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Title: Self-reported confidence in patient safety knowledge among Australian undergraduate nursing students: a multi-site cross-sectional survey study

Abstract

Background

Patient safety is critical to the provision of quality health care and thus is an essential component of nurse education.

Objective

To describe first, second and third year Australian undergraduate nursing students' confidence in patient safety knowledge acquired in the classroom and clinical settings across the three years of the undergraduate nursing program.

Design

A cross-sectional online survey conducted in 2015.

Setting

Seven Australian universities with campuses across three states (Queensland, New South Wales, South Australia).

Participants

A total of 1319 Australian undergraduate nursing students.

Methods

Participants were surveyed using the 31-item Health Professional Education in Patient Safety Survey (H-PEPSS). Descriptive statistics summarised the sample and survey responses.

Paired t-tests, ANOVA and generalized-estimating-equations models were used to compare responses across learning settings (classroom and clinical), and year of nursing course.

Results

Participants were most confident in their learning of clinical safety skills and least confident in learning about the sociocultural dimensions of working in teams with other health professionals, managing safety risks and understanding human and environmental factors.

Only 59% of students felt confident they could approach someone engaging in unsafe practice, 75% of students agreed it was difficult to question the decisions or actions of those with more authority, and 78% were concerned they would face disciplinary action if they made a serious error. One patient safety subscale, *Recognising and responding to remove immediate safety risks*, was rated significantly higher by third year nursing students than by first and second year students. Two broader aspects of patient safety scales, *Consistency in how patient safety issues are dealt with by different preceptors*, and *System aspects of patient safety are well covered in our program*, were rated significantly higher by first year nursing students than by second and third year students. One scale, *Understanding that reporting adverse events and close calls can lead to change and can reduce recurrence of events*, was rated significantly higher by third year students than first and second year students.

Conclusions

In order are to achieve meaningful improvements in patient safety, and create harm free environments for patients, it is crucial that nursing students develop confidence communicating with others to improve patient safety, particularly in the areas of challenging

poor practice, and recognising, responding to and disclosing adverse events, including errors and near misses.

Keywords: Adverse events; Clinical learning; Close calls; Nursing education; Patient safety; Student perceptions

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Introduction

Patient safety continues to be a serious and significant international public health issue (Waterson 2014). Increasing awareness of the complexity associated with reducing adverse events and harm to patients has resulted in a focus of concern and attention on patient safety among health care providers and health profession educators globally (World Health Organisation [WHO] 2009a). Adverse events are defined as unintentional injury or complication resulting from an episode of health care, and include medication errors, falls resulting in injuries, pressure injuries, problems with medical devices and infections (WHO 2009b). Estimates of current prevalence vary, but it is widely considered that up to 10% of hospitalised patients suffer some form of unintentional harm or an adverse event; with most deemed preventable (WHO 2009b, D'Armour *et al.* 2014, NHS Scotland 2016, AIHW, 2016).

Recognition of health care environments as being potentially harmful to patients has been acknowledged as a problem for many years. Writing in 1859, Florence Nightingale noted that “It may seem a strange principle to enunciate as the very first requirement in a hospital – that it should do the sick no harm” (Nightingale 1859). In the United States (US), preventable hospital errors have been identified as the third leading cause of death (Makary & Daniel 2016). The US National Patient Safety Foundation (NPSF 2015) recently noted that ‘the health care system continues to operate with a low degree of reliability, meaning that patients frequently experience harms that could have been prevented or mitigated’. In the Australian context, a study of Victorian hospitals in 2003-04 reported a rate of 7% of episodes of care had a least one adverse event, increasing the length of hospital stay and risk of death, and

costing over \$430 million annually, representing nearly 16% of expenditure on direct hospital costs (Ehsani *et al* 2006). Healthcare providers have a responsibility to ensure that the care provided to patients is safe and aligns with best practice and established clinical standards (Australian Commission on Safety and Quality in Healthcare, 2010).

Many adverse events experienced by patients are associated with nursing care, defined as the services provided by nurses for the benefit of the patient (Dubois *et al.* 2013). Given their proximity to patients and centrality to patient care, nurses fulfil a vital safety role and have the potential to detect errors, omissions and risk before harm eventuates.

Organisational conditions such as staffing, organisation of work and the work environment can affect how nursing care is provided and is a critical factor in determining patient outcomes (Dubois *et al* 2013). Care provision in terms of nursing inputs and interventions are linked to safety-related outcomes including falls, medication administration errors and pressure injuries (Dubois *et al* 2013). Patient safety strategies are continuously designed, tested and implemented in clinical settings, and in this process, the role of nurses is considered a key factor and their patient safety education has become fundamental (Alfredsdottir & Bjorndottir 2008, Slater *et al* 2012, Mansour 2014). The capacity to give voice to concerns is a fundamental component of this patient safety function (Fagan, Parker & Jackson 2016).

It is important that graduate nurses hold sufficient knowledge to recognise potential safety risks and the confidence to protect patients from potential harms or errors and avoidable injuries. Thus, nurse education providers have a critical role in the development of the skills, knowledge and attitudes required of graduates to ensure they are well prepared to provide a safe environment for the patients in their care (Mansour 2013, Francis 2013). Nursing curricula need to be designed to ensure that graduates are prepared to contribute to safe, harm

free clinical environments (Ginsburg *et al.*, 2012, Cooper 2013). However, it has been reported that nursing students may lack the required knowledge and skills to enhance patient safety and to effectively manage errors should they occur (Ardizzone *et al.* 2009); and that nursing curricula lacks sufficient emphasis on patient safety (Attree *et al.* 2008).

A number of investigations have explored patient safety knowledge and skills of undergraduate nursing, medical and pharmacy students and the practice of beginning level health professionals (Duhn *et al.* 2012, Ginsburg *et al.* 2013, Doyle *et al.* 2015, Stevanin *et al.* 2015). These studies have found students commonly encounter adverse events while undertaking clinical experience and that many believe the clinical environment to be unsafe (Stevanin *et al.* 2015). Deficits in the socio-cultural aspects of patient safety education and in communication and teamwork in particular have also been described (Duhn *et al.* 2012, Ginsburg *et al.* 2013, Doyle *et al.* 2015). Socio-cultural aspects of patient safety relate to working in teams with other health professionals for patient safety, effective communication for patient safety, managing safety risks, recognising, responding to and disclosing adverse events, and contributing to a wider organisational culture of patient safety.

A disconnect between classroom learning and clinical practice exists. Ginsburg *et al.* (2012) investigated the patient safety competence of newly graduated Canadian nurses, pharmacists and physicians. Using the Health Professional Education in Patient Safety Survey (H-PEPSS), they found that while all groups reported confidence in their communication skills, greater confidence was reported within the clinical as opposed to the classroom setting (Ginsburg *et al.* 2012). Nurses were the exception. They reported a decrease in confidence in their teamwork skills when moving from the classroom to the clinical setting (Ginsburg *et al.* 2012). These researchers concluded education on patient safety should be strengthened in undergraduate curricula in the Canadian setting, but little is known about the development of nursing students' patient safety knowledge and confidence in the Australian setting (Ginsburg

et al. 2012).

It is important to understand the extent of patient safety knowledge among undergraduate nursing students in order to assess the effectiveness of nurse education and to assess the extent to which we are teaching student nurses to provide safe patient care (Ginsburg *et al.*, 2012).

We were unable to locate any studies that link nurses' perceptions of low patient safety knowledge and confidence to increased adverse events, or high patient safety knowledge and confidence to lower adverse events, thus this is an area requiring further study. Building on Bandura's (1988) theory of self-efficacy, high confidence in knowledge and skills can motivate nurses to greater efforts to persist with and complete challenging tasks, and take a wider view of a task such as patient safety. Confident individuals, or those with high self-efficacy, believe that their actions and decisions shape events. Thus, high patient safety confidence should lead to greater effort in patient safety and greater persistence in the face of challenges and obstacles to safe patient care.

Aim

The aim of the study was to describe the perceptions of first, second and third year Australian undergraduate nursing students regarding their confidence in patient safety knowledge, and the differences, if any, in the patient safety knowledge acquired in the classroom and clinical setting, and across the first, second and third academic year.

The objectives of this study were to:

- (1) describe and compare Australian nursing students' perceptions of confidence in patient safety knowledge acquired in the classroom and clinical settings;

- (2) describe and compare the development of Australian nursing students' perceptions of confidence in patient safety knowledge across the three years of the nursing program; and,
- (3) describe and compare Australian nursing students' confidence in speaking up about patient safety.

Methods

Design

This multi-site, cross-sectional study used a web-based survey with a sample of first, second and third year undergraduate nursing students enrolled in seven universities with campuses across three Australian states (Queensland, New South Wales, South Australia).

Participants

Fourteen Australian university Schools of Nursing (or equivalent) were invited to participate in this multi-site study as research partners; seven agreed to participate; three regional and four urban universities. One to two School of Nursing staff members at each university volunteered to be a research partner and a point-of-contact at their university.

All students enrolled in the undergraduate nursing program at each of the seven participating universities were eligible to participate. First, second and third year undergraduate nursing students were recruited. The inclusion criteria were students enrolled in the undergraduate nursing program at each of the seven universities.

Recruitment and data collection

An email invitation to participate in the survey was sent by an independent third party at each university (who was not a nursing lecturer or tutor) to all undergraduate nursing students. The

invitation email described the study, described what participation involved for the student, and clearly stated that participating in the study and completing the questionnaire was voluntary. A link to the online questionnaire was included in the email. The online questionnaire (hosted by Survey Monkey) was made available to all nursing students of each of the participating universities between September and December 2015. The first page of the online questionnaire was a participant information sheet that gave more information about the study, and named all research partner universities. At this time, to encourage participation in the study, participants were told that they would be entered into a draw to win a gift card if they supplied a telephone number or email address. They were also informed that this contact information would be stored separately from the questionnaire data so as to ensure anonymity and confidentiality of the responses.

Data collection instrument

The Health Professional Education in Patient Safety Survey (H-PEPSS) tool, originally developed and validated by Ginsburg *et al.* (2012, 2013), was used for data collection. The instrument was designed to measure health professionals' and students' knowledge and confidence in six key areas of patient safety (16 items): *Culture of safety* (3 items), *Working in a team with other health professionals* (3 items), *Communicating effectively* (3 items), *Managing safety risks* (3 items), *Understanding human and environmental factors* (2 items), and *Recognising, responding to and disclosing adverse events and close calls* (2 items). The H-PEPSS also contains a *Confidence on clinical skills dimension* and *Broader aspects of patient safety* (7 items), and *Comfort in speaking up about patient safety* (4 items). Items are scored on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The H-PEPSS was chosen for the current study because the instrument is suited for use with a wide range of health professionals, for those - recently completed or - nearing completion of

their training (Ginsburg *et al.* 2012), and for undergraduate nursing students (Stevanin *et al.* 2015).

The patient safety section of the H-PEPSS measures two dimensions of patient safety; knowledge developed in the classroom and knowledge developed in the clinical training experience. Respondents answer each question separately for the classroom and clinical setting. The internal consistency documented for this study (classroom $\alpha = 0.885$; clinical training $\alpha = 0.892$) was higher than reported for the original study (α 0.81 to 0.85, Ginsburg *et al.* 2012).

Additional questions were asked about age, gender, previous healthcare experience, and year of nursing degree. If students were enrolled in subjects across more than one year of the course, they were instructed to nominate the highest year in which they were studying. The questionnaire took approximately 10-15 minutes to complete.

Ethical considerations

The study was approved by the Human Research Ethics Committee at each participating university.

Data analysis

Demographic data were summarised using descriptive statistics. Mean (SD) patient safety scores for each patient safety area were calculated by averaging the items in each area.

Differences were evaluated using parametric tests according to the normally distributed nature of the data. Paired *t*-tests were performed to assess for significant differences between classroom and clinical scores. Cases with missing data were excluded from each analyses.

Cohen's effect size was calculated for statistically significant pairwise comparisons. Broader aspects of patient safety and speaking up scores (range 1-5) were categorised into agree/strongly agree (4-5), and neutral/disagree (1-3) and reported descriptively. Patient

safety scores were compared between year of nursing course groups by using generalized-estimating-equations (GEE) models to account for the clustered nature of the data. GEE was used because it does not assume independence between observations. GEE assumptions are: the responses are clustered and cases are not independent, and homogeneity of variance does not need to be satisfied. Because individual responses from one university will not be “independent” of each other, some statistical correlation is expected. It is important to adjust for clustering effects otherwise the variances of between-cluster comparisons may be underestimated. Model fit is not tested for GEE because it is an estimating procedure; there is no likelihood function. GEE goodness of fit values can be used to compare GEE models for model selection but not to determine model fit (Hardin & Hilbe, 2003). To calculate the mean scores for each year group, responses were assumed to be normally distributed and an identity link function was specified. The GEE models provided adjusted means and standard errors, and *P* values (obtained using the Wald statistic), which were used to compare differences between groups. The differences between year groups were further evaluated after adjustments were made for potential confounders such as age, sex and previous healthcare experience. Alpha of < 0.05 was considered statistically significant. Data were analysed using SPSS v23 (IBM SPSS, Armonk, NY).

Results

Overall, 1319 valid survey responses were received, giving an overall response rate of 11% across all universities. Individual response rates are shown in Table 1.

Table 1 Response rates at each university

University	No. of students	No. of completed	Response rate

		questionnaires	
University 1	3746	417	11.1%
University 2	146	146	100%
University 3	627	98	15.6%
University 4	2101	256	12.2%
University 5	2156	217	10.1%
University 6	1422	92	6.5%
University 7	2126	91	4.3%
		Overall response rate	10.68%

Overall, 454 first year students, 433 second year students, and 426 third year students completed questionnaires (six persons did not nominate their current year in the nursing degree). Demographic characteristics of the study sample are shown in Table 2. Previous healthcare experience included working in a nursing home, as a nursing assistant or as an Enrolled Nurse - a second level nurse who provides nursing care, working under the direction and supervision of a Registered Nurse.

Table 2 Demographic characteristics of nursing student participants

	Year 1 (<i>n</i> = 454)	Year 2 (<i>n</i> = 433)	Year 3 (<i>n</i> = 426)
Age (mean (SD))†	26.8 (9.4)	29.1 (9.7)	30.6 (11.2)
Gender (<i>n</i> (%))†			
Female	407 (89.6)	382 (88.2)	383 (89.9)
Male	47 (10.4)	51 (11.8)	43 (10.1)
Previous Healthcare	201 (44.3)	272 (62.8)	300 (70.4)

Experience (<i>n</i> (%))†			
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†6 persons did not nominate their course year

Confidence in patient safety knowledge

Nursing students were most confident in what they were learning about clinical safety skills and effective communication for patient safety (Table 3). They were least confident in what they were learning about working in teams with other health professionals, managing safety risks, understanding human and environmental factors that contribute to safety, and recognising and responding to remove immediate risks of harm. The statistically significant differences in mean clinical safety skills and culture of safety between classroom and clinical settings had small to moderate effect sizes, thus indicating that classroom learning increased confidence in these dimensions to a greater extent than the clinical setting. For the other statistically significant differences in patient safety dimensions, the effect size was small and, therefore, likely of low clinical significance. In terms of the proportion of respondents who were confident about what they were learning, close to 80% or more of respondents ‘agreed’ they were confident in what they were learning about clinical safety, communicating effectively for patient safety, and a culture of safety (a supportive environment to speak up about safety concerns). Furthermore, over 60% of nursing students agreed they were confident in what they were learning about the other four sociocultural aspects of patient safety.

Table 3 Classroom and clinical patient safety scores – paired *t*-tests

							Agree/strongly agree	
Patient safety areas	Setting	N	Mean	SD	Effect size	Paired t-test	n	%

						P value		
Culture of safety	Class	1084	4.2	0.69	0.25	< 0.001	951	88
	Clinical	1087	4.0	0.83			859	79
Working in teams with other health professionals	Class	1200	3.8	0.83	0.16	< 0.001	824	69
	Clinical	1197	3.7	0.86			739	62
Communicating effectively	Class	1170	4.3	0.69	0.18	< 0.001	1036	88
	Clinical	1166	4.2	0.74			995	85
Managing safety risks	Class	1141	3.9	0.75	-0.04	0.138	877	77
	Clinical	1139	4.0	0.72			904	79
Understanding human and environmental factors	Class	1127	3.9	0.89	-0.02	0.441	791	70
	Clinical	1122	4.0	0.87			807	72
Recognise and respond to remove immediate risks	Class	1113	4.0	0.78	-0.09	0.001	822	74
	Clinical	1109	4.1	0.76			869	78
Clinical safety skills	Class	1240	4.5	0.64	0.25	< 0.001	1159	93
	Clinical	1246	4.3	0.73			1076	86

Confidence in knowledge of broader aspects of patient safety and comfort when speaking up

Most nursing students agreed that the broader aspects of patient safety in health professional education were well covered in their education course. The majority of nursing students agreed that their scope of practice is clear (84%), reporting can lead to change and improvement (79%), patient safety is well integrated in overall training (87%), and clinical aspects of patient safety (e.g., hand hygiene, transferring patients, medication safety) are well covered in their program (91%). In a number of areas, nursing student agreement level (agree or strongly agree) was relatively low (below 70%): consistency in how patient safety issues are dealt with by different preceptors (69%), sufficient opportunity to learn and interact with

members of interdisciplinary teams (65%), and ‘system’ aspects were well covered in the program (54%).

Only 59% of nursing students felt they could approach someone engaging in unsafe practice, and 75% of nursing students agreed it is difficult to question the decisions or actions of those with more authority. The majority (78%) worry they will face disciplinary action if they make a serious error.

Results of GEE analyses

Table 4 displays response comparisons between patient safety subscales and student nurse groups based on year of study. Two subscales, *Managing safety risks*, and *Human and environmental factors*, were scored significantly higher by first-year students than by second and third-year students in the classroom setting. One scale, *Recognising and responding to remove immediate safety risks*, was scored significantly higher by third-year students than by first and second-year students in the classroom setting, and significantly higher by second and third-year students than by first-year students in the clinical setting. Only the difference in the *Recognising and responding to remove immediate safety risks* subscale in the classroom setting remained significant after adjustments for potential confounders.

Table 5 displays response comparisons between broader patient safety and speaking up for patient safety subscales and student nurse groups based on year of study. Two of the broader aspects of patient safety scales, *Consistency in how patient safety issues are dealt with by different preceptors*, and *System aspects of patient safety are well covered*, were scored significantly higher by first-year students than by second and third-year students. One broader aspect of patient safety scale, *Understanding that reporting adverse events and close calls can lead to change*, was scored significantly higher by third-year students than first and second-year students. These differences remained significant even after adjustments were

made for potential confounders such as age, sex and previous healthcare experience. One confidence in speaking up about patient safety scale, *It is difficult to question the decisions or actions of those with more authority*, was scored significantly lower by first-year students than second and third-year students. This difference did not remain significant after adjustments for potential confounders.

Discussion

Nursing students in this study were fairly confident in their clinical safety skills and in effective communication for patient safety, but less confident in working in teams and speaking up for patient safety. Less than 60% of nursing students felt they could approach someone engaging in unsafe practice, and over 75% of nursing students agree it is difficult to question those with more authority and are concerned they will face disciplinary action if they make a serious error. These findings provide evidence for the need to ensure students have educational opportunities to develop these skills. Given nurses have a critical role to play in reducing harm to patients and in promoting patient safety, it is vital that nursing students develop confidence and competence communicating with others to improve patient safety, particularly in the areas of challenging poor practice, and recognising, responding to and disclosing adverse events, including errors and near misses. Additionally, first-year students reported more confidence in relation to patients safety issues than second and third-year students, suggesting either first-year students have less insight into their skills and abilities or that more experienced students have a better understanding of what patient safety is about and what is needed to ensure they practice in a 'safe' manner. Patient safety issues such as recognising and responding to remove immediate safety risks, and a better understanding that reporting adverse events and close calls can lead to change and reduce recurrence of events, appear to develop over time and with greater clinical experience.

Similar to this study Duhn *et al.* (2012) and Lukewich *et al.* (2015) also found that students were more aware of the clinical safety aspects of patient safety provided in both classroom and clinical settings as opposed to the sociocultural aspects of ensuring patient safety. Clinical aspects include tangible tasks such as hand hygiene and medication safety. Duhn *et al.* (2012) suggest these results may reflect students' familiarity with these topics due to public health campaigns or that the curriculum reinforces clinical safety rather than sociocultural issues of patient safety. Study findings of low rates of student agreement with opportunities to learn and interact with interdisciplinary team members supports the argument that tangible clinical tasks are more strongly reinforced in nursing student education as compared to strategies for negotiating difficult conversations with other health professionals. As nursing students progress through their degree, their levels of knowledge and expected autonomy in the workplace increase. As a consequence of their increased awareness, students are also more likely to recognise a gap between their theoretical knowledge and their ability to deploy this knowledge in clinical settings (Ginsburg *et al.* 2013, Steven *et al.* 2014, Stevanin *et al.* 2015). In this study such a theory-practice gap is evidenced by findings, which indicate that first-year nursing students are more confident than second and third-year students in aspects such as scope of practice, systems aspects of patient safety, and perceptions of consistency in how different preceptors deal with safety issues. A study conducted with nursing students enrolled in a Bachelor of Nursing Science program in Canada (Duhn *et al.* 2012) found similar results using the same H-PEPSS measurement tool. The current study findings are consistent with previous literature which reports that rate of non-disclosure or failure to voice concern about errors or events pose patient safety risks (Castel *et al.* 2015). Participants in this study demonstrated reluctance to voice concerns that can have serious implications for nurse and patient safety. For nurses, safety voice is a form of discretionary voice (Burke 2013) that is exercised when individuals discern a problem or

concern that they consider needs addressing. Nurses are tasked with voicing concern about technical safety issues as well as concerns about team care, professional behaviours, or lapses they may witness involving other clinicians. Enacting discretionary voice behaviour about safety concerns may challenge the status quo and established power dynamics, and is more likely to occur in blame-free work environments that support reporting and engagement with safety improvement (Dekker & Breakey 2016). Environments characterised by hierarchical power dynamics, rigid role boundaries and disrespect are recognised to undermine nurses' safety voice (Rosenstein & O'Daniel 2008, Hutchinson & Jackson 2013). Despite concerns for patient safety, silence or inaction is more likely in unsupportive environments (Dankoski *et al.* 2014, Hutchinson & Jackson 2014).

This potential for team dynamics to exert a negative influence on nurses' safety voice was evident when nursing students reported their compliance with unacceptable practices in order to avoid disrupting their sense of belonging in the nursing team (Levett-Jones & Lathlean 2009). A small-sample study of graduate nurses also reported that disruptive behaviours from other nurses was an important contributing factor to the medication errors they made and affected their confidence in raising concerns (Sahay *et al.* 2015). These earlier studies resonate with findings from the current study in which three quarters of respondents reported authority gradients made it difficult for them to raise concern about unsafe practice.

In contemporary nursing settings clinical leadership behaviours are significant contributing factors in shaping how clinical care environments function (Mannix *et al.* 2013), including nurses' decisions to engage in safety voice behaviours. For student nurses practicing in clinical settings, clinical leaders are those nurses functioning in supervisory roles during their placements, including nurses employed as clinical teachers/preceptors and practice staff functioning as mentors (Jackson *et al.* 2011). Student nurses learn and model their nursing practice from these nurses (Steven *et al.* 2014). Findings from this current study indicate that

it is important for universities to foster role-modelling behaviours in staff that guide and encourage student nurses to raise concerns about patient safety. This requires clinical leaders to provide moral support to students nurses (Curtis 2014), and practice consistently with a strong moral compass (Mannix *et al.* 2015), both in the clinical setting and the classroom.

The greater proportion of second and third-year students in this study who agreed that it is difficult to question the decisions or actions of those with more authority is consistent with previous research that reports student nurses can lose their confidence to speak out for patient safety when in the clinical learning environment; which has been (at least partially) attributed to workplace cultures that are demeaning of nursing (Ginsburg *et al.* 2013).

Effective teaching and learning strategies, that include steps to ensure nurses have the confidence to speak out, are necessary if we are to achieve meaningful improvements in patient safety, and create harm free environments for patients (Fagan, Parker & Jackson 2016). However, there is little in the international literature that offers concrete examples to follow. Much like the current study, the majority of available research is evaluative. However, many researchers do offer advice and recommendations for further research. In response to evaluating student confidence and competence in ensuring patient safety, many studies call for a critical examination of curricula to ensure gaps in safety content are identified and rectified, and there is a call for core units on patient safety to be included and for students to be offered assessment opportunities to demonstrate confidence and competence (Mansour 2013, Tregunno *et al.* 2014, Lukewich *et al.* 2015, Weatherford & Viveiros 2015). Tregunno *et al.* (2014) identified that faculty may not have the knowledge required to integrate a sustained patient safety focus. Their recommendations included viewing current curricula to find appropriate places to embed patient safety content and planning to implement units of study dedicated to a patient safety agenda in future curricula; incorporating assessment of patient safety competencies; the development of entry to practice patient safety competency

standards; and, having a faculty member to act as a curricula champion to embed patient safety content.

Limitations

This study has several limitations worth noting. Selection bias is a limitation of cross sectional studies as probability sampling is seldom used (Büettner & Muller 2011). While we recruited participants from seven universities, the response rate was low, which has implications for the representativeness of the sample and generalizability of the findings. Web surveys are notorious for low response rates, but never the less, the sample size was large and statistically robust. However, non-response is a particular problem affecting cross-sectional studies and can result in bias of the measures of outcomes when the characteristics of non-responders differ from responders. Further, as the study incorporated self-report measures the issue of social desirability may have affected the results. Social desirability may have resulted in patient safety knowledge and confidence being under or over reported by the responders. Being a cross-sectional study, students from different academic years were compared. Future research should study a single cohort progressing from first to third academic year to confirm, or not, the findings from this study. These limitations should be addressed in future research.

Conclusions

Patient safety voice develops and strengthens over nursing students' course of study and clinical placements, however it is concerning that a large proportion of students express difficulty in questioning the decisions or actions of those in authority positions and concerns about disciplinary action if errors are made. The integration of patient safety into nursing

curricula and resulting teaching and learning strategies to facilitate student knowledge and competence is still in its infancy. Recommendations from this study include making patient safety the keystone of undergraduate nursing curriculum development in both classroom and clinical settings. This focus also needs to sustain through into graduate nurse programs, with a particular emphasis on effectively deploying high-level interprofessional communication skills.

Recommendations

Nurse educators have a responsibility to ensure that graduating nurses are equipped with the necessary skills, knowledge and confidence to report errors and near misses in health care; and are encouraged to build their own knowledge of contemporary approaches to ensuring continuous quality improvement is achieved for quality patient outcomes. Curricula must include a patient safety agenda, in particular there is a need to design strategies that can empower students to speak up when patient safety is being compromised. A mandate to include meaningful interprofessional learning experiences and build student's leadership and communication skills is just the beginning. This work also needs to be translated to the clinical setting where varying attitudes regarding patient safety and student advocacy, further impinge on student's ability to speak up safely. Nursing faculty have a responsibility to support student advocacy in clinical practice and offer opportunities to debrief about clinical experiences regarding patient safety issues. Furthermore, there is a need for research to highlight any associations between adverse events and nurse perceptions of their patient safety knowledge.

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