

ORIGINAL RESEARCH:
EMPIRICAL RESEARCH - QUANTITATIVE

Barriers and enablers to nurses' use of harm prevention strategies for older patients in hospital: A cross-sectional survey

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Abstract

Background: Preventable harms during hospitalization pose a major challenge for health systems globally. Nurse-led strategies provide comprehensive harm prevention to keep the most vulnerable patients safe in hospital, but gaps in care are common. Nursing roles and activities to prevent harm to patients during acute hospitalization are poorly understood.

Aim: The aim of this study was to identify nurses' perceived enablers and barriers to the implementation of comprehensive harm prevention for older people admitted to an acute hospital setting.

Design: Anonymous, online, cross-sectional survey.

Methods: The adapted Influences on Patient Safety Behaviours Questionnaire (IPSBQ) was used to collect data from nurses working on five general medicine wards across three hospitals of a single tertiary health service in Australia in 2019. Participants also rated their perceptions of overall quality of care, missed care and awareness of strategies for an eight-factor framework for comprehensive harm prevention. The STROBE reporting checklist was used.

Results: Ward response rates between 35% and 58% resulted in 132 complete questionnaires for analyses. High mean scores for behavioural regulation (3.28), beliefs about capabilities (2.96) and environmental context and resources (2.73) indicated these domains were perceived by nurses as enablers. Low mean scores for the domains of intentions (1.65), beliefs about consequences (1.69), optimism (1.72) and professional role and identity (1.85) indicated these were barriers to comprehensive harm prevention by nurses. High perceived quality of care (scored 9–10/10) ($p = .024$), and awareness of strategies for the eight-factor framework ($p = .019$) were significant enablers of comprehensive harm prevention.

Conclusion: Targeted evidence-based strategies that include education, persuasion, incentivization, coercion and modelling would be most useful for promoting comprehensive harm prevention by nurses. However, to be most effective the harm prevention strategy may need to be tailored for each ward.

KEYWORDS

healthcare quality improvement, implementation science, nurses, patient safety, surveys

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1 | INTRODUCTION

Preventable harms are one of the most significant problems impacting healthcare globally, affecting up to one in four hospitalized patients and consuming more than 15% of health budgets (Duckett, Jorm, Danks, & Moran, 2018). Hospitalized older people are among those most vulnerable to preventable harms or complications, with low-quality care identified as a causative factor (Duckett, Jorm, Danks, & Moran, 2018; Phelan & Kirwan, 2020). The preventability of in-hospital adverse events reveals harms most often relate to medical or surgical treatments (e.g. wrong dose, wrong site) and healthcare-associated infections (Duckett, Jorm, Danks, & Moran, 2018; Panagioti et al., 2019). Analyses of catastrophic health system failures (Francis, 2013; Garling, 2008) identified many preventable harms are attributed to poor quality, or omissions, in nursing care rather than clinical errors. By their nature, preventable harms can be minimized or avoided by consistent delivery of comprehensive high-quality care (Duckett, Jorm, Moran, & Parsonage, 2018; Nabhan et al., 2012). Evidence-based strategies to prevent common patient harms during hospitalization are often poorly understood (Steel et al., 2021; Walsh et al., 2020) and poorly implemented (Dahlke et al., 2019; Grealish et al., 2019; Swoboda et al., 2020; van Hell-Cromwijk et al., 2021) by nurses.

This paper reports a study to examine the enablers and barriers to nurses' implementation of strategies to deliver comprehensive harm prevention for older people in hospital.

1.1 | Background

Nurses' roles in care delivery for hospitalized older patients include a combination of meeting fundamental care needs (e.g. activities of daily living), condition-specific care and proactive strategies to avoid harm (Jedwab et al., 2019). Nurses' 24-h presence with patients in hospital places them in the ideal position to keep patients' safe by implementing a range of strategies to avoid preventable harms. Nurses have primary responsibility for planning, implementing and monitoring many harm prevention strategies in daily practice. However, routine nursing care for older people in hospital—such as hygiene, elimination, mobility and pain management—is frequently missed (Chaboyer et al., 2020; Griffiths et al., 2018; Kalankova et al., 2020; Swoboda et al., 2020) contributing to poor patient outcomes (Recio-Saucedo et al., 2018). There is an urgent need to assist nurses to implement evidence-based practices to prevent harm during acute hospitalization.

Nurses' harm prevention work is both complex and challenging because of the numerous guidelines and recommendations that are expected to be used in their daily work. Nurse assessment, decision-making and care planning are negatively impacted by high workloads, and cognitive burden is exacerbated by numerous administrative forms, poor linking of data across forms, duplication, gaps in patient data and poor interdisciplinary communication (Moy et al., 2021; Redley & Raggatt, 2017).

Impact Statement

What problem did the study address?

- Poor quality or omissions in nursing care contribute to preventable harms of hospitalization.

What were the main findings?

- Nurses' intentions, beliefs about consequences, optimism and professional role and identity, all domains of motivation, emerged as barriers to comprehensive harm prevention.
- Findings indicate a complex, multi-faceted intervention is needed to support nurses implement strategies for comprehensive harm prevention for older people at admission to hospital.

Where and on whom will the research have an impact?

- Nurses' implementation of comprehensive planning, implementing and monitoring of harm prevention strategies can mitigate harms of hospitalization for older people.
- An intervention that combines education, persuasion, incentivization, coercion and modelling may offer the best chance of success to promote behaviour change among nurses towards implementing harm prevention for older people on admission to hospital.
- However, to be most effective, the strategy to promote comprehensive harm prevention by nurses must also be flexible to be tailored for the unique context of each ward.

Nurses increasingly report being overwhelmed by workload, with the mismatch between workload and available resources a common source of stress (Bautista et al., 2020; Moy et al., 2021). Documentation burden, which includes completing multiple risk screening and assessment forms in hospitals, is a major source of workload stress for nurses (Moy et al., 2021). For example, nurses can complete up to 25 forms containing over 500 data items for an older patient on admission to hospital (Redley & Raggatt, 2017). Despite the volume of data collected by nurses, assessments of some factors that contribute to common preventable harms are frequently missed, interventions and documentation about strategies used to prevent harm were variable, and new harms frequently identified (Han et al., 2021; McGrath et al., 2017; Redley & Baker, 2019). The information needed by nurses to tailor a personalized comprehensive care plan is often inconsistently captured in medical records, particularly when multiple risks are present (McGrath et al., 2017; Redley & Raggatt, 2017) such as during care for vulnerable older people. Nurses need suitable tools and a strategy to assist them to provide comprehensive harm prevention in the context of holistic care for older people in hospital.

Despite concerns about unintended consequences related to design and implementation (Burian et al., 2018; Sims et al., 2020) such as promoting a tick-box and task focus, the benefits of multi-risk checklists and care bundles to enhance patient safety are emerging in the safety literature (Chaboyer et al., 2016; Mudge et al., 2017). As yet, none support nurses with delivering comprehensive harm prevention for older people in hospital. The 'Have you SCAND MMe Please?' mnemonic (i.e. Skin integrity, Continence, Abnormal clinical findings and medical complications, Nutrition, Deterioration in cognitive or mental state [e.g. delirium, cognitive or mental impairments], Medications, Mobility and Pain) was developed and endorsed by experts as suitable to assist nurses to identify and address eight interrelated factors required for comprehensive nursing care to prevent harm to older patients during acute hospitalization (Redley & Baker, 2019; Redley & Raggatt, 2017). While used in previous research to evaluate practices and identify evidence-practice gaps in nurse assessment, planning and interventions for harm prevention in hospitals (Han et al., 2021; McGrath et al., 2017; Redley & Baker, 2019; Redley & Raggatt, 2017), the eight-factor framework has yet to be applied and evaluated in interventions to guide clinical practices.

We sought to explore features of the individual and contextual factors, including the social and physical environment, that influence nurses' implementation of comprehensive harm prevention practices for older people at admission to hospital. The Theoretical Domains Framework (TDF) provided the conceptual model for this investigation. Developed from numerous theories relevant to implementation science, the TDF is comprised of over 128 constructs grouped into 14 domains to provide a comprehensive and valid theory-informed approach to analyse enablers and barriers to a behaviour (Atkins et al., 2017). It has been used extensively to inform recommendations for healthcare behaviour change interventions suitable for the barriers identified (Atkins et al., 2017; Michie et al., 2013). The study purpose was to use the TDF to understand nurses' perceptions of the barriers and enablers to using the eight-factor 'Have you SCAND MMe Please?' framework for implementation of comprehensive harm prevention strategies for an older person during their admission to an acute hospital setting, and make recommendations about suitable future interventions.

2 | METHODS

2.1 | Aim

The aim of this study was to identify nurses' perceived enablers and barriers to the implementation of comprehensive harm prevention for older people admitted to an acute hospital setting.

2.2 | Design

The survey design used a version of the Influences on Patient Safety Behaviours Questionnaire (IPSBQ) (Taylor, Parveen,

et al., 2013), adapted to capture data relevant to the 14 domains of the TDF. The STROBE reporting checklist was used to guide the study reporting.

2.3 | Study setting

The study setting was five general medicine wards, across three hospitals of a single 700-bed tertiary health service in metropolitan Melbourne, Victoria, Australia. The General Medicine service provides general and acute care medicine, with a focus on multidisciplinary care, for over 10,000 inpatients annually. Nursing ratios on acute hospital wards are mandated by Government legislation at 1:4, or 1:5 in wards with sub-acute beds, during the daytime, with reduced staffing levels at night.

2.4 | Participants

Convenience sampling involved a census approach to recruit all Registered (i.e. degree prepared) and Enrolled (i.e. diploma prepared) nurses working in five general medicine wards. Those on extended leave at the time of data collection were excluded. As the exact number of staff on extended leave fluctuated across the wards during the 6-month data collection period, an approximate denominator ($N = 280$) was calculated based on the mean number of staff available on each ward at the commencement and completion of the survey data collection, as reported by nurse managers.

2.5 | Data collection

All data were collected between May and October 2019. The invitation to participate was sent to all nursing staff via their manager and included a link to an anonymous online REDCap survey. Paper surveys were also provided on wards with a secure return box, or nurses could use an internal mail return envelope addressed to the researcher. Responses to paper surveys were entered manually into REDCap by the researcher. To enhance response rates, university and hospital logos were included in the survey, the preamble informed participants the survey was brief and their responses were anonymous and confidential, the researcher attended change of shift huddles to provide information about the survey and answer questions, a chocolate treat was placed on surveys in the staff room, participants were offered a drink voucher (value \$5) on providing evidence (e.g. screenshot to the manager) that they had completed the survey, and follow-up invitation e-mails were sent via managers every 2 weeks for 6 weeks.

The survey included the IPSBQ that has 35 items aligned to the 14 domains of the TDF. The survey was provided by the original author who had adapted an earlier version of the IPSBQ (Taylor, Parveen, et al., 2013) to align with recent changes to TDF, that increased from 12 to 14 domains (Atkins et al., 2017).

The IPSBQ was used to understand the factors that make it more or less likely that nurses would perform a specific patient safety behaviour; in this case use the eight-factor 'Have you SCAND MMe Please?' framework to implement comprehensive harm prevention strategies for older patients at admission to hospital. To orient nurses to the framework, the survey included a statement inviting them to consider their role in implementing a care plan to provide comprehensive harm prevention for older people, that addresses all of the eight elements of the 'Have you SCAND MMe Please?' Each of the eight elements was named.

The items were rated using a 5-point Likert scale (1 = strongly agree, 2 = agree, 3 = neither agree nor disagree, 4 = disagree, 5 = strongly disagree) with 19 negatively worded items reverse scored so higher scores indicated a positive response about facilitating implementation. For example, the social influence domain items included *My superiors would like me to...*(target behaviour), and *Other staff do not seem to...*(target behaviour) (reverse scored). Testing of the previous 35-item version of the IPSBQ that addressed 11 domains of the TDF demonstrated good construct validity on confirmatory factor analysis, discriminant validity (for all 11 domains), and internal consistency (inter-item correlations range 0.21 to 0.64) (Taylor, Parveen, et al., 2013). Properties of the 35-item version of the tool, addressing the 14-domain TDF (Atkins et al., 2017) used for this study have not yet been reported in the literature. The survey also included questions about confidence to recall the eight factors (i.e. Before reading this guideline, how confident would you have been to recite the eight factors without having to look them up?), awareness of relevant strategies for each of the eight factors, and two single-items that used an 11-point response scale as global measures of (1) nurses' perceptions of the proportion of missed care over their last shift (0%–100%) (Hamilton et al., 2017) and (2) the quality of nursing care provided during their last shift (0–10) (Hamilton et al., 2017; Sochalski, 2001). Single-item global measures have been shown to provide valid, reliable and sensitive measurement, while minimizing participant burden (Hamilton et al., 2017; Keck, 2020). Forced response to items in the online survey was used to minimize non-response.

2.6 | Analysis

IBM SPSS Statistics Version 27 (IBM Corp, 2021) was used for statistical analyses. After reverse scoring of negative items, higher scores (i.e. 4, 5) indicated higher perceived barriers and lower scores (i.e. 1, 2) indicated lower perceived barriers. Survey data were analysed using descriptive (frequencies, mean, standard deviation), and inferential statistics (independent samples t-tests and ANOVA with Tukey HSD post hoc tests) suitable for the data type and distributions, and Bonferroni adjustments were applied when multiple tests were performed. As missing data were less than 5% for variables and cases there was no need to manage missing data (Tabachnick & Fidell, 2014). Statistical significance was set at .05.

2.7 | Validity and rigour

All manually entered surveys were double-checked by a second researcher. The overall IPSBQ had good internal consistency, with Cronbach's alpha coefficient of .91. Three items recorded corrected item-total coefficients less than 0.3 (Item 11, environment (2) .175; Item 16, professional identity (2) .241; Item 26, reinforcement (3) .249), however, were retained in analysis in view of the high Cronbach's alpha, and to maintain scale integrity as each domain was examined by only a few items.

2.8 | Ethical considerations

Ethical approval from the participating health service (Ref: RES-19-0000-207L) and university (Ref: 2019-142) was obtained prior to data collection. Nurses were informed about the study and invited to participate via an e-mail from their managers. Participant information was also provided on the first page of the survey. Researchers did not access any individual information to protect privacy. Submission of a completed survey indicated consent. All data were anonymous, and coded using participant-created codes.

3 | RESULTS

Ward response rates between 35 and 58% resulted in 132 complete surveys for analyses (Table 1). Most participants were female (87.9%) and working as registered nurses (46.2%) or graduate-registered nurses (14.6%). Participants' highest qualifications were undergraduate degrees for almost half (45.7%); 20.2% had a Certificate or Diploma and 15.5% held postgraduate qualifications. Just over half of the participants (56%) indicated they were previously aware of strategies to prevent harm for all eight of the factors in the 'Have you SCAND MMe Please?' framework for comprehensive harm prevention.

The highest mean scores for behavioural regulation (3.28), beliefs about capabilities (2.96) and environmental context and resources (2.73) suggested these domains were perceived by nurses as enablers to implementing strategies to prevent harm related to the eight-factor 'Have you SCAND MMe Please?' framework. Alternatively, comparatively low mean scores for the domains of intentions (1.65), consequences (1.69), optimism (1.72) and professional identity (1.85) emerged as possible barriers to comprehensive harm prevention by nurses (Table 2). One-way between groups ANOVA (with Bonferroni adjustment) indicated mean scores on domains did not differ between wards ($F[4126] = 2.194, p = 0.73$).

The data were examined to identify whether perceptions of barriers in general (as indicated by the overall score on the IPSBQ) differed with participant characteristics. Time working in nursing (three groups: ≤ 12 months, 13–60 months, ≥ 61 months; $p = .24$), perceptions of missed care (two groups: $\leq 10\%$, $\geq 11\%$; $p = .52$) (groupings were determined by examining data distributions to create relatively

TABLE 1 Participant characteristics and rating of missed care and care quality

	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	TOTAL
Responses	31	29	31	22	19	132
Response rate	58.5%	54.7%	50%	35.4%	38%	47.1%
Female % (n)	90.3 (28)	86.2 (25)	83.9 (26)	86.4 (19)	94.7 (18)	87.9 (116)
<i>Nurse classification</i>						
Enrolled	3.2 (1)	10.7 (3)	3.2 (1)	4.5 (1)	26.3 (5)	8.5 (11)
Graduate	10 (3)	10.7 (3)	12.9 (4)	27.3 (6)	15.8 (3)	14.6 (19)
RN (year 2–10)	43.3 (13)	53.6 (15)	45.2 (14)	50 (11)	36.8 (7)	46.2 (60)
CNS	23.3 (7)	7.1 (2)	22.6 (7)	4.5 (1)	10.5 (2)	14.6 (19)
Manager/ANUM/Educator	20 (6)	17.9 (5)	16.2 (5)	13.6 (3)	10.5 (2)	14.6 (19)
<i>Highest qualification</i>						
Certificate/diploma	20 (3)	25 (7)	22.6 (7)	13.6 (3)	33.3 (6)	20.2 (26)
Undergraduate degree	46.7 (14)	42.9 (12)	58.1 (18)	45.5 (10)	27.8 (5)	45.7 (59)
Postgraduate qualification/s	40 (12)	28.6 (8)	16.2 (5)	36.3 (8)	38.9 (7)	15.5 (20)
<i>Work experience</i>						
Time in months working as a nurse Median (IQR)	86.5 (155) 4–420	43 (106) 2–438	92 (120) 4–564	135.5 (132) 4–408	168 (154) 6–300	96 (151) 2–564
Range						
Time in months working in current position Median (IQR)	10.5 (19) 1–189	12 (18) 1–180	44 (83) 2–372	30 (150) 4–312	60 (129) 2–175	23 (75) 1–372
Range						
<i>Care quality</i>						
Missed care on most recent shift (0%–100%) M (SD)	23.7% (15.4) 10–70%	28.2% (15.4) 10–70%	26.3% (21.6) 10–100%	21.6% (14.3) 10–70%	19.5% (SD .97) 10–40%	24.4% (1.63) 10–100%
Range						
Reported <30% missed care on last shift % (n)	87.1 (27)	71.4 (20)	73.3 (22)	94.7 (18)	94.7 (18)	82.7(104)
Quality of nursing care on last shift (/10) M (SD)	7.93 (1.31) 4–10	8 (1.09) 6–10	8.4 (SD 1.5) 4–10	8.05 (1.18) 6–10	8.16 (1.12) 6–10	8.11 (1.26) 4–10
Range						
Rated quality as 8%–10% (n)	69.9 (21)	68.9 (20)	80.7 (25)	70 (14)	68.4 (13)	72.1 (93)
<i>Are you aware of information about how to implement strategies to prevent harm related to all the factors in the 'Have you SCAND MMe Please?' guideline?</i>						
Yes, all	45.2 (14)	44.8 (13)	74.2 (23)	63.6 (14)	57.9 (11)	56.8(75)
No, none	3.2 (1)	10.3 (3)	0	0	0	3 (4)
Most	51.6 (16)	44.8 (13)	25.8 (8)	36.4 (8)	42.1 (8)	40.2 (53)
<i>Before reading the 'Have you SCAND MMe Please?' guideline, how confident would you have been to recite the eight factors without having to look them up?</i>						
Extremely confident	16.1 (5)	7.1 (2)	9.7 (3)	4.5 (1)		8.4 (11)
Reasonably confident	32.3 (10)	32.1 (9)	38.7 (12)	68.2 (15)	31.6 (6)	39.7 (52)
Fairly confident	22.6 (7)	32.1 (9)	22.6 (7)	13.6 (3)	26.3 (5)	23.7 (31)
Not very confident	25.8 (8)	17.9 (5)	22.6 (7)	13.6 (3)	36.8 (7)	22.9 (30)
Not confident at all	3.2 (1)	10.7 (3)	6.5 (2)		5.3 (1)	5.3 (7)

equal groups) and confidence to recite the eight factors (two groups: yes or no; $p = .45$) were not associated with IPSBQ scores. Alternatively, high perceived quality of care (Keck, 2020) (three groups 1–8, =9, =10; $F [2, 125] = 3.826, p = .024, \eta^2 = .06$ [moderate]) and high awareness (i.e. aware of all) of information about the eight

strategies (two groups: yes or no; $t [129] = 2.376, p = .019, \eta^2 = .04$ [small]) were significantly associated with higher (facilitating) IPSBQ scores. While post hoc comparisons of total IPSBQ scores between the five wards using a Tukey HSD test indicated differences in mean scores for the IPSBQ were non-significant ($p = .07$), it was noted the

TABLE 2 Participant scores for domains of the TDF

Domain of TDF	Ward 1M (SD)	Ward 2M (SD)	Ward 3M (SD)	Ward 4M (SD)	Ward 5M (SD)	OverallM (SD)
Knowledge	2.01 (0.61)	1.99 (0.62)	1.8 (0.62)	1.98 (0.70)	2.05 (0.72)	1.94 (0.64)
Skills	2.47 (0.86)	2.4 (0.57)	2.42 (0.93)	2.75 (0.65)	2.71 (0.89)	2.52 (0.79)
Behavioural regulation	2.33 (0.68)	2.41 (0.76)	2.26 (0.63)	2.23 (0.81)	2.53 (0.74)	2.35 (0.72)
Memory, attention & decision processes	3.21 (0.75)	3.31 (0.51)	3.00 (0.90)	3.34 (0.47)	3.71 (0.73)	3.28 (0.73)
Environmental context & resources	2.68 (0.75)	2.74 (0.72)	2.68 (0.81)	2.83 (0.54)	2.78 (0.72)	2.73 (0.71)
Social influences	2.13 (0.66)	2.28 (0.52)	1.97 (0.71)	2.18 (0.48)	2.5 (0.60)	2.19 (0.62)
Social professional role	1.98 (0.81)	1.88 (0.86)	1.65 (0.67)	1.9 (0.77)	1.84 (0.71)	1.85 (0.77)
Beliefs about consequences	1.65 (0.66)	1.85 (0.67)	1.52 (0.72)	1.78 (0.61)	1.71 (0.67)	1.69 (0.67)
Goals (Goals and Action Plan ^a)	2.44 (0.74)	2.58 (0.56)	2.34 (0.63)	2.56 (0.42)	2.64 (0.62)	2.2.5 (0.61)
Reinforcement	2.17 (0.64)	2.47 (0.64)	2.14 (0.75)	2.24 (0.57)	2.33 (0.71)	2.27 (0.61)
Optimism	1.69 (0.68)	1.89 (0.67)	1.39 (0.54)	1.82 (0.64)	1.97 (0.69)	1.72 (0.67)
Intentions	1.68 (0.63)	1.72 (0.54)	1.46 (0.59)	1.71 (0.59)	1.72 (0.62)	1.65 (0.59)
Beliefs about capabilities	2.99 (0.77)	3.16 (0.70)	2.73 (1.06)	2.93 (0.82)	3.03 (0.83)	2.96 (0.85)
Emotion	2.35 (1.02)	2.38 (0.86)	2.19 (0.90)	2.52 (0.96)	2.74 (0.82)	2.41 (0.92)

Abbreviation: TDF, Theoretical Domains Framework.

^aThe TDF domain 'Goals' was examined using IPSBQ domains-Goals (three items) and Action Planning (two items).

ward group sizes were unequal for multiple comparisons. Visual examination of mean score distributions revealed that the differences between the highest and lowest scoring wards (Ward 3: $M = 73.77$ and Ward 5: $M = 85.61$) appeared substantial. An independent samples t-test was used to further explore differences between these two wards indicating a significant difference in the mean IPSBQ ($t[47] = -2.500, p = .016, \eta^2 = .12$ [moderate]).

4 | DISCUSSION

This study used a validated theoretical approach (Atkins et al., 2017) that identified both enablers and barriers to nurses' implementing comprehensive harm prevention strategies for older patients on general medical wards. High survey scores identified enablers were most often aligned with nurses' perceptions of their capability (e.g. of behavioural regulation), motivation (e.g. beliefs about capabilities) and opportunity (e.g. environmental context and resources). Conversely, the barriers that emerged all aligned with nurses' motivation to implement comprehensive harm prevention strategies (e.g. intentions, beliefs about consequences, optimism and professional role and identity). These findings align with previous research that suggests nurses may undervalue their harm prevention strategies (Roberts et al., 2016; Swoboda et al., 2020).

Low confidence that harm prevention strategies will work can undermine nurses' motivation to implement these strategies in comprehensive care plans (Grealish et al., 2017). The study findings of multiple enablers and barriers related to nurses' harm prevention practices reflect the complexity of nurses' clinical work. Consistent with literature regarding complex interventions in healthcare, the

findings highlight that multiple influences on the individual, their clinical context and health system need to be considered in intervention development, as well as planning and implementing a change process for nurses in acute healthcare (Braithwaite et al., 2018; Greenhalgh et al., 2018).

Identification of the existing enablers that support nurses to implement comprehensive harm prevention strategies provides a foundation to leverage future improvement work. A significant finding was that enablers (i.e. items with higher IPSBQ scores) were associated with nurse perceptions of higher quality of care. For example, high scores for items related to behavioural regulation indicated the quality of care benefits were derived from nurses' behaviours related to self-monitoring, memory, attention and decision-making (Atkins et al., 2017). High self-reported awareness of intervention strategies for all eight factors emerged as an enabler to comprehensive harm prevention, associated with higher IPSBQ scores. Similarly, nurses' scores for their environmental context and resources suggest interactions with their environment and organizational culture supported their harm prevention work (Atkins et al., 2017). This finding is further supported by the suggestion that nurses' beliefs about their capabilities related to self-confidence, their self-efficacy and empowerment in implementing harm prevention impact on strategies they implement for comprehensive harm prevention (Atkins et al., 2017).

Evidence of behaviour change techniques' mechanisms of action (Carey et al., 2019; Michie et al., 2013) provides guidance about interventions expected to mitigate the specific barriers to nurses' harm prevention work identified using the survey. Based on our findings, strategies that target education, persuasion, incentivization, coercion and modelling are most likely to be effective to support nurses to implement comprehensive harm strategies (Carey et al., 2019; Michie et al., 2013; Steel et al., 2021).

The need for education interventions was supported by low scores for four closely related domains of the TDF, complemented by low mean scores for nurses' self-reported knowledge (<2.5 on all wards), and reports that less than half (48%) of the nurse participants were confident they could recall all elements of the eight-factor framework when planning harm prevention strategies. However, evidence is mixed about the effectiveness of education interventions when used alone to facilitate improvement in nurses' harm prevention practices, such as medication safety and communication (Kerr et al., 2020; Manias et al., 2020). Education strategies appear to be most effective when used as part of a multi-intervention strategy (Lin, Marshall, et al., 2020; Lin, Tsan, et al., 2020) for complex healthcare concerns.

Similarly, low scores for nurses' intentions, beliefs about consequences and optimism domains of the TDF suggest problems with nurse motivation hinder the implementation of comprehensive harm prevention. This finding complements existing literature that shows poor awareness, and uncertainty about intervention effectiveness negatively impact on nurses' harm prevention work (Ayton et al., 2017; Emme, 2020; Hada et al., 2019). Furthermore, recent systematic and scoping reviews similarly found that nurses often missed function-focussed care, attributed to organizational barriers that often left nurses feeling powerless to address overarching problems (Bagnasco et al., 2020; Chaboyer et al., 2020; Swoboda et al., 2020). Nurses' role ambiguity (See et al., 2020) and care prioritization decisions (Chaboyer et al., 2020) have also been identified as contributors to missed care. Evidence suggests nurses' motivation may be amenable to persuasion, modelling and coercion/incentivization-type interventions (Carey et al., 2019). Examination of relevant literature identified several potentially useful strategies relevant to enabling nurse motivation for patient safety behaviours.

Persuasion interventions, using communication to prompt feelings that stimulate actions (Michie et al., 2013), have successfully targeted nurse patient safety behaviours including use of mnemonics and checklists (Lin, Tsan, et al., 2020), technology-enabled data views, prompts and reminders (Bell et al., 2016; Lang et al., 2019; McCance et al., 2020) and redesigning nursing documentation (Curtis et al., 2021; Longhini et al., 2020). Modelling strategies, such as using local opinion leaders, experts or clinical champions to support practice change are widely reported, however evidence of effectiveness with nurses is at best modest. Again, these strategies appear to be most effective when combined with complementary interventions (Curtis et al., 2021; Lin, Marshall, et al., 2020; Lin, Tsan, et al., 2020). Strategies to improve nurse patient safety behaviours using coercion and/or incentivization (i.e. using reward or punishment) appear to relate to strategies that operate at a macro-organizational or system rather than a micro-unit or ward level, for example patient safety walkarounds (Taylor, Chuo, et al., 2013) and use of nurse-specific measures of care quality and safety (McCance et al., 2020). However, again, evidence demonstrating these strategies can change individual nurses' patient safety behaviours is weak (McCance et al., 2020).

Linking the findings of this research to specific research evidence to address the barriers to nurse patient safety, behaviours such as nurses' motivations and beliefs about consequences, suggests the

need for a complex multifaceted intervention to simplify the process of addressing multiple care domains (Greenhalgh et al., 2018; Reed et al., 2018). For example, technology can successfully assist clinicians to manage the complexity of individual patients' needs that do not fit standard single-risk guidance, hence requiring management of large volumes of assessment and guideline information to guide care decisions (Greenhalgh et al., 2018). These findings indicate a complex technology-enabled intervention, that integrates multiple complementary strategies to simultaneously provide access to complex information and enable nurse motivation, may offer the best opportunity to change nurse patient safety behaviours in relation to comprehensive harm prevention. A technology-enabled intervention can assist nurses curate the high volume of information and the complexity of synthesis required to guide individual care (Greenhalgh et al., 2018); a mnemonic or checklist can assist nurses order or prioritize workflows and prompt recall to avoid gaps; and visual displays provide feedback loops and mechanisms for measurement and monitoring change (Lin, Tsan, et al., 2020). Findings also support the need to consider flexibility for tailoring an intervention to suit the local context and setting of implementation (Curtis et al., 2021; Lin, Tsan, et al., 2020; Pfadenhauer et al., 2017).

Findings suggest differences between the lowest and highest scoring wards in the number of enablers (i.e. domains with a score >2.5) (4 vs. 7), and overall IPSBQ scores. These differences are consistent with literature between-ward differences in patient safety interventions (Giles et al., 2020). The role of nurse leadership in ward safety culture and nurse empowerment is well established (Goedhart et al., 2017) and could be considered, in part, as a plausible explanation for explaining this finding. Research demonstrates that leadership is a key factor in both how nurses value (Feo & Kitson, 2016) and implement (Albsoul et al., 2019) nursing-specific care, and patient experiences of this care (Bridges et al., 2020). Differences between wards suggest a need to consider how a strategy can be tailored to suit the contextual features, leadership and priorities of each ward. For example, differences were detected between Ward 5, located in a new community hospital site with the lowest number of beds, and Ward 3 that had a high patient turnover and was located in an older hospital within a culturally diverse and low socioeconomic geographic area.

4.1 | Strengths and limitations

The use of a single health service and a response rate which was below 50% on two of the participating wards limit the generalizability of findings. Previous studies have reported acceptable psychometrics of the IPSBQ (Taylor, Parveen, et al., 2013), however, reliability and validity of the adapted version to include the 14 domains of the TDF have not yet been reported and the sample size in this study was inadequate for confirmatory factor analysis. Overall tool reliability (Cronbach's alpha) was acceptable, but sub-scale reliability examined using mean inter-item correlations due to the small number of items in each sub-scale, revealed three sub-scales with scores below the acceptable range of 0.2–0.4 (online appendix)(Cronbach, 1990). The mix of positively and

negatively worded items (Taylor, Parveen, et al., 2013) reduced the risk of response bias (Dillman et al., 2014). The forced response of the on-line survey items may have led participants to choose a non-preferred option. Finally, nurse confidence to recite the eight-factor framework involved nurses reviewing the framework prior to answering the question posing potential for response bias, but despite this, less than half indicated they could recite the factors.

5 | CONCLUSIONS

Barriers to comprehensive harm prevention by nurses related to low scores on four TDF domains related to reflective motivation. The findings suggest research on interventions to effect desired behaviour change for effective harm prevention by nurses should include a combination of strategies that address education, persuasion, incentivization, coercion and modelling to implement comprehensive harm prevention. Also, a multi-intervention strategy tailored for each ward is likely to be most effective to support comprehensive harm prevention by nurses.

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AUTHORS' CONTRIBUTIONS

Bernice Redley and Alison M. Hutchinson designed the study. Bernice Redley collected, analysed and interpreted the data and drafted the manuscript. Alison M. Hutchinson and Natalie Taylor verified the data analyses and were major contributors in writing and editing the manuscript. All authors read and approved the final manuscript.

PEER REVIEW

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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SUPPORTING INFORMATION

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