change and human-centred co-design.

Methods: The purposive sample included 44 nurses, 5 clinicians from other disciplines and 3 consumers recruited from five general medicine wards across three hospitals of a large public health service in metropolitan Melbourne, Australia. Data were collected over 12 h of naturalistic observations of nurses during eight patient admissions, and during four participatory human-centred co-design workshops between August 2019 and January 2020. Observation, field notes and workshop artefact data were integrated for qualitative content and thematic analysis.

Results: Analysis revealed a 5-step journey map, with a temporal logic, that captured nurses' experiences, as well as the enablers and barriers to harm prevention practices when admitting an older person to the hospital. The consensus was reached on three priority features to assist nurses to implement harm prevention practices when they admit an older person to the hospital: (1) prioritize important care; (2) tailor care to the individual and (3) see the big picture for the patient.

Conclusion: The novel research approach identified five steps in nurses' activities and harm prevention practices during admission of an older person to the hospital, and key features for a solution to assist nurses to keep patients safe. The findings provide the foundation for further research to develop interventions to assist nurses to manage high workloads during this complex activity.

KEYWORDS
acute care, co-design, documentation, older people, participatory, work organization

1 | INTRODUCTION

An older person's admission to the hospital is a crucial point for nurses to identify important care needs and plan strategies to prevent patient harm during hospitalization. Nursing admission of any person to the hospital is instrumental for care planning, and subsequent multidisciplinary care delivery; however, there are important consequences for older people who are particularly vulnerable to preventable patient harm and increased length of hospital stay (Moon et al., 2021; Phillips & Baur, 2021). Nurses' harm prevention practices during the hospital admission process for older people warrant scrutiny due to its importance for patient safety. However, admission of an older person to a hospital ward is associated with a significant workload and cognitive burden for nurses (Andrzejewski, 2020; Phillips & Baur, 2021; Strassner et al., 2020; Trovo et al., 2020). Hospitals lack clearly defined, easily implementable strategies to assist nurses with comprehensive harm prevention during the admission of older people to the hospital (Redley, Douglas, et al., 2022; Redley, Taylor, et al., 2022).

1.1 | Background

Admission to the hospital is a crucial point for nurses to identify a patient's care needs and plan strategies to prevent patient harm, yet research on this important nursing process is limited. During the admission process, nurses assess and familiarize themselves with a patient and their care partners using visual cues, interactions and by completing multiple assessments (Phillips & Baur, 2021; Redley & Raggatt, 2017). Information collected by nurses is used by the multidisciplinary healthcare team as the basis for hospital care (Phillips & Baur, 2021). The outcome of the admission process should be a personalized care plan to meet individual health and personal care needs and keep the patient safe in the hospital.

Patient admission is a complex activity with an intense workload and high cognitive demand for nurses (Phillips & Baur, 2021; Trovo et al., 2020). Nurses must negotiate hundreds of recommendations from care guidelines, hospital policies and procedures, to integrate with individual risk profiles and personal preferences of patients (McGrath et al., 2017; Redley, Douglas, et al., 2022). In addition, nurses undertake multiple assessments, collect large amounts of data, and complete numerous forms for each patient admitted to the hospital (Phillips & Baur, 2021; Redley & Raggatt, 2017; Trovo et al., 2020), often in the context of inadequate resources and competing demands. To manage their workload nurses can miss, partially complete or delay care, or make deliberate decisions about the nursing care they will or will not provide (Kalisch et al., 2009; Scott et al., 2019), leading to missed or rationing of nursing care which has been implicated in preventable patient harm and catastrophic health service failings (Phelan & Kirwan, 2020).

Nurses typically undertake patient admission activities in the context of busy clinical settings where they must also manage competing demands of care for multiple patients, interruptions, multitasking, task-switching and resource shortages (Andrzejewski, 2020;

Impact Statement

What problem did the study address?

- The quality of patient hospital admission process has important consequences for patient safety, preventable patient harm and length of hospital stay.
- Admission to the hospital is a crucial point for nurses to identify a patient's care needs and plan strategies to prevent patient harm during hospitalization.

What were the main findings?

- Five steps capture the complex, high-intensity nursing activity of admitting a new patient to the hospital, but nurses face multiple barriers to implementing patient safety strategies.
- To assist nurses to admit an older person to the hospital: (1) prioritize important care; (2) tailor care to the individual and (3) see the big picture for holistic patient care.

Where and on whom will the research have impact?

- The research provides a novel solution focussed approach to research complex nursing practices and to inform future care.
- Better understanding how and why things can be done well by nurses, and enabling this to occur, can help address intractable patient safety concerns.

Trovo et al., 2020). Nurses must make in-the-moment decisions about what, how and when care will be delivered for the new and unfamiliar patients, as well as the other patients under their care. In the context of incomplete information when admitting an unfamiliar patient to the hospital, missed nursing care and care rationing decisions are particularly problematic.

Nursing documentation is consistently identified as a common element of missed or rationed care (Mandal et al., 2020). Substantial evidence indicates that missed or rationed nursing care contributes to negative patient outcomes, and preventable harm experienced by patients including medication errors, pressure injuries, nosocomial infections, urinary tract infections, falls, delirium, clinical deterioration and death (Chaboyer et al., 2021; Mandal et al., 2020; Phelan & Kirwan, 2020; Suhonen et al., 2018).

When work demands exceed available resources, nurses use heuristics, hidden strategies and workarounds to address shortcomings in work processes, environments and technology to effectively maximize their time, work and benefit for patients' safety (Aiken et al., 2017; McHugh et al., 2021; Stafos et al., 2017; Van Der Veen et al., 2020). To rapidly identify a high-risk patient (Burdeu et al., 2021), nurses use combinations of subtle physical, behavioural and psychosocial cues, often not captured by the numerous predefined data points in EMRs (Stafos et al., 2017). Tasks such as responding to the patients' most vital medical needs, medication and helping in doctors' rounds are often completed first (Suhonen et al., 2018). While urgency, severity or acuteness of illness are often

considered by nurses to be the most important criteria for setting priorities, nurses also prioritize care using patient groups, specific diseases, age and the perceived good that care might bring for patients in different clinical settings (Suhonen et al., 2018). Older patients, or those not expected to recover, are often given low priority for nursing care when resources are stretched (Emme, 2020; Evripidou et al., 2021; Gamborg et al., 2020; Suhonen et al., 2018), despite evidence suggesting prioritizing older patients and high-intensity interventions can be most effective to avoid harm (Strassner et al., 2020). Solutions to address missed nursing care require complex interventions that are flexible, proactive and context specific, focus on what nurses can modify, and build multidisciplinary alliances (Palese et al., 2019).

The current pattern of targeting interventions on one narrow safety problem after another has been a major contributor to burgeoning nursing workloads. Recent patient safety movements advocate a shift from 'focus and fixing' to better understanding how and why things can be done well and enabling this to occur (Baxter et al., 2019; Braithwaite et al., 2015). There is a need for research to identify what works well for nurses and their patients, and better understand how to reduce workload and cognitive burdens so nurses can work effectively to provide holistic care despite complex and less than ideal clinical situations (Dzau et al., 2018; Sims et al., 2020).

To effectively assist nurses to implement comprehensive harm prevention during patient admission, it is important to consider the knowledge, skills, beliefs, feelings and habits of nurses within the context of the competing cognitive, emotional and environmental processes impacting their work behaviours (Atkins et al., 2017). The capability-opportunity-motivation -behaviour (COM-B) model has been widely used to understand behaviours and identify mechanisms to facilitate effective behaviour change interventions (Atkins et al., 2017; Michie, 2015). Similarly, Human-Centred co-Design (HCD) complements the COM-B model as it prioritizes understanding of human needs during complex experiences, as well as their capabilities and ways of behaving in a given context, to inform solution development acceptable to end-users (Brown, 2019; IDEO, 2015). Knowledge about how to practically apply HCD methodological approaches to the design of innovative solutions to enhance nursing practices in complex healthcare environments is not widely recognized (Crowe et al., 2022).

This paper reports a multi-method study to explore nurses' experiences of implementing harm prevention strategies during the admission of an older person to the hospital. The purpose was to identify practices that work well in the context of busy real-life practices as the foundation for a future novel solution acceptable and useful to nurses. The study aim was to describe and understand nurses' experiences and behaviours in relation to patient safety practices during the admission of an older person to the hospital. The objectives were to: (1) describe the steps nurses use during patient admission; (2) identify influences on nurses' behaviours and decisions and (3) identify and prioritize nurses' needs during the admission process.

2 | METHODS

2.1 | Design

This multi-method observational study was guided by HCD, which has its origins in critical realism in that it is concerned with understanding the complexities of what affects human action and interaction, explaining effects in the real world (Archer et al., 2013). Data were collected using naturalistic non-participant observation of nurses admitting a new patient to the ward, and during four interactive workshops using activities adapted from HCD resources for use with clinicians in acute hospital settings (Hasso Plattner Institute of Design at Stanford, 2019; IDEO, 2015; LUMA Institute, 2012).

2.2 | Setting

The study was conducted in five general medicine wards located across three hospital sites of a single large public health service in metropolitan Melbourne, Australia. The selected wards typically provide acute hospital care for populations of older people with complex combinations of acute health problems, multiple co-morbidities and additional functional, emotional and social needs. Many of these patients are admitted unexpectedly from emergency departments further increasing the complexity of their care. These wards were selected as unplanned admissions of an older person to the hospital for an acute health problem is associated with high risk for preventable errors, avoidable harms of hospitalization and adverse outcomes during their hospital care (Moon et al., 2021).

2.3 | Participants

Consistent with HCD principles, purposive, maximum variation sampling was used to provide rich sources of information and a wide range of perspectives. Prior to recruitment, all nurses (approximately 250) working in the participating wards were informed about the study via an e-mail sent from department managers.

2.4 | Nurse participants for observations

Nurse participants for observations were recruited on the general medicine wards just prior to the data collection. Convenient dates and times for the observation data collection were scheduled between the researcher and nurse manager to maximize data capture, coincide with expected new arrivals from the emergency department onto the ward, and minimize any disruption to staff and ward practices. All nurses expected to be present or involved with caring for patients on their arrival to the ward were verbally informed about the research and data collection by the researcher (BR) on the day of data collection, invited to ask any questions and provide

verbal consent prior to the observations and interviews. None of the nurses approached declined to participate.

2.5 | Patients observed during admissions

All patients aged over 60 years arriving on the ward during the scheduled data collection times were eligible for admission observations, and there were no exclusion criteria. On their arrival to the ward, the patient and any companions were informed about the observations by the researcher, invited to ask questions and verbally agree or decline participation in the observations; none declined. As the focus of data collection was nurse behaviours, interactions and activities, there was no risk to patients, and no data were identifiable or collected directly from patients or companions, verbal assent was acceptable for ethics approvals.

2.6 | Workshop participants

Workshop participants included nurses, multidisciplinary clinicians and consumers. Nurses were informed about the times in invitation e-mails, and those working on the day of the workshops were also informed verbally and invited to attend. Multidisciplinary clinicians (medical and allied health, managers) were purposefully selected by a member of the research team to ensure diverse experiences and roles, and individually invited to participate. Consumers with experience of admission to general medicine services were recruited through an invitation sent from the consumer-advisory panel of the health service. Workshop participants provided written consent prior to the commencement of the workshop.

3 | DATA COLLECTION

Qualitative data were collected using observation, interviews and group workshops. Data were collected between August 2019 and January 2020 by a single experienced female researcher (BR), unfamiliar to participants and trained in a wide range of research methods.

3.1 | Observation data collection

Naturalistic non-participant observations of nurses occurred in real-time during the admission of an older person to the hospital ward and were complemented by interviews during and/or immediately after observation. Observations commenced at patient agreement immediately after their arrival on the inpatient ward and concluded when the nurse responsible for admitting the patient indicated to the observer they had completed the admission. 'Think aloud' techniques were used where nurses were asked to talk about what they were thinking, doing and feeling and explain these during the

observed activities (Cotton & Gresty, 2006). The specific focus of observations was nurses' actions, self-reported informational processing styles, prompts, heuristics, priorities and decisions about patient assessment and care planning while admitting a patient to the hospital. At the conclusion of the admission, the observer examined the admission documentation for completeness. All observation and interview data were collected by the same observer (BR) using unstructured field notes and verbatim participant quotes where possible. Nurse participants were invited to provide their role and years of experience; no additional or personally identifying details were collected to support assurances of anonymity and to reduce participant burden and attrition risk. The data collection strategy avoided collecting data from the same nurse on more than one occasion. Demographic details of patients were collected at the time of observation. Consistent with the iterative nature of HCD, six observations and preliminary analyses occurred before the HCD workshops; two observations were conducted after the HCD workshops to support the credibility of preliminary analysis and workshop data analysis.

3.2 | Workshop data collection

Qualitative data were also collected during two group activities at each of four 90-min interactive HCD workshops. The activities were adapted from HCD resources (Hasso Plattner Institute of Design at Stanford, 2019; LUMA Institute, 2012) by the lead researcher (BR) to suit the participants, content and time available. Workshops were held at two of the three hospital sites and scheduled to make it convenient for nurses to attend during their workday (i.e. during the time allocated for staff education).

Consistent with HCD principles, each workshop included up to eight participants purposefully selected to provide diverse experiences and roles, except for the consumers who all attended together for peer support. All workshops were facilitated by the same female experienced researcher trained in HCD methods (BR) and discussions were transcribed in real-time, including verbatim quotes, by a trained non-participating observer. Table 1 provides a summary of how the workshops were conducted.

4 | ETHICAL CONSIDERATIONS

Health service and university ethics approvals were obtained prior to the commencement of the study (REF RES-19-0000207L-51470 and 2019-142, respectively).

All nurse participants were provided with written (via e-mail) and verbal explanations of the study and an opportunity to ask questions of the research team. Participation in this study was voluntary and all participants had the option to decline or opt out of the study at any time before de-identified data were collected for analysis. Observation participants provided verbal consent and all workshop participants provided written consent prior to data collection.

TABLE 1 Conduct of workshops

Steps	Description
Step 1	a. Presentation of the study aims b. Discussion of preliminary findings from the first six observations to orient participants to the research problem and stimulate their thinking
Step 2	First group activity in each workshop involved creating experience maps and shared insights. • Small groups (2–4 participants) listened to a nurse ($n = 5$) or consumer ($n = 3$) share their story of a recent patient admission to the hospital, told using an adapted emotion map tool (Hasso Plattner Institute of Design at Stanford, 2019). • The storyteller in each group created a diagram that captured the activities and emotions or feelings (i.e. positive or negative) they experienced during the hospital admission. • Other small group members observed and listened to the storyteller, while also capturing their own impressions, surprises and insights using a semi-structured paper tool with prompts (i.e. questions and emojis). • At the conclusion of the story, all group members were invited to ask questions of the storyteller followed by a shared discussion about their surprises and insights.
Step 3	To address the third aim of the study, workshop participants were invited to participate in a series of activities that involved reflecting on the shared preliminary observation findings, and insights gained from the nurse and consumer admission stories. • Iterative brainstorming (divergent) and voting (convergent) exercises were used to collect, collate and synthesize participant individual and group ideas and insights about problems and needs experienced by nurses during the admission process, and then identify and prioritize potential problems.

TABLE 2 Measures to maintain research rigour

Form of data triangulation	Measure
Method triangulation	Involved using multiple methods including observation, interview, and discussion to collect data on the same phenomenon
Analyst triangulation	Involved two independent researchers in the steps of analysis
Theory triangulation	Involved using theoretical foundations of HCD (Brown, 2019; Norman, 2013) and behaviour change (Michie et al., 2011) to collect, analyse and interpret the data
Data source triangulation	Involved data collection from participants purposefully selected to provide in-depth and diverse perspectives of experiences of the same phenomenon
Transferability	Enhanced by capturing data in real clinical settings and from multiple ward settings, with no new data emerging in final data collection
Credibility and dependability	Enhanced by using participants' own words to illustrate the findings, and maintaining a detailed audit trail throughout the research

When possible and appropriate, all patient participants and their companions received a Patient Information Form and a verbal explanation of the study, and verbal consent was obtained before proceeding with observations. The burden on patients involved in the observation was minimal, and not beyond those expected of routine care delivery, and care was not affected. Ethics approval provided permission for a verbal 'opt-out' approach for observation of patients and their companions, and a waiver of consent allowed collection of de-identified observation data on patients unable to provide verbal consent. If the patient was considered unable to consent due to being unwell or with significant cognitive impairment, a carer or companion, if present, was also informed of the study and invited to provide verbal assent on behalf of the patient and themselves; however, all patients unable to provide assent were accompanied on arrival to the ward. The potential benefit of including all patients, particularly those unable to provide consent, was important for the integrity of this study focused on improving patient safety outcomes for those most vulnerable to preventable harm in the hospital. Patient privacy and confidentiality were always ensured.

As demands of participation in this research included a time commitment for nurse participants, those observed while undertaking patient admissions were offered a $5 drink card, and those attending the 90-min workshops were offered a $50 voucher in appreciation for their time.

All data were deidentified on collection hence no data that could identify any individual was collected or stored. Codes were used to match the different data sources and types to the same event.

4.1 | Analysis

Data used for analysis included all the participant-generated artefacts (i.e. experience maps, observer insights, ideas on post-it notes, grouped and ordered ideas on posters), and detailed field notes of workshop discussions captured by an independent observer.

Workshop artefacts and field notes were manually collated along with the observation field note data and subjected to inductive coding and qualitative thematic analysis guided by Braun and Clarke's (2006) six-step process. Two researchers (BR and TD) initially coded data independently and then met to resolve conflicts, integrate and group similar ideas. Discussions took place throughout the analysis to iteratively refine coding and thematic groupings to address the three research aims.

4.2 | Research rigour

Research rigour was enhanced by using four forms of data triangulation (Carter et al., 2014) as illustrated in Table 2.

5 | RESULTS

The purposive sample included 52 participants in total across all data collection activities (see Table 3). Of these, 27 were nurses observed during patient admissions, with eight of these nurses also providing interview data as the nurse responsible for the patient during or after observations (Table 3). Eight admissions of older patients were observed; patient characteristics are provided in Table 3.

The four HCD workshops involved 25 participants (Table 3). To preserve anonymity, encourage participation and reduce the risk of response bias, demographic details beyond participant roles were not collected from participants and assurances of anonymity reiterated frequently, or in response to concerns.

The analysis resulted in a journey map outlining five steps in the patient admission process, with a temporal logic representing critical steps in this process (Aim 1). Each step included enablers and/or barriers to ward admission processes (Aim 2) (see Figure 1). In addition, nurses' needs and the most desirable features for a solution to assist nurses during patient admission were identified and prioritized (Aim 3) (Table 4).

5.1 | Steps and influences in the nurse admission process

Five themes that reflected sequential steps over the nurse admission process were identified in the preliminary analysis of the first six observations, then refined through discussion and activities with workshop participants and the subsequent two admission observations. Each step encompassed a range of activities that nurses undertook, and data captured a range of factors that influenced nurses' experiences, emotional responses, behaviours and decisions in these steps. The five thematic steps are illustrated in Figure 1, and Table 4 provides subthemes and illustrative data. These findings address the first two aims of the study.

5.2 | Make sense and prioritize

The first step captured how nurses used their impression, formed at or before the initial encounter with the newly arrived patient, to make sense of them as a person, their condition and care needs. Two subthemes were anticipation and red flags.

5.2.1 | Anticipation

Anticipation involved the nurse interpreting information provided before the arrival of the patient to prepare for the patient's arrival. Nurses described how they used the information they received by telephone or indirectly from their nurse manager or the EMR to prepare for the arrival of the patient. Anticipation was described as a positive experience where "nurses look forward to meeting the new patient" (Workshop 1, nurse), but anxiety-provoking when information was missing or incomplete, which was both observed and reported by workshop participants (Table 2).

5.2.2 | Red flags

Red Flags captured the heuristics nurses used to interpret information during initial patient interactions to identify risk and prioritize work. These included factors nurses used to create an initial impression of concern about a patient and make sense of any immediate patient needs for rapid planning, initiation of interventions or strategies to prevent imminent harm. Nurses described key information gathered during the first moments of their interaction with a new patient they used for rapid pattern-recognition of salient signs and symptoms, and implicitly to inform an initial impression about patient safety risks.

For example, visual cues prompted nurse participant comments such as "that person doesn't look well" (Observation 4) or "this admission is going to be difficult" (about a confused patient) (Observation 5) as a new patient arrived onto the ward. Nurses also expressed concern about patients with cognitive impairment or behavioural disturbance, evidence of clinical deterioration, inconsistency or gaps in the handover communication they received or in-patient care documents, and an inability to communicate with patients or companions (e.g. speaking or language barriers).

TABLE 3 Study participants, data collection methods and data collected

	Naturalistic observation of patient admission			HCD workshop		
	Nurses observed	Nurses interviewed during admission	Patients admitted	Empathy interview and map	Observation of story	Needs, problems and priorities
Participant characteristics	4 managers or CNS 19 RNs 1 GN 3 EN 1 student nurses	2 nurse managers or CNS 4 RNs 1GN 1 EN nurse	8 6 Female 2 Male	5 Nurses 3 consumers	3 nurse managers or CNS 3 RNs 1 medical consultant 1 Allied health consultant 1 EN 6 student nurses	3 nurse managers or CNS 8 RNs 3 consumers 2 researchers, 1 medical consultant 1 Allied health consultant 1 EN 6 student nurses
Data collected	1–39 years of nursing experience Between 2 and 6 nurses observed during each admission	Observation duration between 59 min and 2 h 4 min (median 1 h 41 min); total 12 h and 48 min Between 3 and 10 (median 6) distractions (continued with their current task), Between 5 and 40 (median 13.5) interruptions (required to stop their current task to attend to another)	Aged between 62 and 89 (median 78.5) years	Diagrams of activities and attached emotions or feelings (X8)	Summary of, surprises and insights on semi-structured paper tool (X14)	Post-it notes with single ideas on each grouped and prioritized on posters (X8)
				Transcripts, including verbatim participant quotes (X4) providing approximately 32 pages of single-spaced text in total		

Abbreviations: CNS, Clinical Nurse specialist; EN, Enrolled nurse (diploma prepared); GN, Graduate Nurse (first year of practice); RN, Registered Nurse (degree prepared).
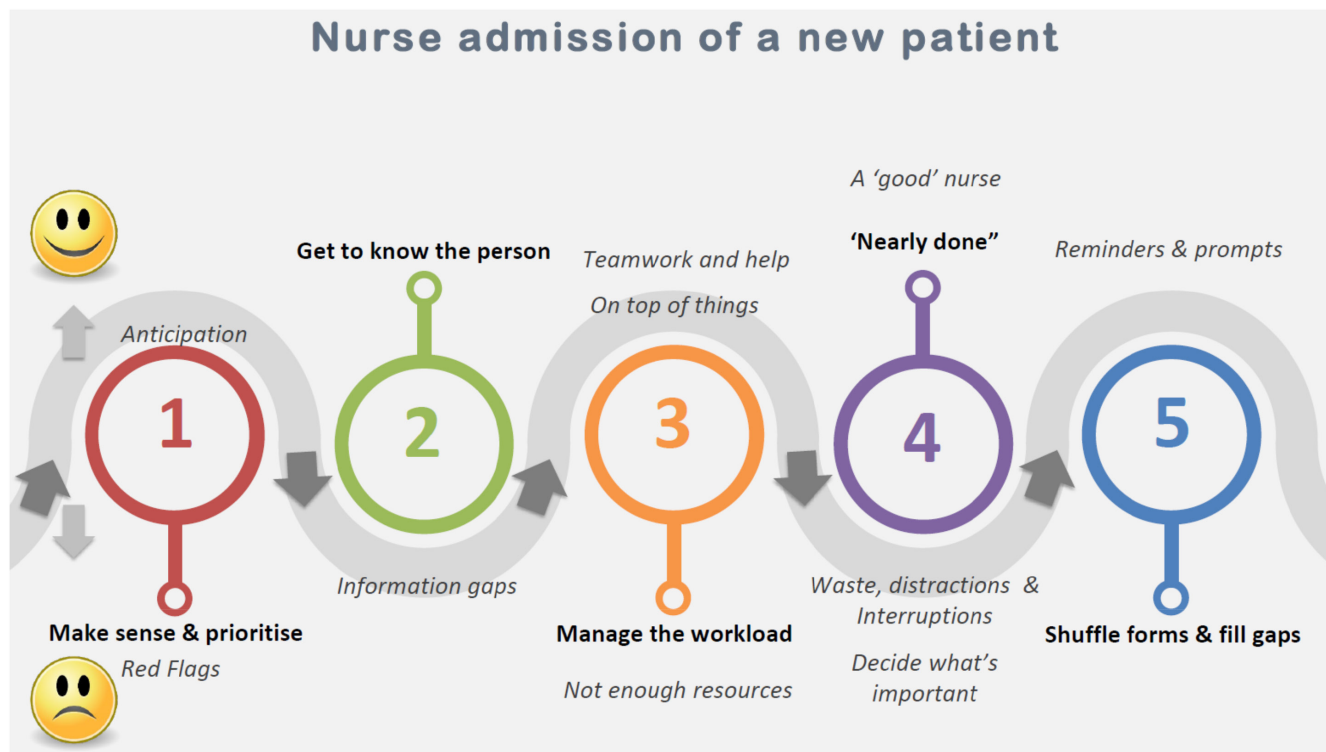
FIGURE 1 Process map of five-step nurse admission process and barriers and enablers

Another Red Flag related to the time the patient arrived on the ward; many participants expressed concern about patients arriving close to a change of shift. Concern about managing workload with multiple competing priorities was another Red Flag for nurses.

5.3 | Get to know the person

Many nurse participants shared their enjoyment experienced when getting to know a new patient, reflecting on this as a positive aspect of the admission process. The information gathered while familiarizing themselves with a new patient was also recognized as important for making decisions about individual risk management. Nurses used and described a range of strategies to gather information to help them know more about the patient, for example using interpreters, corroborating information with the patient and companions. The demands of information gathering during patient admission was a common challenge for nurses. One subtheme related to information gaps.

5.3.1 | Information gaps

Gaps in patient information was raised as a specific challenge and barrier to the admission process. Nurses described challenges such as standard forms being unsuitable for a particular patient, information not available where it was expected to be (e.g. EMR), and barriers to accessing resources (e.g. interpreters). Participants shared

how inconsistencies and gaps in patient information were frequent and problematic and a barrier to effective harm prevention activities.

5.4 | Manage the workload

This step recognized the workload burden experienced by nurses during the patient admission and captured competing demands and the strategies nurses used to manage the workload. Three subthemes were identified.

5.4.1 | Teamwork and help

Teamwork was viewed as a positive part of the admission experience by many nurse participants. They reported feelings of gratitude towards those who assisted them during the patient admission. Consistent with this finding, most of the observed admissions involved multiple nurses assisting the nurse who had primary responsibility for the patient and their admission. Alternatively, a lack of support from other staff members was a cause of staff stress.

5.4.2 | On top of things, or not

Participants described 'being on top of things' as a positive experience. Conversely, nurses described their negative feelings when

TABLE 4 Illustrative data demonstrating the steps in the nurse admission process and barriers and enablers

Step and subthemes	Illustrative data and quotes
1. Make sense and prioritize *Anticipation*	[We need] sufficient information so you don't have to search for missing information which adds to pressure. (Workshop 2, nurse) *Emergency department nurse:* 'I handed over to the ward, did you get that?' [prior to arriving] WN *Ward Nurse:* 'No'. (Observation 4) If you don't receive a proper handover, you waste time looking for other stuff and you may miss things, and then other things get missed….it can take a few days to pick up the things that have been missed. (Workshop 2, nurse)
Red Flags	I can see what will go wrong, and I will need to call a MET [Medical Emergency Team] call. (Workshop 2, nurse) If their GCS [Glasgow Coma Score] is 15 it's easy to get all the information. If they are from a nursing home/confused etc. it can be hard. You need to ask everything at the handover time, and you have to be prompt so that you don't have to chase answers later. (Workshop 1, nurse) I felt unsafe to start with, she was confused, I was frustrated. (Workshop 3, nurse) [There are] times when admissions should not be accepted…at handover because they will feel rushed – bad for person and patient, bad for nurse handing over to as well. (Workshop 2, nurse) With handover, depending on admission, do obs [vital sign observations], give patient buzzer [call bell], apologise for leaving for a while, then go to other patients. Situations changing quickly is part of the stress…. Or obs on someone else and MET call and you forget about admission. (Workshop 2, nurse)
2. Get to know the person	Gathering background info [information] on patients' home life – it's really interesting…but it did become long winded. (Observation 7) '[I need to] get to know her, she's a high falls risk.' [Medium risk is written on the bedside board]. 'I'm going to get water because if I promise something I must do it or she'll be on her feet.' (Observation 4) Son is standing at the end of the bed. Sons translates to his mother. Mother speaks to son in own language. (Observation 5) Registered nurse asks patient to recite months backwards. FM [family member]: 'Is that 4AT Score?' Family member speaks to patient in own language and patient responds. Nurse records this in the EMR. (Observation 8) Patient explains in detail what happened when she fell. Nurse is looking at the patient, making good eye contact, responding to the patient with nods and gestures as they speak. Nurse: 'Because of that you are a falls risk, I'll put that up here' [points to board]. The nurse writes on the board at the end of bed 'High Falls Risk'… 13:03 CNS [Clinical Nurse Specialist] speaks to the nurse: 'Falls. I've just put medium and walking frame'. (Observation 6)
Information gaps	[Nurse to Observer]: 'Unfortunately this tool doesn't take these things into consideration.' (Observation 5) Graduate nurse: 'See if we can get an interpreter'. Senior nurse asks why she needs interpreter. Graduate Nurse: 'I can't fill in much of the form.' Senior nurse: 'You'll have to the ask nurse in charge.' (Observation 3) (13:44 h) 'I cannot see the patient under the ward [on EMR] so I cannot allocate as the primary nurse…ask ward clerk to transfer…' (13:49 h). Ward clerk enters room and nurse tells the nurse the patient [has not been] transferred to ward on the EMR (14:01 h). Ward clerk calls from doorway that the patient record is being transferred now (14:07 h.). Registered nurse notices the patient is now on ward EMR. (Observation 8) During the handover from the ED the nurse [looking at the EMR] states 'It's not showing any obs for me,' then looking at the ED chart, 'Oh yours is different'. (Observation 6) RN continues discussion about medications…family member explains the insulin was not given in the ED. (Observation 8) Son states ambulance report says she fell but she didn't fall. The information from ambulance is not correct. (Observation 5)
3. Manage the workload *Teamwork and help*	Colleague support is the only thing to stop you feeling snowed under. Otherwise you get to a point when your brain stops. Someone did obs [collected the vital signs], someone got them a cup of tea and that was important because it helped me move to the next point. Colleagues just knew that's what was needed, and sometimes you have to ask. (Workshop 2, nurse) We have buddy nurses and they can help each other during the shift. On our ward most of the time nurses are helping each other. If I ask for help I will normally get it. (Workshop 3, nurse)
On top of things, or not	I'm on top of things, getting things done: weight, obs [vital signs], remembered the postural BP, name on board, kitchen diet. (Observation 1) Feeling overwhelmed…because of a number of things not just one thing…But here is an admission that needs to be prioritized as well, so [it] becomes overwhelming. (Workshop 2, nurse) I forgot the initial weight of the patient. Brain overload. Wrote on hand and then washed hand. (Observation 7) You might think she's okay but then she falls and priority turns back to her…and you forget about admission. (Workshop 2, nurse)

(Continues)

TABLE 4 (Continued)

Step and subthemes	Illustrative data and quotes
Not enough resources	[On] weekends you can't contact allied health so if I need something like speech [speech therapist], it's a lack of resource. I felt bad about that because this is a hospital and we need to be able to give 100% care 24 h. (Workshop 2, nurse) [You] need more time, to recollect yourself, even just 5 min to work out what's going on. [You] need some time to pause and reflect on what you're doing and why. (Workshop 2, nurse) BP machine not working when plugged in. 'I manage to get the only machine not working.' (Observation 3)
4. Nearly done *Being a good nurse*	As a nurse we want to provide proper care for the patient and not just rush. When the patient comes and you don't have time...you're not feeling like you can do your job well. (Workshop 2, nurse) I want to do a good job. I don't want to be seen by others to be incompetent. (Workshop 2, nurse) [You] know what the next nurse will feel...because you've been in same situation before. You say they didn't give me a good handover so you're left to deal with it. (Workshop 2, nurse)
Waste, distractions and interruptions	Nurse moves to open the toilet door for another patient. Returns to patient who continues talking. (Observation 5) Interrupted by another nurse asking for help with a wash. 'Can you give me a few minutes?' (Observation 3) If I had clear documentation I would not have wasted my time looking for doctors and other staff. (Workshop 2, nurse) 'I'll get yours in a minute, I just need to do something'. Nurse then completes obs [vital signs] on the patient opposite. (Observation 6)
Decide what's important	I'll handover the delirium chart to PM [afternoon shift]; they may have better luck – but I think she is okay. I'm also going to handover skin assessment rather than strip her down, they can do that when she has a wash tomorrow. I will document the wounds on her head and hand. She doesn't have a cannula...don't need that form. (Observation 1) 'He is eating lunch so I won't bother him.' (Observation 6) 'Okay, we are going to get her weighed but I don't want to cause her pain...she has pain so I don't want to get her up'. 'Weight I will do later because she is in pain and losing weight'...Most important – pain management. (Observation 4)
5. Shuffle forms and fill gaps *Reminders, checks and prompts*	Having a checklist system [is good] to ensure everything is there. (Workshop 2, nurse) 'I will go back and check paperwork soon....Half my job will be getting my head around the paperwork.' (Observation 7) Talks to self while completing the form. (Observation 4) [Observer chart check]: Patient is diabetic – but this is not stated in the nurse assessment, no PMHx [past medical history] completed, skin not assessed... Nutrition – not completed; The questions have been asked but not recorded on the forms. (Observation 5)

they felt unable to manage their work, such as feeling overwhelmed or forgetting something.

5.4.3 | Not enough resources

Nurses reflected on challenges such as limited time or availability of resources; for example, faulty equipment, reduced staffing on weekends and access to specialist staff negatively impacted their harm prevention activities.

5.5 | 'Nearly done'

Nurses often described feelings of relief, and a sense of achievement when they were 'nearly done'. At this point, nurses felt they had completed most of the admission activities they felt were important or had prioritized, and only the tasks perceived as less important were left to be done. Nurses' desire to do a good job was expressed as a driver to complete these tasks but felt this was often hampered by unnecessary tasks or external activities.

5.5.1 | Being a 'good' nurse

Participants frequently spoke about trying to be a 'good' nurse. This involved looking out for colleagues by getting everything done before the next shift; they wanted to be viewed by other nurses as doing a good job. Concern for the patient, professional pride and fear of being judged by their peers, emerged as drivers to do a good job. The step has two subthemes.

5.5.2 | Waste, distractions and interruptions

Being hampered by unnecessary tasks or external activities was a common experience reported by nurses. Nurses most often described time-wasting associated with information gathering and documentation. In addition, all observations captured nurses experiencing distractions and interruptions during the patient admission process.

5.5.3 | Decide what's important

Nurses almost always prioritized patient clinical needs (e.g. related to cognitive or behavioural abnormalities, clinical deterioration, pain and medications) over functional factors (e.g. care related to mobility and falls prevention, skin integrity, nutrition and continence). This was best reflected in the order that tasks were completed. Cognition assessment and collection of vital signs were frequently among the first tasks completed. Nutrition was also frequently among the first tasks, to ensure the patient could access their next meal. Falls

prevention and skin integrity were performed later, and continence assessment was almost universally omitted during the initial admission assessments.

5.6 | Shuffle forms and fill gaps

Almost universally, the final step in the admission process involved nurses checking forms to make sure they had been completed and adding any important information that was missed. As forms were seldom accessed in a sequential order, this often involved checking and re-checking the forms, looking for gaps and using strategies such as checklists and reminders, particularly if time was tight before the next shift commenced.

5.6.1 | Reminders, checks and prompts

This subtheme reflected the wide range of checks, prompts and reminders that were generally viewed positively by nurses.

5.7 | Nurses needs and priorities for solution development

To address the third research aim to identify and prioritize nurses' needs during the admission process, iterative brainstorming and ranking activities were used to identify the range of problems nurses experienced. Workshop participants grouped and prioritized ideas resulting in consensus agreement about three high-priority features of a solution to assist nurses to provide comprehensive harm prevention during the admission of an older person to the hospital. These were: (1) identify and prioritize the most important care; (2) tailor care and harm prevention strategies to individual needs, preferences and circumstances and (3) see the big picture for the patient for holistic care. Additional desirable features included:

- Use the best available evidence;
- Respect and support nurses' clinical judgement in decision-making;
- No additional forms to complete or workload (reduce workload);
- Ensure solutions are streamlined, simple and easy to follow;
- Provide prompts to avoid forgetting something important;
- Make it easy to find important information.

6 | DISCUSSION

This research used a novel multi-methods iterative approach, informed by HCD, to identify, map and define nurses' activities, experiences and behaviours during the admission of an older person to the hospital. Recurring patterns in observed nurse behaviours and self-reported experiences revealed five steps in the nurse admission process and both internal and external stimuli or events during

patient admission that appeared to assist or hinder nurses. The findings also provide a foundation for future solutions to assist nurses to keep patients safe during the complex admission process. Nurses desire assistance to: (1) prioritize important care; (2) tailor care to the individual and their needs and (3) see the big picture for holistic patient care.

The novel research approach provided unique insights about problems faced by nurses during patient admissions, and influences on nurses' behaviours, thereby providing the foundation for future change or interventions to improve nurses' work processes. Making change requires understanding the nature of the problem and the change required at both broad and granular levels (Atkins et al., 2017; Michie et al., 2011). The change also requires the active participation of the target population and those who hinder or support them. If change interventions are to be meaningful, they must target behaviours that are clinically significant, address the right determinants that predict targeted behaviours, and be delivered in a way that fits the characteristics of the intended recipients, culture and context (Atkins et al., 2017; Michie et al., 2011). Human-centred design is emerging as a useful methodology for solving these complex implementation problems in healthcare (Crowe et al., 2022; IDEO, 2015) by engaging diverse stakeholders in understanding complex problems and creating acceptable solutions for end-users.

This study used the Theoretical Domains Framework (TDF) that underpins the COM-B model for behaviour change (Atkins et al., 2017; Michie et al., 2011) to help understand and interpret data reflecting nurses' experiences, and drivers of their behaviours during the patient admission process. The framework also provides a taxonomy of evidence-based strategies that were used to identify strategies expected to support successful change by targeting specific barriers or behaviours (Carey et al., 2019).

This study revealed a range of motivation-related factors influencing nurses during patient admission including social (e.g. desire to be seen as a 'good' nurse and helping team members) and emotional (e.g. concern for the patient and feeling overwhelmed) drivers. Strategies that provide information about patient safety consequences, positive reinforcement for desired practices, rewards or incentives for effort and outcomes, and clarity about expected performance should be considered to address these barriers (Carey et al., 2019).

In addition, nurses' opportunity to perform at their best during patient admissions appeared to be negatively impacted by several environmental factors (i.e. equipment, resource shortages, competing demands of care for multiple patients, interruptions, task-switching and multitasking) similar to those previously, and frequently, cited in the literature (Andrzejewski, 2020; Trovo et al., 2020). Using the behaviour change taxonomy (Carey et al., 2019), social support, removing or reducing adverse stimuli (e.g. interruptions or distractions) and making a change to the physical (e.g. equipment) and social environment (e.g. support) are suggested interventions to support nurses.

Nurse psychological capability appeared enhanced by rapid pattern recognition where they used a variety of interpersonal and environmental cues during patient initial contact, indicative of

heuristics (i.e. 'rules of thumb' or shortcuts) (Nagtegaal et al., 2019), as shortcuts to improve their efficiency and reduce their cognitive effort during the admission process. While heuristic decisions have been found to be effective most of the time despite their rapidity and lack of required effort, they can also carry risks. Of particular note is the potential for a tendency to misinterpret information in favour of previous beliefs, patterns that could be mistaken, and subtle cues often missed by less experienced clinicians (Nagtegaal et al., 2019). Previous research suggests biases may be common in the care of older patients who are often given low priority for nursing care when resources are limited (Emme, 2020; Evripidou et al., 2021; Gamborg et al., 2020; Suhonen et al., 2018).

Nurses in this study were observed to rapidly identify heuristic exceptions, characterized in this study as 'Red Flags'. These cues prompted nurses to increase focus and vigilance, use detailed thought processes or collect additional information to confirm or challenge their initial impressions and inform their decisions about priority setting for patient safety. For example, a rapid assessment of cognition in the older person often occurred early in the admission process, but in the absence of any alteration or risk factors, completion of the cognitive screening tool was often delayed or omitted from the admission process. Similarly, one nurse prioritized getting the patient a drink to reduce her risk of falling, despite only just meeting the patient for the first time.

In this study, decisions about care rationing emerged as challenging for nurses, adding to the complexity of their work, and aligned with nurses' desire to 'be a good nurse'. Similarly, nurses required to prioritize or ration care have previously reported they feel these decisions threaten their professional autonomy and their desire to perform care in a professional way (Suhonen et al., 2018). Nurses have also reported moral distress due to the ethical challenges of needing to make choices about meeting patients' needs, and ambivalence about prioritizing nursing tasks in their attempts to balance patient dignity with other indirect and direct patient care. These decisions have been associated with feelings of inadequacy, frustration, powerlessness and guilt (Suhonen et al., 2018).

Research suggests further challenges for nurse rationing decisions arise when criteria used to assess priorities differ, such as between different clinicians, or when differing individual patient needs to create perceptions of inequity (Suhonen et al., 2018). To date, evidence about the unintended consequences of care rationing decisions has predominantly focused on negative outcomes such as increased nurse workload and patient harm (Chaboyer et al., 2021; Mandal et al., 2020; Phelan & Kirwan, 2020). Understanding nurse rationing decisions during patient admission to the hospital, and how to find strategies to support nurses to make decisions that keep patients safe, has been largely neglected.

Understanding nurses' behaviours in context, particularly positive influences on nurses' behaviours and mental models used for efficiency, is critical to avoid undesirable, dangerous or inefficient behaviours (Niedderer et al., 2014). In this study, nurses' activities, behaviours and experiences were characterized with the intent to identify important needs, and features of a solution to assist nurses

to manage complex work and prioritize decisions about patient safety during the admission of an older person to the hospital.

The finding that nurses require a solution that helps them identify and prioritize important care, tailor strategies to individual needs, while keeping an eye on the 'big picture' was consistent with modern nursing theories that promote holistic care built on the physical, psychosocial and relational dimensions of individuals and their human needs (Kitson et al., 2014). Harm prevention is an international patient safety and quality priority (Australian Commission on Safety and Quality in Health Care, 2019; World Health Organization, 2021) to address unacceptable rates of preventable patient harm. The complexity of this challenge can best be met with a technology solution to assist nurses in quickly identifying high-risk patients, minimizing unnecessary data capture and assisting patient safety activities during patient admission to the hospital. Such a solution could offer significant benefits to nurses and their patients (Moon et al., 2021) as well as healthcare organizations. This study provides the foundation to create an intervention to minimize the effort required for nurses to complete patient safety activities during patient admission, that is acceptable to nurses and meets important needs in clinical practice.

6.1 | Limitations

Convenience sampling at a single site limits the transferability of findings. However, the use of diverse participant groups, multiple data collection methods and an iterative analytic approach enhanced both the credibility and rigour of the study. Sharing preliminary findings with clinicians during the HCD workshops provided a form of member checking to enhance the dependability of the data. Data were collected using observations and non-traditional participatory HCD activities to capture emotions, brainstorm and support the convergence of ideas providing a range of artefacts and field notes for analysis. The interactive nature of these activities may have influenced participant behaviours or contributions, increasing risk for response bias despite assurances of anonymity and confidentiality. Conversely, diverse participant views can expand participant thinking and add depth to the data. As yet, there are limited reports of the usefulness of these strategies for nursing and health professions, although they are widespread in other disciplines (Slattery et al., 2020).

7 | CONCLUSIONS

During admission of an older person to the hospital, nurses collect and synthesize data from multiple sources to inform patient safety activities to meet an individual's needs and risk. The novel research approach identified five steps in nurses' activities and harm prevention practices during admission of an older person to the hospital, and key features for a solution to assist nurses to keep patients safe. The findings provide the foundation for further research to develop interventions acceptable to nurses and fit for purpose to assist nurses to manage a high workload and cognitive burden when they admit an older person to the hospital.

AUTHOR CONTRIBUTIONS

BR, TD, LH, BdC, AMH: Made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; BR, TD, LH, BdC, AMH: Involved in drafting the manuscript or revising it critically for important intellectual content; BR, TD, LH, BdC, AMH: Given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content; BR, TD, LH, BdC, AMH: Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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