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The safety of nurses during the restraining of aggressive patients in an acute psychiatric unit

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KEY WORDS

Restraining, physical assault, aggressive patients, safety.

ABSTRACT

Objective

The aim of the study was to describe patterns of injuries sustained by nurses during the restraining of aggressive patients and to identify factors in the restraining process that can be modified to improve the safety of nurses during restraining.

Design

Within-method triangulation was used in this study and involved two quantitative data collection methods.

Setting

An adult acute psychiatric unit in Victoria, Australia.

Subjects

Seven male and twenty-six female nurses.

Main outcome measures

The outcome measures are patterns of injuries and ways of reducing injuries.

Results

Incident reports showed more than half of all injuries occurred in the afternoon shift and during the holding stage of restraining. Eighty percent of the injured nurses sustained multiple injuries. Questionnaire results showed that restraining was associated with an estimated increased risk of being injured of 25% (RR = 1.25, 95% CI= 0.97 to 1.61, $p > 0.05$). The proportion of injuries was higher among female nurses (52.38%) compared with male nurses (28.57%), (RR=0.51, 95% CI = 0.15 to 1.74, $p > 0.05$). Lack of group co-ordination was perceived as the main contributor to injury. Introducing easier restraining techniques and increasing the training period were identified as ways that might improve the safety of nurses.

Conclusion

Most injuries occurred at the holding stage of restraining and in the afternoon shift. Many participants sustained multiple injuries and most of the injuries were caused by physical assaults. There is need for improving group coordination during restraining to increase the safety of nurses.

INTRODUCTION

The injuries sustained by nurses in mental health services is a global problem, and there is a worldwide concern for the safety of nurses (Duxbury and Paterson 2005; Erdos and Hughes 2001). While the core business of nursing is to improve patients' health, occupational health and safety of the people who nurse them also needs to be promoted and protected. Mahoney (1991) states that assaults of nurses by patients result in emotional responses including anger, anxiousness, sense of helplessness, loss of control and increased irritability. Physical injuries sustained from assault may heal quickly, but the emotional trauma lasts longer (Bruser 1998). This study was designed to identify ways of reducing injuries to nurses during restraining thereby promoting physical and mental health of nurses.

LITERATURE REVIEW

The use of restraining in hospitals

'Control and Restraint' is the most commonly taught manual technique for the management of aggression and has existed in mainstream psychiatry for approximately 15 years, yet there is little research on its safety and effectiveness (Southcott and Howard 2007). Leadbetter (1995) identified four components used when employing physical restraint, namely: the immobilisation of the subject through the use of body weight and strength; the restriction of limb movement by employing some form of hold; keeping the subject in an off-balance position; and the use of 'reasonable force'. The mental health unit which is the subject of the current study uses the components identified by Leadbetter (1995) for controlling and restraining patients.

The authors in the current study divided the restraining process into three stages in order to facilitate the description of patterns of injuries. The first stage is the restraint initiation, where nurses move towards restraining the patient. The second stage is holding, where nurses maintain the patient in an immobilised state using special holds (called 'locks'). The last stage is exit, where nurses loosen their hold on the patient and move away from the patient.

Patterns of nurses' injuries during restraining

It appears that injury of staff during restraining is not uncommon, although prevalence estimates vary. A study by Graham (2002) showed that in 81 episodes of restraint there were 13 episodes (16%) which resulted in abrasions to either patients or staff, and a study by Carmel and Hunter (1989) revealed that two thirds of staff members were injured during containment procedures and most of them sustained injuries to the body extremities.

Factors associated with nurses' injuries during restraining

Dowson et al (1999) revealed that staff injured whilst restraining patients had not been trained in restraining. Wright (2003) asserts that staff and patient injuries during restraining are caused by poorly executed and ill-defined restraining techniques. Southcott and Howard (2007) demonstrated that gender had no effect on the safety of restraining. This might be explained by the fact that female and male nurses receive the same training in restraint.

Ways of reducing injuries to nurses during restraining

The Australian Nursing Federation (ANF) (Victorian Branch) provides education to nurses on the prevention of injuries and management of violent incidents by conducting seminars on prevention of violence against nurses (ANF Victorian Branch 2009). ANF (Victorian Branch) endorsed a zero tolerance policy for occupational violence and aggression towards its members (ANF Victorian Branch 2006). The policy helps to prevent injuries to nurses because it does not accept occupational violence and aggression (ANF Victorian Branch 2006).

As there is a paucity of research conducted amongst nurses about injuries sustained during restraining of patients there is clearly a need for more study on this subject.

AIM OF THE STUDY

The aim of the study was to describe patterns of injuries sustained by nurses during restraining of aggressive patients and to identify factors in the restraining process that can be modified to improve the safety of nurses during restraining, in a mental health acute ward in Victoria, Australia. The specific objectives were:

1. To identify patterns of injuries to nurses sustained during the restraining procedure.
2. To explore nurses' perceptions of factors associated with their injuries during the restraining procedure.
3. To explore the nurses' perceptions on ways of improving their safety during the restraining procedure.

METHODS

Design

Within-method triangulation was used in this study and involved two quantitative data collection methods. Within-method triangulation "is used when the phenomenon being studied is multidimensional. For example two or three different quantitative instruments might be used to measure the same phenomenon. Conversely, two or more qualitative methods can be used" (Burns and Grove 2005, pp.226). Within-method triangulation was appropriate for this study because the phenomenon being studied was multidimensional and one method of data collection could not completely answer the research question.

Ethical issues

Approval from The Faculty Human Ethics Committee at La Trobe University, Faculty of Health Sciences (reference: FHEC09 / 244) and from the hospital ethics committee (Project number: 09280B) was obtained prior to conducting of this study. Participants were informed that they were not obliged to participate in the study and that non-participation in the study would not affect their relationship with the researchers in any way.

Setting and sample

The study was conducted in an acute inpatient adult psychiatric unit in Victoria, Australia. The 25-bed unit is in one of the hospitals of Victoria's largest public healthcare provider. The two eligibility criteria for participation in the study were: being a nurse in a psychiatric unit and being eligible to restrain aggressive patients. All 33 nurses who work in the unit were provided with details of the study because they were all eligible to participate. As the eligible study population was small any other method of sampling would have resulted in sampling error and selection bias. Potential participants included seven male and twenty-six female nurses with an age range of 19 to 62 years. Two consecutive weekly meetings were used to recruit participants. Participant information sheets were distributed during the meetings and also placed in the mail pigeon-holes of those who did not attend the meeting. A recruitment advertisement was also displayed on the nurses' notice board.

Data collection

There were two data collection phases. The first was through the analysis of incident reports; the second was through a questionnaire.

Incident reports

Data on patterns of injuries to nurses sustained between January 2008 and December 2009 were retrieved from Incident Reports stored in the hospital "RISKMAN" database. Data items collected included: time of injury; type of injury; causes of injuries; gender; and the stage of restraining procedure when injury took place. The incident reports were de-identified to ensure the anonymity of nurses and patients.

Questionnaire

The questionnaire was designed to collect data about the nurses' perceptions of factors associated with their injuries, patterns of nurses' injuries, and on ways of improving staff safety during the restraining procedure, and also included questions generated through the RISKMAN review of incident reports. The researcher distributed the consent form, withdrawal of consent form, and questionnaires to the participants to complete on their own time. Anonymity of all participants was maintained throughout the study.

Reliability and validity

Incident reports are accepted as valid and reliable instruments in Australia and worldwide as they have been used to generate injury surveillance data for many years, including data about injuries to patients and nurses in hospitals. A pilot study was carried out on a group of nine Master of Public Health students during a thesis workshop in order to determine face validity and reliability of the questionnaire. Validity was also established by use of triangulation of incident reports and questionnaire.

Data analysis

Data were analysed using the statistical package Stata/IC 10.0. Descriptive statistics were used to analyse data. Fisher's exact test was used to test the association between variables. A statistical significance level of $p < 0.05$ was used. A content analysis was undertaken to analysis qualitative responses from open ended questions.

FINDINGS

Findings from incident reports

Patterns of injuries

Twenty-two incidents of injuries to nurses while restraining aggressive patients were identified in RISKMAN. Twenty-one incidents of injuries were caused by physical assaults and only one had an unspecified cause. The review also revealed that six nurses sustained upper limb injuries; five sustained head injuries, see Table 1. Most injuries occurred during the afternoon shift (twelve), followed by morning (seven) and night shift (three). The analysis of injuries by restraining stages demonstrated that holding stage had the highest frequency of injuries (54.55%), followed by initiation stage (27.27%) and exit stage (18.18%).

Table 1: Types of injuries by causes of injuries (n=22)

| Causes of injuries | Types of injuries | | | | | | | Total |
|-----------------------------|-------------------|-------|-------------|-------------|---------|--------------|----------|-------|
| | Head | Chest | Upper limbs | Lower limbs | Abdomen | Unclassified | Multiple | |
| Physical assault by patient | 5 | 1 | 6 | 3 | 1 | 2 | 3 | 21 |
| Unspecified cause | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Total | 5 | 1 | 6 | 3 | 1 | 3 | 3 | 22 |

Findings from the questionnaire

Of the 33 questionnaires distributed thirty were returned, giving a response rate of 90.9%. Three participants did not participate in restraining. Of the twenty-seven participants who were involved in restraining, twenty-four were trained in restraining. Table 2 summarises the characteristics of the participants.

Table 2: Characteristics of nurse participants

| Characteristics | N=30 Group n | Injuries reported | No injuries reported | Relative risk, 95% confidence limits, 2-sided Fisher's exact test |
|---|-----------------|----------------------|----------------------------|--|
| Sex | | | | RR = 0.51, (95% CI = 0.15 to 1.74) p >.05 |
| Male | 7 | 2 | 5 | |
| Female | 23 | 13 | 10 | |
| Age group | | | | |
| < 25 years | 4 | 1 | 3 | |
| 26 to 35 | 10 | 6 | 4 | |
| 36 to 45 | 4 | 3 | 1 | |
| 46 to 55 years | 10 | 4 | 6 | |
| > 55 years | 2 | 1 | 1 | |
| Involved in restraining | 27 | 15 | 12 | RR = 1.25 (95% CI= 0.97 to 1.61) p > 0.05 |
| Not involved in restraining | 3 | 0 | 3 | |
| Refresher course | | | | RR = 6, (95% CI = 0.91 to 39.31) p < .05 |
| Attended refresher course (21) | 21 | 14 | 7 | |
| Had not attended refresher course (9) | 9 | 1 | 8 | |
| Use of recommended technique | | | | RR = 0.56, 95% CI = 0.74 to 4.15 |
| Did use technique | 11 | 4 | 7 | |
| Did not use technique (Non-response) | 17 2 | 11 | 6 | |

Patterns of injuries**Participants injured while restraining patients**

Fifteen (55.56%) participants reported that they had been injured whilst restraining. Restraining was significantly associated with an estimated 25% increased risk of being injured. Eleven participants sustained injuries through physical assaults; seven through falls and two participants did not know how they sustained injuries. Some participants sustained injuries from both physical assaults and falls. Twelve participants sustained multiple injuries; two had back injuries and only one sustained abrasions.

Participants' injuries by gender and age

The proportion of injuries was higher amongst female compared with male participants. Being male was associated with an estimated reduced risk of being injured of 49%, although this was not statistically significant. Participants aged 36 to 45 years had the highest proportion (75%) of participants who were injured compared with other age groups. Participants aged 25 years and below had the lowest proportion (25%) of participants who were injured.

Participants' injuries by restraining stages

The holding stage of restraining had the highest frequency of injuries (62%), followed by initiation stage (33%) and exit stage (5%).

Participants' injuries by refresher course

Fourteen out of twenty-one participants who attended the refresher course in restraint training were injured and only one out of nine of those who did not attend a refresher course were injured. Attending refresher course was associated with an estimated increased risk of being injured of six fold.

Participants' injuries by use of recommended restraining technique

Recommended techniques were commonly not used when restraining, and injuries were much less common in those who did use the correct technique with an estimated reduced risk of being injured of 44%. Out of nine participants who gave their reasons for not using recommended restraining technique, five recorded that the technique was not applicable; two forgot the technique and the other two recorded that they forgot the technique and that the technique was not applicable.

Perception of nurses on factors associated with their injuries

Some participants provided more than one response to this question. Twenty-one participants believed that injuries were caused by lack of group coordination. Seventeen participants recorded that training was not implemented correctly and ten participants perceived that some patients knew the restraining procedure and used it against staff. Only six participants recorded uncondusive/ dangerous environment (for example wet floor) as a factor that contributed to their injuries.

Ways of improving nurses' safety

Table 3 shows the broad themes identified in the analysis of responses to open ended questions on ways of improving the safety of nurses during the restraining procedure.

Table 3: Improving nurses' safety

| Themes | Response rate (%) |
|---|-------------------|
| Increasing training period | 39.13% |
| Improving team work | 21.74% |
| All staff need to be trained | 17.39% |
| Introducing easier restraining techniques | 13.40% |
| Using de-escalation methods | 8.70% |

DISCUSSION

The aim of the study was to describe patterns of injuries sustained by nurses during restraining of aggressive patients and to identify factors in the restraining process that can be modified to improve the safety of nurses during restraining. The research objectives were used to guide the discussion of the findings.

The results revealed that many participants (55.56%) were injured despite training. This is contrary to the study by Dowson et al (1999), which revealed that staff injured while restraining patients were not trained in restraining. The 95% confidence interval for the population relative risk and the two-sided Fisher's exact test showed that the risk of being injured was the same for those involved in restraining and those not involved in restraining. The researchers have not identified any peer-reviewed literature with which to compare these results. There are nurses who avoid participating in restraining because of fear of being injured during restraining; these results might encourage them to participate in restraining.

Injuries were most common in the age group 36 to 45 years. It can be speculated that the participants in that age group might have worked more shifts and restrained more than the other age groups or they worked less shifts; participated less in restraining and hence forgot how to use the recommended restraining techniques.

There were a higher proportion of injuries among female participants compared with male participants and, although in this study the relationship between gender and injuries is not statistically significant, this is consistent with a study by Southcott and Howard (2007), which demonstrated that gender is not related to the safety of use of a restraining procedure. The high proportion of injuries among female participants is a concern and requires further attention.

Both incident reports and questionnaire results have demonstrated that the majority of the nurses were injured during the holding stage of restraint compared with other stages. Explanations for this might be that the restrainers became less cautious because at that stage the patient was fully restrained or the restrainers got tired during the holds. These findings suggest that nurses need to be more cautious during the holding stage. There is no published literature to compare these results with; however the results are valid because two methods of data collection gave similar findings.

Another concern is that participants who attended the refresher course were more likely to be injured than those who did not attend the refresher course. The relationship between attending the refresher course and sustaining injuries while restraining aggressive patients was statistically significant, and we have not identified any published studies with which to compare our results. The refresher course was probably more focused on the prevention of injuries to patients and overlooked the safety of nurses, and nurses who attended the refresher course were more likely to engage in restraining more often than those who did not attend the refresher course.

Injuries were more common among participants who were not using recommended restraining techniques compared with those who used recommended techniques. These findings are consistent with Wright's (2003) study which revealed that, staff and patient injuries are caused by poorly executed and ill-defined restraining techniques. The restraining techniques were inapplicable to the situation and / or forgot the techniques at the time of restraining were the most common reasons given by the participants for not using the appropriate restraining techniques. There is a need to modify the restraining techniques so that they become applicable to all restraining situations.

Both incident reports and questionnaire showed that physical assaults were the leading cause of injuries to nurses and falls were the least cause of injuries. There is no published literature for comparison.

The incident reports we analysed showed that upper limb injuries were the most common injuries sustained by nurses followed by head injuries. The questionnaire revealed that the majority of those injured sustained multiple injuries. Graham's (2002) study showed that there were 13 episodes of abrasions to either patients or staff out of 81 episodes of restraint, and is consistent with the study which showed that only one out of twenty-seven participants sustained abrasions.

The incident reports also showed most injuries occurred during the afternoon shift and there is no published literature for comparison. This study was not designed to identify temporal patterns of injuries and associated reasons, and further research is required to find out why injuries are more common at this time.

Many participants attributed their injuries to training not being implemented correctly and lack of group coordination. It can be speculated that lack of group coordination was caused by lack of effective communication among restrainers.

More than half of the participants perceived that restraint training needs improvements and this supports the study results by Southcott (2002), which revealed that although staff were generally satisfied with the restraint training, they did identify some gaps. Some participants perceived that introducing easier restraining techniques; improving team work; increasing restraint training period; and using de-escalation methods may improve the safety of nurses. Increasing training periods may provide nurses with more time to master restraining techniques.

LIMITATIONS OF THE STUDY

1. The sample size was too small to generalise the results to all acute psychiatric units in Victoria.
However, it is possible that despite the requirement to report work-related injuries not all are reported.
2. There were more female participants than male participants.
3. The questionnaire was only tested for face validity.

The authors feel that these limitations were minimised and did not significantly affect the quality of study results.

CONCLUSIONS

This study is of paramount importance to the safety and well-being of nurses and patients. The study has shown that nurses working in the acute psychiatric units remain at risk of being injured during the restraining of aggressive patients. If easier restraining techniques are introduced; restraint training period is increased and group coordination during restraining is reinforced, it could evoke a greater sense of safety and confidence when dealing with aggressive patients.

RECOMMENDATIONS

Recommendations for nursing practice

The study has confirmed that nurses are injured while restraining patients and suggests the need for the use of safer alternative methods and the need to reduce the use of restraint in psychiatric units.

Nurses are recommended to improve group coordination during restraining and to use recommended restraining techniques in order to reduce injuries during restraining. Psychiatric units are encouraged to introduce easier restraining techniques and increase restraint training period to help restrainers to master the techniques.

Nurses should advocate for their safety during restraining aggressive patients because if they do not advocate for themselves then that equates to apathy in the work place, and very little will change to improve their working conditions.

Recommendations for further research

1. The study showed that most injuries occurred at the restraining stage, therefore further research is needed to explore why this is so.
2. There is an urgent need for more research on a state level on the safety of nurses during the restraining procedure using a large sample size in order to generalise the results.
3. There is need for further study to evaluate the effectiveness of restraint refresher course.

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Lecture Capture: first year student nurses' experiences of a web-based lecture technology

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KEY WORDS

Higher Education; Lecture Capture; On-line learning; Student evaluation; Undergraduate nurse education; Web-based technologies.

ABSTRACT

Objectives

This exploratory evaluation sought to examine students' experiences of receiving lectures via a web-based digital lecture technology, Lecture Capture.

Design

A descriptive, online survey undertaken during weeks 8-10 of semester one in May, 2010.

Setting

An Australian University in Brisbane, South-East Queensland.

Subjects

128 first-year students enrolled in a Bachelor of Nursing Program.

Main outcome measure

Student experiences of Lecture Capture measured by a 14-item survey developed for the evaluation.

Results

Students largely perceived Lecture Capture to be useful in aiding understanding and learning, both during the course and in preparation for assessment. It particularly helped the two older groups of students (22-30 & >30 years) understand lectures and revise content at their own pace. Lecture Capture assisted first-year students in adjusting to university life, and this was most noticeable for the youngest group of respondents (<19 years). On-line lectures helped students become familiar with the program's websites and web resources and provided an opportunity to practice note-taking. With the exception of those aged 22-30, Lecture Capture was not regarded as a more effective use of time than face-to-face lectures. Predominantly, students would have preferred face-to-face lectures with optional Lecture Capture, and this was strongest amongst the two older groups. Students overwhelmingly noted satisfaction when live lectures became available from week four.

Conclusions

Findings support the use of web-based digital lecture technology during the initial weeks of university for first-year Bachelor of Nursing students, but indicate this should be to supplement, rather than replace, traditional face-to-face lectures.

INTRODUCTION

Students' transition to university study can be challenging and, whilst there have been improvements, with Australian school-leavers reporting an easier academic transition in 2009 than previous years (James et al 2010), the changing profile of those entering Higher Education (HE) has meant many still experience difficulties. For instance, between 61- 71% of Australian students undertake an average of 13-15 hours of paid employment per week whilst studying (James et al 2010; Australian Vice-Chancellors' Committee 2007 respectively). In addition, there are growing numbers of mature aged students (Australian Vice-Chancellors' Committee 2005) who have to combine studying with family commitments and paid employment. As such, considerable efforts have been placed on developing teaching and learning strategies within universities to support diversity amongst students and to enhance flexibility in their learning processes. The use of web technologies, in particular e-lectures, is one area that has seen focused efforts to enable better support for students' learning in the HE sector.

A review of the literature indicates a general paucity of studies that have explored the benefits of web-based lecture technologies (WBLT) on university students' learning and general HE experience. However, when studies have undertaken evaluations, the benefits are consistently documented. For example, when online instructional videos were used for teaching clinical nursing skills in undergraduate nurses, students were most enthusiastic about the flexibility and learning autonomy afforded by the online videos; this was most evident for females and students over 23 years of age (Kelly et al 2009). Similarly, when online lectures and quizzes were used for first-year pharmacy students in a drug information course, students reported that it helped them learn course material and was useful when studying for assessment (Freeman et al 2006). Exploration of first-year Bachelor of Nursing (BN) students' perceptions of another web-based intervention revealed that these students felt online activities had enhanced their learning, given them the tools to practice learning and allowed them to study at their own pace (Koch et al 2010). However, in all these studies and others besides (McKinney and Page 2009; Salamonson and Lantz 2005), students still appear to largely prefer face-to-face lectures, with it considered optimal if online lectures supplement, rather than replace, contact teaching. For some students the lack of a community in WBLT poses a challenge to learning (Song et al 2004) and some nursing students have reported regret at losing touch with their lecturers and fellow students (Farrell et al 2007). But how do WBLT compare with face-to-face lectures in terms of student experience and educational outcome? To date, results are somewhat inconclusive as to any overall differences, and this is seen internationally. In a study of U.K postgraduate nursing and healthcare students, Campbell et al (2008) found no significant differences in results for a research methods course whether delivered via an online discussion or face-to-face seminar. That said, however, greater use of online resources was associated with better attainment. A study of $n=815$ students from four Australian universities also found: 68% of students indicated they learnt just as well using web-based lecture recordings as they did through face-to-face lectures; 79.9% felt it was easier to learn; 66.7% thought it helped them achieve better results; and 76.3% reported positive experiences of the learning option (Gosper et al 2008; Woo et al 2008). Finally, in a study of Taiwanese nursing students, it was found that those who received a supplementary web-based course achieved significantly higher scores on intramuscular injection knowledge and skill than their counterparts, who received just classroom lectures and skill demonstration (Lu et al 2009).

The Project

The first year teaching team at an Australian university designed a quality improvement project aimed at better supporting BN students during their initial weeks at university. The project was designed to ease the transition into university study by offering the first three weeks of lecture content for all courses via the WBLT, Lecture Capture. Small group face-to-face learning still occurred in both tutorials and laboratories, and large group face-to-face 'common time' around study skills also continued. Following the initial three weeks, face-to-face lectures, which were also digitally captured, were instituted.

METHOD

Aim

The exploratory evaluation sought to address the following questions:

1. To what extent do students feel that Lecture Capture:
 - a. assists learning and understanding, during the course and in preparation for assessment?
 - b. assists with adjusting and settling into university life?
 - c. increases familiarity with the BN program's websites and web resources?
 - d. is a more effective use of their time in comparison to face-to-face lectures?
2. To what extent do these students prefer face-to-face lectures with Lecture Capture as a supplementary option?

Design

A descriptive, online survey was undertaken during weeks 8-10 of semester one in May 2010. As this evaluation was an internal Quality Assurance Activity, being designed around the University's Plan, Implement, Review, Improve (PIRI) Quality Improvement Framework, ethical approval from the University Human Research Ethics Committee was not required.

Sample and Setting

The study was conducted in the Nursing and Midwifery department of one university campus located in Queensland, Australia. All first-year students enrolled in the BN program were eligible to complete the survey ($n=222$). Students were initially made aware of the survey through emails from the First Year Advisor and then reminded by Course Convenors during laboratories/tutorials and through a notice on the students' on-line learning website. Participation was voluntary and students were informed responses were anonymous and non-identifiable.

Data collection

The survey was developed by the research team and comprised 14 questions pertaining to student perceptions of Lecture Capture during the first eight weeks of study (see Table 2). The first 13 items were pre-determined closed response questions, using a four-point Likert scale that ranged from 'strongly agree' to 'strongly disagree'. The final item allowed participants to provide comment. The survey was available to complete on-line through SurveyMonkey, which students accessed via a web link.

Data analysis

Survey data was captured online via SurveyMonkey and exported into the Statistical Package for the Social Sciences Version 18.0 (SPSS Inc., Chicago, IL, USA) for analysis. Basic frequencies were established for all interval data and crosstabulations were undertaken to examine the association between categorical items exploring the experience of Lecture Capture and age. As it is recommended that crosstabulations undertaken using the chi-square test have no more than 20% of expected counts with $<n=5$ (Field 2001), responses on the four-point Likert scale were collapsed into two groupings; agree and disagree. A Research Assistant thematically coded the final open response item.

FINDINGS

128 students completed the online survey, resulting in a 57.7% response rate. As shown in Table 1, students were predominantly female (87.5%) and enrolled in the BN Program full-time (89.8%). Student age varied, although there were noticeably fewer students aged 19-21 years (14.2%) who completed the survey.

Table 1: Sample Characteristics

| Characteristic | Sub-category | (n) | (%) |
|--------------------------|--------------|-----|------|
| Gender (n=128) | Female | 112 | 87.5 |
| | Male | 16 | 12.5 |
| Age (n=127) | <19 | 37 | 29.1 |
| | 19-21 | 18 | 14.2 |
| | 22-30 | 36 | 28.3 |
| | >30 | 36 | 28.3 |
| Enrolment status (n=128) | Full-time | 115 | 89.8 |
| | Part-time | 13 | 10.2 |

Student experiences of Lecture Capture

Table 2 shows that the vast majority of students considered Lecture Capture a good way to learn and study for course assessment items (97.4%). Approximately seven out of ten agreed that Lecture Capture assisted them in understanding the content of lectures at their own pace (72.6%). Furthermore, approximately eight out of ten agreed that on-line lectures helped them revise lecture content at their own pace (83.5%). Although the value of on-line lectures in helping students to practice note-taking during lectures was less strongly endorsed, there was still a positive skew in responses (65.8% agreeing versus 34.2% disagreeing).

Table 2: Frequencies (n and %) of student nurses' responses to the on-line survey

| Survey item: | Strongly agree | | Agree | | Disagree | | Strongly disagree | |
|---|----------------|------|-------|------|----------|------|-------------------|------|
| | (n) | (%) | (n) | (%) | (n) | (%) | (n) | (%) |
| assisted coping with work & life commitments while settling into University study (n=117) | 36 | 30.8 | 40 | 34.2 | 22 | 18.8 | 19 | 16.2 |
| assisted understanding content of lectures at own pace (n=117) | 36 | 30.8 | 49 | 41.9 | 23 | 19.7 | 9 | 7.7 |
| assisted practising note-taking of lecture content (n=117) | 26 | 22.2 | 51 | 43.6 | 32 | 27.4 | 8 | 6.8 |
| assisted revising content at own pace (n=115) | 44 | 38.3 | 52 | 45.2 | 12 | 10.4 | 7 | 6.1 |
| was a more effective use of time than face-to-face lectures (n=115) | 24 | 20.9 | 28 | 24.3 | 40 | 34.8 | 23 | 20.0 |
| enabled quick familiarity with courses' web-sites & web resources (n=117) | 25 | 21.4 | 58 | 49.6 | 25 | 21.4 | 9 | 7.7 |
| a good way to learn & study for assessment (n=116) | 65 | 56.0 | 48 | 41.4 | 2 | 1.7 | 1 | 0.9 |
| Enjoyed learning options provided by both face-to-face lectures and posted lectures on-line after the lecture (n=117) | 75 | 64.1 | 40 | 34.2 | 2 | 1.7 | 0 | 0.0 |
| Preferred face-to-face lectures with Lecture Capture as an option for learning (n=117) | 63 | 53.8 | 26 | 22.2 | 23 | 19.7 | 5 | 4.3 |

Nearly two-thirds of students' felt on-line lectures helped them cope with work and life commitments whilst settling into university (65%). A slightly higher proportion agreed that on-line lectures assisted them to quickly become familiar with the course websites and web resources (70.1%). Despite these benefits students were divided in their views of Lecture Capture being a more effective use of time than face-to-face lectures (54.8% in agreement versus 45.2% in disagreement)

From week three to the time of survey, face-to-face lectures were made available, were recorded digitally and were posted on-line. The majority of students (98.3%) indicated they enjoyed face-to-face lectures with optional Lecture Capture revision. When asked if they would have preferred both of these two methods of material presentation during weeks one-three instead of only on-line lectures, three-quarters agreed (76.1%), with most again being emphatic in their response (53.8%). It is worth noting that a quarter of respondents indicated they would not have preferred the use of the two methods during the first three weeks (23.9%). Although these respondents were spread across all age ranges, the largest number was of school age (39.3%).

Sixty students provided additional comment and these largely mirrored results from the closed response items. Comments predominantly favoured the use of digital Lecture Capture, particularly in terms of its ability to enable students to replay and revise lecture content at their own pace to enhance their understanding (33.3%) and for those times when it was not possible to attend campus-based lectures (23.3%). Some students noted the welcomed flexibility, which enabled them to juggle study with paid work and carer/family commitments (11.7%). However, many students still indicated a preference for face-to-face lectures with supplementary Lecture Capture (28.3%). There were also some students who were critical of the WBLT primarily because of: technological issues, such as some lectures being streamed online without the option of download (13.3%); the inability to ask questions (5%); enhanced difficulty in forming study groups and making friends (5%); and general hindrance to settling into university life (5%).

Association between student experiences of Lecture Capture and age

Crosstabulations of interval survey items by student age are shown in Table 4. Whilst the chi-square tests found no statistically significant associations, a number of noteworthy differences are observed. Specifically, school age respondents (<19 years) were most likely to agree that Lecture Capture assisted them in coping with work and life commitments whilst transitioning into university study (73.5%). The two oldest groups of students (22-30 & >30 years) were most likely to agree that Lecture Capture helped them understand lectures (86.7% & 73.5% respectively) and revise content (93.1% & 90.9 respectively) at their own pace. Those aged 22-30 were the only age group who had a greater proportion of students agreeing that Lecture Capture was a more effective use of time than face-to-face lectures, contrary to the overall trend (57.1% agree vs 42.9% disagree). Finally, there was strongest preference for face-to-face lectures with Lecture Capture as a supplementary option amongst the two oldest groups of students (22-30 years = 80.0% & >30 years = 82.4%).

A number of issues need to be considered that may have limited the study. Firstly, the evaluation was conducted in one Australian university thus restricting generalisability of results. Secondly, the sample was relatively small and the response rate modest. Thirdly, whilst it is recognised that gender and enrolment status may influence student experiences of on-line learning, it was not appropriate to undertaken crosstabulations given the unequal split of male/ female and full-time/ part-time enrolled participants. Fourthly, student employment status was not collected and so the relationship between employment status and perceptions of Lecture Capture could not be explored. Finally, the survey was undertaken before assessment items in some courses but not in others and, thus, the students may not always have been in a position to best judge how effective the two presentation systems were for their overall academic performance.

Table 4: Crosstabulations (n and %), with chi-square test statistics (p=), of student nurses' experiences of Lecture Capture by age

| Survey item | <19 | | 19-21 | | 22-30 | | >30 | | Chi-sq p = |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|
| | Ag % | Dis % | Ag % | Dis % | Ag % | Dis % | Ag % | Dis % | |
| Online lectures... | (n) | (n) | (n) | (n) | (n) | (n) | (n) | (n) | |
| assisted coping with work & life commitments while settling into university study (n=117) | 73.5 (25) | 26.5 (9) | 55.6 (10) | 44.4 (8) | 58.8 (20) | 41.2 (14) | 66.7 (20) | 33.3 (10) | .497 |
| assisted understanding content of lectures at own pace (n=117) | 64.7 (22) | 35.3 (12) | 61.1 (11) | 38.9 (7) | 86.7 (26) | 13 (34) | 73.5 (25) | 26.5 (9) | .155 |
| assisted practising note-taking of lecture content (n=117) | 64.7 (22) | 35.3 (12) | 61.1 (11) | 38.9 (7) | 70.0 (21) | 30.0 (9) | 64.7 (22) | 35.3 (12) | .932 |
| assisted revising content at own pace (n=115) | 73.5 (25) | 26.5 (9) | 72.2 (13) | 27.8 (5) | 93.1 (27) | 6.9 (2) | 90.9 (30) | 9.1 (3) | .063* |
| was a more effective use of time than face-to-face lectures (n=115) | 38.2 (13) | 61.8 (21) | 44.4 (8) | 55.6 (10) | 57.1 (16) | 42.9 (12) | 41.2 (14) | 58.8 (20) | .475 |
| enabled quick familiarity with courses' web-sites & web resources (n=117) | 76.5 (26) | 23.5 (8) | 66.7 (12) | 33.3 (6) | 66.7 (20) | 33.3 (10) | 70.6 (24) | 29.4 (10) | .820 |
| a good way to learn & study for assessment (n=116) | 100 (34) | 0.0 (0) | 94.4 (17) | 5.6 (1) | 96.7 (29) | 3.3 (1) | 97.0 (32) | 3.0 (1) | .657* |
| Enjoyed learning options provided by both face-to-face lectures and posted lectures on-line after the lecture (n=117) | 97.1 (33) | 2.9 (1) | 94.4 (17) | 5.6 (1) | 100 (30) | 0.0 (0) | 100 (34) | 0.0 (0) | .395* |
| Preferred face-to-face lectures with lecture capture as an option for learning (n=117) | 67.6 (23) | 32.4 (11) | 72.2 (13) | 27.8 (5) | 80.0 (24) | 20.0 (6) | 82.4 (28) | 17.6 (6) | .485 |

Note. Ag = Agree; Dis = Disagree; %= within age; (n)= count; *>20% of expected values with less than n=5.

DISCUSSION

Overall, findings from this exploratory evaluation support the use of WBLT during the initial weeks of university for first-year BN students. The positive experiences of Lecture Capture in this evaluation resonates with previous studies that have shown the value of WBLT in terms of aiding student understanding and learning, both during the course and during revision for assessment (Freeman et al 2006). It shows students' perception of enhanced understanding of lectures and ability to revise content at their own pace (Koch et al 2010), and provision of flexibility in learning (Kelly et al 2009). This evaluation also found the use of a WBLTC appeared to assist student nurses in adjusting and settling into university life, seemingly helping them to quickly become familiar with the BN program's websites and web resources, and providing an opportunity to practice note-taking during lectures. However, again consistent with previous studies (Koch et al 2010; Kelly et al 2009; McKinney and Page 2009; Freeman et al 2006; Salamonson and Lantz 2005), this evaluation found that WBLT should be used to supplement, and not replace, traditional face-to-face lectures. This may be associated with students' 'stereotypical' perception of university requiring face-to-face delivery of content. Furthermore, given the high level of social engagement and communication inherent within the nursing profession in general (Kiteley and Ormrod 2009), it could be argued that this preference for face-to-face contact with optional WBLT stems from the characteristics of the students entering the BN program (i.e. highly sociable). Alternatively, it may be that,

because learning is supported by an active process of engagement, interaction and reflection, (Brown et al 1983), it is the sense of community and interaction that students experience during face-to-face lectures, which makes this the student's learning method of choice (Song et al 2004).

Exploration of age group in students' response to Lecture Capture suggests that age may impact on their perception of digitally recorded lectures. Older students in particular noted Lecture Capture's ability to help them understand and revise content at their own pace, whereas younger students (recent school leavers) indicated more frequently the positive impact of Lecture Capture in assisting them in settling into university life. There was also a greater number of older than younger students indicating that they would have preferred face-to-face lectures with optional Lecture Capture during the first three weeks of their studies. Finally, those aged 22-30 were the only age group to indicate that digitally recorded lectures were a more effective use of time than face-to-face lectures, contrary to the overall trend. Collectively, these findings suggest that students of different ages have differing needs, particularly during their initial transitional weeks into university study. As consistent with previous literature, older students in this evaluation were more positive about the use of WBLT, primarily because of the flexibility of learning it afforded them and their other time commitments (i.e. work and family) (Kelly et al 2009).

CONCLUSIONS

This exploratory evaluation was designed to ease the transition to university study by offering the first three weeks of lecture content for all BN courses via the WBLT, Lecture Capture. Findings support the use of WBLT during the initial weeks of university for first-year BN students, but indicate that this should be as a supplement to, and not a replacement for, traditional face-to-face lectures. The findings also provide useful information for those planning and delivering teaching and learning activities to meet the diverse needs of commencing university nursing students.

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A glimpse of the future nursing workforce: the Graduate e-cohort Study

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KEY WORDS

Graduate nurses, nursing workforce, retention, longitudinal research, Internet research

ABSTRACT

Objective

This paper outlines the demographic profile, workforce trajectory and study intentions of the first cohort of newly graduated and registered nurses participating in the Graduate e-cohort Study.

Design

A longitudinal, electronic cohort of newly graduated and registered nurses was recruited into the first survey and completed the questionnaire by logging on to the e-cohort web platform www.e-cohort.net

Subjects

Newly graduated and registered nurses completing in 2008 from the University of Queensland, Australia; and Massey University, the University of Auckland and AUT University from New Zealand.

Main outcome measure

The establishment and report on a cohort of newly graduated and registered nurses in Australia and New Zealand

Results

All NZ and most Australian participants were employed as nurses. Over half the NZ participants were undertaking a postgraduate qualification compared to 5.9% of the Australian participants. The majority intended to undertake further postgraduate study. All Australian participants working as nurses were currently employed in Australia. 13% of NZ participants were working in Australia. Most participants worked in metropolitan areas (85%) in acute care hospitals (81.1%) in their preferred clinical speciality area (79.4%). Surgical was the most prevalent speciality area (17.8%).

Conclusions

The majority of participants are young, highly mobile, have completed a graduate transition to practice and work in metropolitan areas. Retention of this workforce is essential to meet health care demands and replace the large cohort of older nurses retiring over the next decade.

INTRODUCTION

The nursing workforce is fundamental to the provision of health care and essential for the implementation of the health strategy for the 21st century aimed at improving global health and well-being (International Council of Nurses 2004). However, this workforce is under pressure due to attrition, high turnover, emigration, and lack of resources. Compounding this situation is the international financial crisis which is impacting on national budgets resulting in restructuring to control health spending, which is in itself stressful and can lead to increased workloads for nurses and increasing dissatisfaction with the level of care provided. Policy development and service delivery planning based on evidence is imperative to support nurses, who have considerable options, to continue working in the health sector. Retention of nurses in their country of preparation is also essential, failure to do so will mean countries risk losing the very people needed to work in this challenging environment (Aiken 2002). However, while there is agreement about the challenges facing the workforce overall data related to the decisions, practice experiences and career planning of newly graduated and registered nurses. A number of authors (Buchan et al 2006, O'Brien-Pallas et al 2005) note that this lack of data is a gap in supporting policy and workforce planning.

This paper reports the demographic profile, workforce trajectory and study intentions of the first cohort of newly graduated and registered nurses participating in the Graduate e-cohort Study (GeS). The term newly graduated and registered nurses (NG&RNs) is used throughout this paper to identify this cohort of nurses. Some nursing students graduate but choose not to register as nurses whereas others may be newly registered in one of the countries taking part in this research due to recent immigration rather entering the profession for the first time. These nurses are not included in the cohort.

Literature focused on NG&RNs is limited and must be approached with caution with variations in the definition of 'newly registered', initial nursing qualifications (such as licensed, bachelor or diploma), the country and context, and methodologies. However, several broad themes appear in the literature reporting on this group of nurses consistent with the issues for the wider nursing workforce. The key concern is retention but as Gaynor et al (2006) noted in a review there were no studies located examining new graduate retention. Embedded within this concern are themes related to turnover during the first years of nurses' careers, reasons nurses choose to leave the profession completely and work patterns related to full or part time work.

High turnover rates, particularly of recently registered nurses, can be disruptive and lead to a decrease in the quality of care through lack of continuity and the loss of nurses from an area just when they are developing expertise (North et al 2006; Hayes et al 2005). Several studies have explored the issue of NG&RNs moving or intending to move, from their first position, which for some was due to dissatisfaction with the environment (Bowles and Candela 2005), others relocated because of circumstances outside nursing (Robinson et al 2008). However, these nurses chose to remain in the profession but move to other positions. Criteria suggesting that graduates may stay in nursing, although relocating geographically, included length of time spent in the first job, being less concerned about which specialty they went into after graduation (Robinson et al 2008). While a range of reasons have been identified that influence these nurses' employment choices they are not lost to the health workforce overall.

NG&RNs who choose to leave the profession are of greatest concern and appear to be hard to access for research purposes. Research on early career nurse migration with a cohort of English diploma prepared nurses found the peak age for leaving nursing was identified as 28 years of age (Robinson et al 2008). Similarly, Black and Spetz (2009) reported from a USA study of nurses no longer in nursing, that younger nurses, those aged under 30 years and graduated less than ten years, leave nursing because of concerns about workplace conditions. While workplace issues are of concern for nurses of all ages it appears this is particularly so for those in younger age-brackets who are also likely to be newer to nursing.

Attempts to monitor graduate employment rates have varied considerably yet the collection of consistent data is crucial to identifying national patterns and undertaking international comparisons with the aim of developing policy and implementing strategies to improve retention. In Australia the last two Nursing and Midwifery Labour Force reports from the Australian Institute of Health and Welfare (AIHW 2009; AIHW 2008), have incorporated data on the numbers of nurses graduating from university-based courses. In 2007, 6,683 nurses graduated from Australian universities, 1377 more than in 2003. In NZ in March 2010 there were 1,231 newly graduated nurses admitted to the register (Nursing Council of New Zealand 2010). In NZ data on new graduates' student experience and their career plans once registered has been collected for a number of years by The Nurse Educators in the Tertiary Sector (NETS) group. However, until recently it has not been possible to compare this data due to low response rates in the early years of data collection, and variation in the nature of data collected.

Although a number of longitudinal studies have tracked nursing student retention (for example Deary et al 2003; Harvey et al 1994), none appear to longitudinally track NG&RNs and this lack of longitudinal data has been noted as a major gap in workforce planning (Robinson et al 2008). In response to the need for robust and consistent data on the NG&RN workforce the GeS was established. The aim of this longitudinal, electronic cohort study is to collect annual demographic and workforce data from a cohort of NG&RNs from The University of Queensland (UQ), Australia, Massey University, The University of Auckland (UoA) and AUT University from NZ. This paper presents preliminary data from the initial survey.

METHODOLOGY

The GeS has been added to the existing suite of projects established on the e-cohort web platform www.e-cohort.net, developed by the School of Nursing and Midwifery, UQ. Two longitudinal studies are already established on the web platform: the Nurses and Midwives e-cohort Study (N&MeS) surveying nurses and midwives in Australia, NZ and the United Kingdom (UK), and the Doctors Study surveying medical practitioners in Queensland, Australia. Establishment of the web platform and the N&MeS are discussed in detail elsewhere (Huntington et al 2009; Turner et al 2008).

The initial cohort of NG&RNs completed the first of the annual surveys by logging on to the e-cohort web platform after receiving a written invitation from their nursing school in either hardcopy or through alumni contact. The study received ethical approval from the Human Ethics Committees of all participating universities. The participants have an automatically generated study ID for research purposes. Personal contact information is held in a separate database from the survey responses to ensure confidentiality and anonymity of responses.

The GeS questionnaire consists of 55 items derived from previous workforce research and themes identified in the literature. Demographic data includes age, marital/partnership status, qualifications completed and family responsibilities. Also collected are details of initial registration, place of work, specialty area of practice and type of service, specialty preference and whether the nurse is working in this area along with future intentions related to postgraduate study. The questionnaire is then divided into brief sections for (i) participants in the workforce which focuses on hours, specific roles and place of work; (ii) those employed but not in nursing which asks for reasons and place of work; and (iii) those not in the workforce at all and those not in the workforce and seeking work, and again asks for reasons, length of absence and intention to return. A final open question provides the opportunity for general comments from participants. The questionnaire was piloted by 20 registered nurse members of the research team and their colleagues. Feedback resulted in revisions to the questionnaire in terms of layout and content, and minor difficulties with online registration were rectified.

The data was directly entered by participants on the data base then exported to an Excel spreadsheet. The sample characteristics are presented using descriptive statistics.

FINDINGS

The first survey was completed by 111 graduates out of a total population of 436 (241 graduates UQ, 195 in total from NZ) who had graduated at the end of 2008, a response rate of 25.45%. Both the Australian and NZ samples have a greater proportion of females than the 92.9% in the total NZ nursing workforce (Nursing Council of New Zealand, 2010) and the 90.4% females in the Australian nursing workforce (Australian Institute of Health and Welfare 2009) (See Table 1). The Australian participants mean age was 23.7 years with an age range of 19 to 42 years, 7.8% were 40 or older. The NZ mean age was 25.4 years, the age range 20 to 55 years and 6.7% were 40 and older. There are two international students in the total cohort. In the overall sample 31.8% were married or in de-facto relationships and 16.2% (n=18) of the whole sample provided care to others outside of employment. Thirteen of the 18 participants caring for others stated that family-related responsibilities restricted work choices.

Table 1: Respondent Characteristics

| Demographic Details | | Percent/ number of NZ sample N=60 | Percent/ number of Australian sample N=51 | Total Sample N=111 |
|---|-----------------------------------|---|---|-----------------------|
| Gender | Female | 98.3% (59) | 94.1%(48) | 96.4%(107) |
| | Male | 1.7 % (1) | 5.9% (3) | 3.6%(4) |
| Age | Mean Age | 25.4 (60) | 23.7 (51) | 24.6 (111) |
| | Median Age | 22.5 (60) | 21 (51) | 22 (111) |
| University | University of Queensland | | 100% (51) | 45.9%(51) |
| | Auckland University of Technology | 33.3% (20) | | 18%(20) |
| | Massey University | 40% (24) | | 21.6%(24) |
| | University of Auckland | 26.7% (16) | | 14.4%(16) |
| Country | Australia | | | 45.9%(51) |
| | New Zealand | | | 54.1% (60) |
| Year graduated | 2008 | 56.7%(34) | 37.3%(19) | 47.7% (53) |
| | 2009 | 43.3%(26) | 62.7%(32) | 52.3% (58) |
| Marital status | Single | 61.7% (37) | 74.5%(38) | 68.2%(75) |
| | Married/De-Facto relationship | 36.7% (22) | 25.5 (13) | 31.8% (35) |
| Care for dependents outside of employment | Yes | 13.3(8) | 19.6%(10) | 16.2% (18) |
| | No | 86.7%(52) | 80.8%(41) | 83.8%(93) |

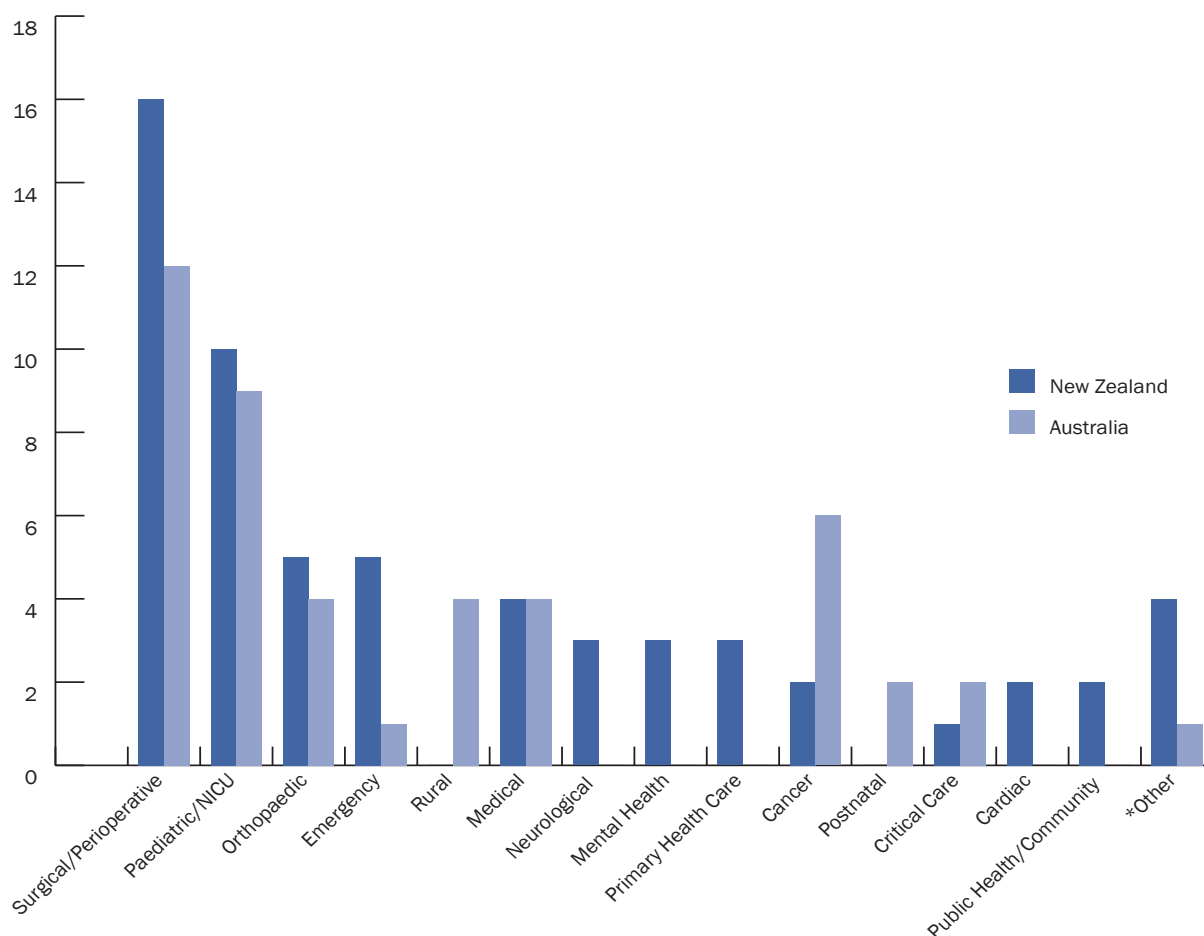
Table 2 shows graduate employment characteristics. All NZ graduates were employed as nurses and had completed or were undertaking a graduate transition to practice program. A small group of Australian graduates (7.8 %, n=4) were not employed as nurses but were in health related occupations, one was commencing a nursing job in the near future and the other three wanted to be employed in nursing. In the Australian group, 88.2% (n=45) had completed or were in a transition to practice program while four of the six who were not in a program wanted to undertake this in the future; two were working in areas where programs were not offered. Over half the NZ participants were completing or had completed a postgraduate qualification compared to 5.9% of the Australian participants. The majority of all participants (90%) intended to undertake further postgraduate study.

Table 2: Employment

| Employment details | | Percent/ number of NZ sample N=60 | Percent /number of Australian sample N=51 | Total Sample N=111 |
|---|-------------------------|---|--|-----------------------|
| Employed as a nurse | Yes | 100%(60) | 92.2%(47) | 96.4%(107) |
| | No | | 7.8%(4) | 3.6%(4) |
| Completed or completing a Graduate Transition Program | Yes | 100%(60) | 88.2%(45) | 94.6%(105) |
| | No | | 11.8%(6) | 5.4%(6) |
| Current Postgraduate Study | Yes | 51.7%(31) | 5.9% (3) | 30.6%(34) |
| | No | 48.3%(29) | 94.1%(48) | 69.4%(77) |
| Postgraduate study in the future | Yes | 90%(54) | 90.2%(46) | 90.1%(100) |
| | No | 10% (6) | 9.8% (5) | 9.9%(11) |
| Employment status | Full-time and permanent | 70% (42) | 80.9%(38) | 74.8%(80) |
| | Full-time and temporary | 11.7% (7) | 4.3%(2) | 8.4%(9) |
| | Part-time and permanent | 15% (9) | 8.5%(4) | 12.1%(13) |
| | Part-time and temporary | 3.3 % (2) | 2.1% (1) | 2.8%(3) |
| | Casual | | 4.3% (2) | 1.9% (2) |
| State/ Country employed | Queensland | 1.7 % (1) | 95.7%(45) | 43%(46) |
| | Victoria | 6.7% (4) | 2.1%(1) | 4.7%(5) |
| | South Australia | 1.7% (1) | | .9% (1) |
| | Western Australia | 3.3% (2) | 2.1%(1) | 2.8%(3) |
| | New Zealand | 86.7%(52) | | 48.6%(52) |
| Employment location | Metropolitan | 85% (51) | 85.1%(40) | 85% (91) |
| | Provincial | 11.7% (7) | 6.4%(3) | 9.3% (10) |
| | Rural | 3.3% (2) | 8.5%(4) | 5.6% (6) |
| | Remote | | | |

All the Australian participants working as nurses were currently employed in Australia, 11.8% (n=6) intended to work in the United Kingdom or Ireland in the next 12 months. Thirteen per cent (n=8) of NZ participants were working in Australia and a further 13% (n=8) intended to work overseas in the next 12 months, five in Australia, two in Canada, one in the UK. One NZ respondent working in Australia intended to return to NZ. The majority of the overall sample was in fulltime permanent positions (74.8%). Ten percent (6) of New Zealand participants worked mainly with Indigenous communities, five in NZ, no Australian participants identified as working with Indigenous communities.

In the overall sample most participants worked in metropolitan areas (85%) in acute care hospitals (81.1%) in their preferred clinical speciality (79.4%). Surgical/perioperative was the most prevalent speciality area (17.8%, see fig 1). In NZ where graduates are comprehensively educated to work in mental health settings as well as more general areas only 5% (n=3) of the NZ respondent group were working in mental health, 9.2% of NZ nurses work in this area (Health Workforce Information Programme, 2009). Three NZ participants were employed in primary health areas, this speciality area accounts for 11.2%, of NZ nurses. In the NZ specialities of rehabilitation and aged care which employ 13.8% of the total nursing workforce there was only 1 graduate working in rehabilitation and none had aged care as a speciality though 1 recorded it as a preference.

Figure 1: Clinical Speciality

*Other includes aged care, gastroenterological, haematological, rehabilitation and respiratory nursing

The Australian distribution of specialities followed similar trends with the emphasis on surgical (13.7%) and paediatric (15.7%) nursing. One respondent was working in aged care and four named rural or remote nursing as a speciality area. No graduates were working in mental health or primary health care/general practice nursing specialities.

DISCUSSION

The longitudinal data from this cohort will be significant as the demographic data identify a largely younger cohort with a mean age of 23.7 years for Australian participants and 25.4 years for those from NZ. The majority identify as single with minimal or no responsibilities for caring for dependents. This finding is significant as the group could be highly mobile and more likely to travel to other countries for work and leisure opportunities. This is supported by Zurn and Dumont (2008) who note that a career as a health professional is frequently promoted as a global profession where people can work and see the world. The data supports the concern expressed in NZ about the impact of the mobility of younger graduates as a total of 26% of this subgroup had left or were planning to leave NZ. This was not the case for the Australian subgroup all of whom were employed in Australia at the time of completion of the survey with a smaller percentage planning to travel abroad.

Graduate transition programs appear to be a key initiative in the retention of NG&RNs. In NZ New Entry To Practice (NETP) programs offered by employers such as District Health Boards (DHBs) provide a structured transition to practice. A 2009 evaluation of these programs found they positively influenced choice of workplace

and retention of graduates, and provided appropriate support in the transition from student to registered nurse (Haggerty et al 2009). In the GeS cohort all NZ and 88.2% of Australian participants had completed a graduate transition to practice program.

The present study also highlights the ongoing popularity of particular specialties for graduates such as surgical/perioperative. This may reflect the general attitude amongst nurses that some acute experience in the early stages of their career is useful and desirable, however, of interest is the lack of Australian NG&RNs either working, or planning to work in mental health, community specialties or with the Indigenous communities.

Offering transition to practice programs in specialty areas where it is difficult to attract NG&RNs could improve recruitment and retention. Australian research has shown that the longer nurses stayed and worked in hard-to-staff regions, the more likely they are to continue working in that area (Lea and Cruickshank 2005). The majority of participants in the GeS were employed in metropolitan areas, the provision of quality graduate transition to practice programs could well encourage recruitment of NG&RNs to rural and geographically isolated areas, mental health and other hard-to-staff specialty areas such as age-related residential care and ensure these areas are considered as credible career options. These areas are of increasing importance due to growing health needs related to chronic illness management and an increasing focus on primary health services for physical and mental health management.

The difference between the countries in undertaking postgraduate study in the early years of practice could be explained by the structure of the NZ New Entry to Practice programs. Increasingly the DHBs managing the programs include the requirement to complete a postgraduate paper within the transition year (Haggerty et al 2009). This is seen as formalising the structured learning components required in many transition to practice programs

As with any research there are limitations. As noted the response rate is low which appears to be a feature of electronic data collection as discussed by a number of authors (Ekman and Litton 2007; Turner et al 2007). Use of this method is, however, increasing and recruitment into the subsequent GeS surveys appears to be increasing. Also, the GeS is electronically based and participants need to have access to a computer, be computer literate and have reliable connectivity to the internet. In addition, as this project is longitudinal keeping participants engaged may be challenging, especially considering the high level of geographical mobility of this cohort. However, despite these limitations the GeS has the potential to track participants throughout their professional lives.

CONCLUSION

There is no doubt that the future of the nursing workforce hinges on those nurses currently engaged in, or graduating from, Bachelor of Nursing programs. Data from the first cohort of the GeS have been presented indicating the majority of participants are young, highly mobile, have completed a graduate transition to practice and work in metropolitan areas in surgical/perioperative areas. Retaining NG&RNs is essential to meet health care demands and replace the generation of nurses who will be retiring over the next decade. The current and future cohorts in this longitudinal study will provide robust workforce data that can inform future workforce policy, planning and innovative retention initiatives.

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Identifying medication documentation errors using handwritten versus pre-printed ICU flowcharts

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KEY WORDS

Intensive Care Unit, medication errors, prescribing and administration documentation errors, ICU flowcharts, adverse drug events.

ABSTRACT

Objective

To compare and review medication documentation errors using handwritten versus pre-printed ICU flowcharts.

Design

Randomised retrospective audit comparing handwritten ICU flowcharts from 2004 and pre-printed ICU flowcharts from 2009.

Setting

Ten bedded, Level 2 Intensive Care Unit in Australia.

Subjects

Total of 60 ICU flowcharts: 30 handwritten flowcharts from 2004 and 30 pre-printed flowcharts from 2009.

Main outcome measures

To determine whether using pre-printed ICU flowcharts eliminated or significantly reduced the number of medication documentation errors compared to handwritten medication orders using ICU flowcharts.

Results

Although the sample size of this audit was small, this audit showed that there was no overall difference when using handwritten and pre-printed ICU medication flowcharts. Four error categories were initially measured against, but a fifth category was identified during the audit. The third category 'prescribing documentation errors' was identified as the largest category for errors, with a 44% error rate using handwritten ICU flowcharts and a 78% error rate using pre-printed ICU flowcharts.

Conclusion

This audit demonstrated although there was no overall difference using handwritten or pre-printed ICU medication flowcharts, using pre-printed ICU medication flowcharts reduces the risk of an adverse drug event that may result in patient harm by classifying error categories. This audit has also highlighted the need for further research into medication documentation errors using paper-based or electronic medication charting in the ICU, the role of pharmaceutical review during the prescribing process and to explore the role of nurse practitioners in the ICU.

INTRODUCTION

Medication errors are one of the most commonly preventable incidents in Australian hospitals (Hughes 2008; Roughead and Semple 2008). Medication errors are defined as “any errors in the prescribing, dispensing or administering of a drug, whether an adverse consequence occurred or not” (Bohomol et al 2009, p. 1260). As well as the significant impact medication errors cause patients in terms of morbidity, mortality and increased length of hospital stay, it is estimated nationally, medication errors occur in 5 to 20% of all drug administrations and approximately 1.5 million patients experience an adverse drug event (ADE) costing the healthcare system annually an extra \$380 million (Roughead and Bedford 2010; Bohomol et al 2009; Leach 2006).

Medication errors within Intensive Care Units (ICUs) have been attributed to multiple reasons including; staffing levels, fatigue, skill mix, workloads, multiple medication orders, lack of familiarity with medications, complex and critically ill patients requiring high technology care and a lack of knowledge relating to hospital medication policies (Jones and Treiber 2010; Roughead and Bedford 2010; Henneman 2009; McDowell et al 2009; Valentin et al 2009; Roughead and Semple 2008; McHugh 2005; Shulman et al 2005; Watterneck et al 2004; Donchin et al 2003). The incidence of medication errors and medication documentation errors in ICUs have been widely discussed within the literature (Kane-Gill et al 2010; Ali et al 2009; Bohomol et al 2009; Henneman 2009; McDowell et al 2009; Valentin et al 2009; Roughead and Semple 2008; Kane-Gill and Weber 2006; Shulman et al 2005; Ridely et al 2004; Watterneck et al 2004;). A landmark study by Bates et al in 1999 showed that prescribing errors have accounted for 56% of all medication errors. There is clear evidence to support the finding that medication documentation errors most commonly occur in the prescribing phase and that these prescribing errors are preventable, alongside drug administration errors (Ali et al 2009; Coobes et al 2009; Kopp et al 2006; Hogden et al 2005; Shulman et al 2005; Ridley et al 2004; Watterneck et al 2004). Literature has long supported the concept of ‘pharmacist participation’ in the prescribing stage of medication orders, aiming to reduce the number of prescribing errors (Leach 2006; Leape et al 1999).

There is a legal requirement for nurses are to be aware and demonstrate an understanding of the legal issues surrounding the correct documentation of medication orders to ensure and maintain patient safety (Jones and Treiber 2010; ANMC 2008; Deans 2005; Manias and Street 2001). Despite the relatively newly introduced sixth right ‘Right documentation’, there is limited research exploring medication documentation errors by nurses. However, one multi-national research study did highlight that there was a 45% error rate relating to ‘time of administration’ when documenting medication administration amongst nurses (Valentin et al 2009).

Many ICUs use 24-hour specialised observation charts known as ‘flowcharts’ that records patients haemodynamic details that are then used to formulate treatment decisions (Kim et al 2008; Manias and Street 2001). As the Australian National Inpatient Medication Chart is intended for general medicines use and intravenous (IV) infusions require a specialised ordering chart many ICU flowcharts contain a specialised medication chart for continuous and intermittent IV infusions (DoHA 2000).

While many studies have shown that medication errors have decreased using pre-printed IV orders compared to handwritten IV orders, the aim of this audit was to determine that the rate of medication documentation errors had reduced or had been eliminated altogether using pre-printed ICU flowcharts (Donihi et al 2006; Hodgen et al 2005; Shulman et al 2005; Watterneck et al 2004). It was hypothesised that the number of medication documentation errors using a pre-printed ICU flowchart would be significantly reduced but that medication documentation errors were still occurring using the new ICU flowchart.

METHOD

Design

This was a randomised retrospective audit conducted using a quantitative data collection tool, Microsoft Excel. The inclusion criteria comprised of day one adult-ventilated patients requiring varying types of IV therapy such as; sedatives, analgesia, catecholamine infusions, total parenteral nutrition, IV fluid and blood product therapy. 'Day one' patients were selected to reflect the higher acuity of the patients and to reflect the various reasons as previously described that may lead to medication documentation errors.

Sample

The sample size of this audit consisted of 60 flowcharts: 30 handwritten flowcharts from 2004 (n=852) and 30 pre-printed flowcharts from 2009 (n=727). The 60 flowcharts were selected from the 2004 and 2009 ICU patient admission roll-book. As a further consideration, handwritten flowcharts only from 2004 and pre-printed flowcharts from 2009 were selected to avoid any changes in documentation standards that may have occurred during pre-printed flowchart trials held between 2005 and 2008.

Data Instrument

As there are no mandated policies or guidelines for specialised medication charts, four categories were used as an audit instrument developed from the guidelines of the Australian National Medicines Policy (DoHA 2000) and the Australian Commission on Safety and Quality in Healthcare (2009). These guidelines stipulate the safe inpatient prescribing standards shown in Table 1.

Table 1: Required inpatient documentation standards for authorised prescribers.

| Guideline | Components |
|-------------------------------------|--|
| 3.1 Patient identifying information | Patient name, hospital identification number and date of birth and gender |
| 3.5 Adverse drug reaction alerts | Unknown allergies, known allergies or adverse drug reactions, name of drug/substance, reaction details and date of reaction occurred |
| 4.5 Medication order | Date of order, generic name of drug, dose, route, frequency, time to be administered and prescriber signature and name |

The audit instrument also encompassed the legal requirements for nurses set by the Australian Nursing and Midwifery Council (2008), the Australian National Medicines Policy (DoHA 2000) and the Australian Commission of Safety and Quality in Healthcare (2009) in relation to administering and managing medications summarised in Table 2.

Table 2: Required medication administration standards for nurses.

| Guideline | Components |
|---|--|
| Know relevant medication legislations | Poisons Act 1964 and Poisons Regulation 1965 in relation to the management of scheduled medications |
| Adequate knowledge of medications | Knowledge of medication, therapeutic purpose and dose, frequency, route of administration, specific precautions, contraindications, side effects, adverse effects and correct storage of medications |
| Adhere to organisational policies and procedures | Verbal orders, delegation of medication administration to medication endorsed nurses, student nurses and student midwives and management of nurse-initiated medications |
| Check medication order | Check correct prescription order with prescriber and/or pharmacist before medication administration |
| Allergy identification | Determine any unknown or known allergies or adverse drug reactions |
| Adhere to the '6 rights' of medication administration | Right drug, right individual, right dose, right time, right route and right documentation |
| Report and manage medication incidents | Report any medication incidents according to organisational policy |

Data evaluation

Both flowcharts contained a specialised IV ordering section and the four categories were grouped according to the guidelines and components required for legal medication documentation standards for prescribers and nurses. Table 3 outlines the four relevant categories identified and the components of each category analysed.

Table 3: Categories & components identified to meet legal documentation standards.

| Category | Components |
|--|---|
| A. Patient identifying details | Patient's full name, date of birth and hospital registration number |
| B. Identified drug allergies or adverse drug reactions | Documented known or unknown drug allergies or adverse drug reactions |
| C. Prescribed medication infusions | Date of order, patient's weight, drug, drug solution, dose and rate and signature of prescriber |
| D. Administered medication infusions | Time of administration and a signature from two nurses |

Ethical Considerations

This audit is classified as 'negligible risk research' meaning there was no foreseeable risk or harm to patients by undertaking the audit (NHMRC 2007). Written consent was obtained from the local Government Department to access patient medical records. By a way of disclosure the author of this audit had previously worked within this ICU and had been the main facilitator in planning, designing, trialling and implementing the pre-printed ICU flowchart into clinical practice.

FINDINGS

The number of IV infusions handwritten in 2004 was 464. Of these 464 infusions there were a total of 495 documented medication errors identified. In 2009 the total number of pre-printed drug infusions was 185. The decreased number of infusions can be attributed to each drug infusion lasting for a 24 hour period instead of requiring a new drug order for each individual infusion¹. A total of 189 documentation errors were identified for 2009.

Error Categories

Category A comprised of an overall 46% (14/30) error rate in 2004 versus 0% (0/30) in 2009. There was a 100% (30/30) error rate in Category B during 2004 compared to a 1.3% (4/30) error rate in 2009. Figure 1 shows that the majority of documentation errors occurred in Category C. 44% (215/484) of errors relating to prescribing documentation standards occurred in 2004 versus an increase in prescribing errors in of 70% (130/185) during 2009. In Category D, 17% (87/484) of documentation errors occurred in 2004 compared to 20% (37/185) in 2009. A fifth category, Category E, was formed when it was recognised that nurses had scribed IV infusions. 30% (149/484) of documentation errors related to nurses scribing IV infusions occurred in 2004 versus 0.1% (2/185) in 2009.

Error components

Category A showed there were no errors relating to documenting patients' names and hospital registration numbers in 2004 and 2009 as shown in Figure 2. During 2004 fourteen documentation errors occurred versus zero errors in 2009 when documenting patients' date of birth.

During 2004 there was no documentation cited of known or unknown drug allergies or adverse drug reactions on all 30 flowcharts. In 2009 this standard improved by 86% (26/30) where patients' drug allergy or adverse drug reaction was identified in all but four charts².

¹ Patient admission numbers and patient acuity were taken into consideration when evaluating the decline in prescribed infusions. Although there was an overall decline in patient numbers, patient acuity had increased in 2009 from 2004. The mean APACHE II score in 2004 was 15.2 (n=832) and 16.3 in 2009 (n=727).

² Drug allergy or adverse drug reaction status was determined in all patients using previous National Inpatient Medication Charts and medical progress notes.

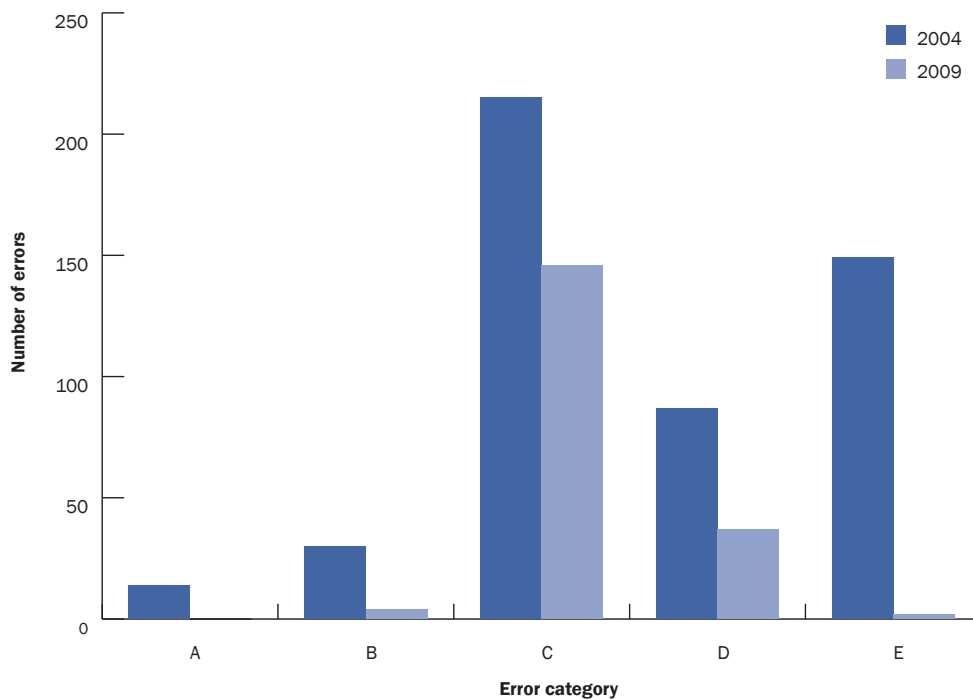
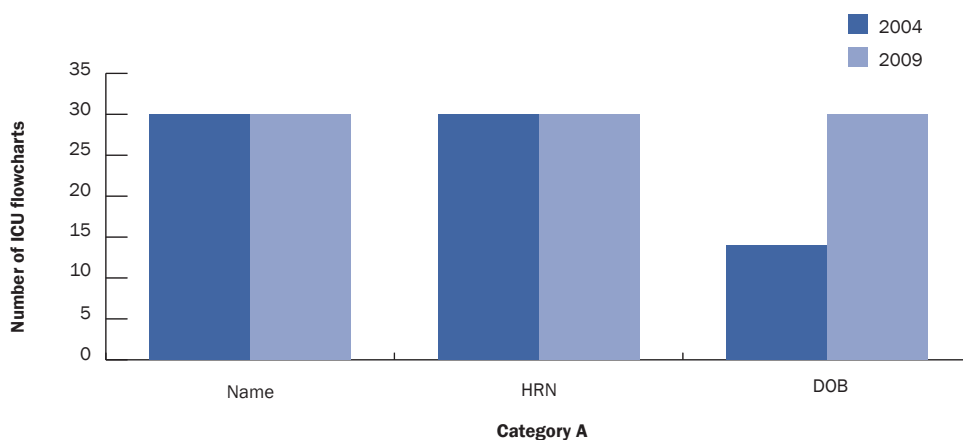
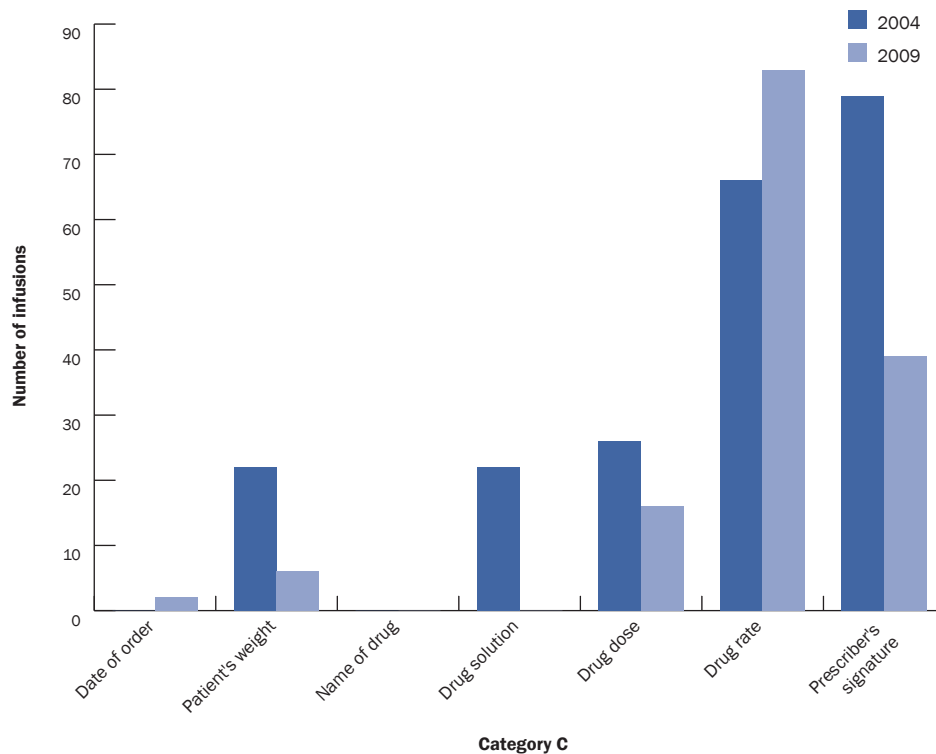
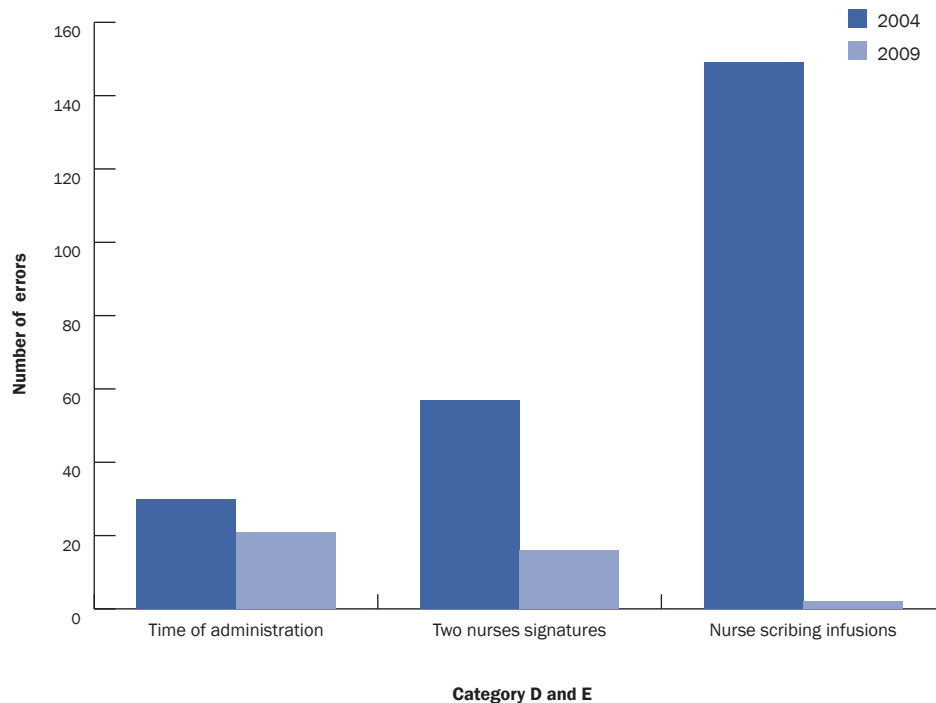
Figure 1: Number of documented errors**Figure 2: Patient's identifying details**

Figure 3 outlines the seven components of prescribing standards of Category C. This figure shows that in 2004 there were 0% (0/30) errors documenting the prescribing days' date versus 0.6% (2/30) in 2009. 73% (22/30) of flowcharts did not have patient's weight documented in 2004 compared to 0.2% (6/30) in 2009. 0% errors occurred in both 2004 (0/464) and 2009 (0/185) when documenting the medication to be infused. In 2004 there was a 0.4% (22/484) solution error rate versus zero errors in 2009. 0.5% (26/484) occurred in 2004 when documenting drug dose versus 0.8% (16/185) errors in 2009. During 2004 there was a 14% (66/484) error rate regarding drug rate versus 44% (83/185) in 2009. 16% (79/484) of all IV infusions were not signed for by an authorised prescriber in 2004 compared to 21% (39/185) in 2009.

In 2004 there was a 0.6% (30/464) error rate when documenting time of IV infusion administration (Category D) and this standard fell to a 1% (21/185) error rate in 2009. Conversely, in 2004 1.2% (57/464) of IV infusions infused did not have two nurses signatures documented as opposed to 0.8% (16/185) in 2009. Thirty two percent (149/464) of actual documented errors in 2004 were as a result of nurses' scribing IV infusions (Category E). This percentage fell to 0.1% (2/185) in 2009 as shown in Figure 4.

Figure 3: Prescribed drug infusions 2004 (n=464) and 2009 (n=185)**Figure 4: Documentation errors by nurses**

DISCUSSION

This audit compares medication documentation standards using handwritten versus pre-printed flowcharts. As technology advances ICUs are moving away from paper-based systems to electronic documentation systems including electronic medication prescribing (Gozdan 2009; George et al 2009; Roughead and Semple 2008; Whyte 2005). Many ICUs however, continue to use paper-based flowcharts and specialised medication charts for intermittent or continuous IV infusions.

During this audit no error free flowcharts were identified meaning every flowchart contained at least one documentation error. The rate of documentation errors for both 2004 and 2009 were significantly high with an error rate of 102%. In 2004 there were 495 documentation errors out of the 484 IV infusions and in 2009 there were 189 errors out of the 185 IV infusions.

Medication documentation errors can potentially lead to an ADE and jeopardise patient safety through iatrogenic injury. While the gold standard of zero medication documentation errors is strived for eradicating medication errors from practice may be difficult to achieve and unrealistic given that error is a fact of human condition (Leape 2009; McDowell et al 2009). Medication errors have been broken down into four classes as seen in Table 4 and while human error exists, the ideal aim and standard is the fourth class of 'minor clinical significance' during the medication process (Kopp et al 2006).

Table 4: Class and definitions of medication errors ^{9,10}

| Class | Definition |
|----------------------|--|
| I. Fatal | Resulting in patient death |
| II. Life-threatening | Resulting in serious adverse effects requiring prolonged length of hospitalisation |
| III. Significant | Resulting in patient monitoring but not requiring corrective treatment |
| IV. Minor | Has no clinical implications to the patient |

Category A

Documenting patient identifying details resulted in an improved standard when recording patients' *date of birth* by 53% (16/30). Documentation of patients' *date of birth* is of significant importance as it is key identifier of the patient under the 'six rights' of medication administration for nurses (Crisp and Taylor 2010). Likewise the National Medicines Policy (DoHA 2000) also stipulates the documentation of patients' *date of birth* to differentiate a patient with the same full name to avoid prescribing, dispensing and administering medications errors. Failure to document patients' date of birth may result in a medication class error of either I, II, III, IV.

Category B

Documenting patients' *allergies* or *adverse drug reactions* status is important to avoid Class I or II adverse events from occurring. The improved standard of 86% (26/30) when documenting patients' *drug allergy* or *adverse drug reaction* status can be attributed to the introduction of an allergy box on the pre-printed flowchart in accordance with the Australian Commission on Safety and Quality in Healthcare (2009) guidelines.

Category C

The largest error of documentation errors occurred in prescribing standards and this study found that prescribing errors had actually increased using the pre-printed medication flowchart by 34%. The significance of the prescribing documentation errors requires closer scrutiny.

Date

Category A showed that documentation standards of the *date the drug order* was prescribed had declined in 2009 (2/30) compared to 2004 (0/464). According to the Australian Commission on Safety and Quality in Healthcare (2009) guidelines describe that date the order is written is required. As both the 2004 and 2009 flowcharts are patient specific and used to document a variety of subjective and objective data the risk of an ADE occurring is categorised within Class IV.

Weight

Adult patients' *weights* are documented for a variety of clinical reasons including drug and dose calculations when administering various IV infusions. In 2009 there was a 72.8% rise when documenting patients' *weight* and can be attributed to the 'weight box' being larger and placed next to where the patient's name is recorded. Failure to document patients' *weight* may lead to a Class IV or III ADE.

Medication

Correct prescribing standards were present both in 2004 and 2009 when documenting the *medication* to be infused. This ideal standard ensures that patients are not at risk for an ADE to incur.

Drug Solution

Incorrect documentation of drug solutions in 2004 was 0.4% (22/484) compared to 0% (0/185) error rate in 2009. This appears at face value to be attributed to pre-printed drug solution orders. It is concluded that this increase in documentation standard meets the ideal aim of placing patients at 'no risk' of an error.

Drug Dose

Initially it would appear that *drug dosage* prescribing standards were worse in 2009 by 0.3% using the pre-printed medication charts. However, risk to patient safety was actually minimised as instead of making handwritten *drug dosing errors*, incorrect *drug dose* errors were due to doctors not circling what drug strength was required. This error can be categorised into Class IV errors as all drug infusions are made according to the ICU's drugs protocols.

Drug Rate

Documentation standards of drug infusion rates also declined in 2009 by 30%. Failure to *document drug infusion* rates can have significant implications to patients in ICU leading to Class II or III ADEs. Patients receiving sedation and analgesia to assist with intubation and ventilation may be at risk of over-sedation without proper assessment and titration of drug infusions. This can cause significant delays in patients being extubated resulting in prolonged stays in ICU and hospital that may place patients at risk of acquiring ventilator-associated nosocomial infections (Quenot et al 2007).

Prescriber signature

Both nursing and medical legislation standards require a signature from an authorised prescriber when ordering drug infusions. Failure to prescribe or administer a medication without a *prescriber signature* is a breach of legislation standards and has the potential to cause an ADE from classes I to IV (Coombes et al 2009). In 2009 documentation of *prescriber signatures* fell by 5%. One possible explanation for decline in documentation standards may be caused by drug infusions being pre-printed on the flowcharts and prescribers not being prompted to sign infusions as with handwriting IV infusions.

Category D

Documentation standards for category D were divided between the two components *time of administration* and *signature of two nurses*. *Time of administration* documentation standards fell in 2009 by 10.4%. However, documentation standards in for two nurses' signing IV infusions increased by 10.2% in 2009. *Time of administration* documentation errors may only result in a Class IV adverse event, while failure to sign for IV infusions may result in a Class I ADE.

Category E

Of significance is the additional risk factor discovered during the study of Category E. Category E was not identified at the planning stages of the study when assessing against the legal documentation standards for authorised prescribers and nurses. However, during the data collection and analysis of the 2004 flowcharts it was identified that 30% (149/484) of the IV infusions had been scribed by nurses. Of these 149 infusions, 70 infusions had then been clearly identified as being signed for by an authorised prescriber other than the person scribing the drug infusion. The phenomenon of nurses scribing infusions without 'written' or 'verbal orders' to maintain a patient's haemodynamic and/or ventilation status and doctors signing infusions 'off' at a later date is well-recognised within ICU despite no literature to support this concept.

In 2009 evidence of nurses scribing drug infusions fell by 44%. This has placed patients at far greater lesser risk of a Class I, II, III or IV ADE from occurring. Through the introduction of nurse practitioners in ICU there may be a greater need for more nurse practitioners to avoid such documentation errors that may lead to patient injury (Hoffman et al 2004).

Limitations

This study was undertaken as a quality improvement activity and one of the main limitations of the study was the population sample size of 60 flowcharts. Counter-claiming this limitation is the number of IV infusions prescribed in 2004 (n=484) and in 2009 (n=185). In light of the number of IV orders for 2004 and 2009, increasing the sample size of the study may not have necessarily yielded different overall percentage results as all charts were from the first day of admission into ICU when on average the largest volume of IV infusions are prescribed.

CONCLUSION

Medication errors in ICU have been an area of concern resulting in extensive research in order to reduce ADEs from occurring. Research so far has identified that medication errors are largely preventable and over half the medication errors that occur happen during the prescribing stage as this study also found. Medication errors in ICU are attributed to multi-factorial reasons including high patient acuity, busy workloads, stress, fatigue and lack of knowledge and training. Medication documentation errors in ICU can lead to ADEs that can have a significant impact on the patient and to healthcare expenditure as a result of iatrogenic injury.

The purpose of this study was to examine medication documentation rates using handwritten and pre-printed medication charts using the Australian National Medicines Policy (DoHA 2000) as measuring standards. Based on these standards this audit found that there are high medication documentation error rates using handwritten and pre-printed specialised medication flowcharts. The significance of this study to clinical practice was to classify the errors in terms of 'risk to the patient' as a result of medication documentation errors.

This audit has found that using pre-printed ICU medication flowcharts reduces the risk of patients experiencing a Class 1 or 11 ADEs and patients are more likely to move across the continuum to a Class IV ADE. Despite the small population size of this audit, this audit has highlighted the need for pharmaceutical review during the prescribing phase and to explore implementation of electronic medication charting nationally. Finally, further qualitative research investigating the phenomenon found in Category D may support the role and growth of nurse practitioners in Intensive Care.

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Skin inspection for evaluating the presence of risk indicators to developing pressure ulcers

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KEY WORDS

Nursing, Outcome Assessment, Skin, Pressure Ulcer.

ABSTRACT

Objective

The skin of patients with multisystem trauma or spinal cord injury was inspected in order to evaluate the presence of indicators of risk for pressure ulcer development associated with the Nursing Outcomes Classification (NOC) descriptor 'Tissue Integrity: Skin and Mucosa'.

Design and setting

A cross-sectional descriptive study performed in a tertiary referral hospital integrated into the public health network of Fortaleza, Ceará state, Brazil.

Subjects

Forty-nine patients with multisystem trauma or spinal cord injury.

Results

Most participants were young men with multisystem trauma. The majority used pressure redistribution devices; the most common was a pyramidal mattress. Among NOC indicators for tissue integrity, texture showed the most change, followed by tissue temperature. The sacral region showed the greatest change in colour and temperature, and the scapulas showed the greatest change in temperature. Seventy-five percent of subjects had a final score of 5:5, indicating non-compromised skin.

Conclusion

Classification parameters were developed based on NOC indicators and their applicability in our patients was verified. Use of the NOC skin integrity outcomes may be an effective method for identifying risk indicators for pressure ulcer development.

INTRODUCTION

Using the nursing process to establish a protocol for prevention or treatment of pressure ulcers (PU) is in its early stages in several countries. Existing nursing research focusing on PU in Brazil is limited (Costa et al 2005), and most studies focus on treatment rather than prevention. The failure to use the care-oriented nursing process with this type of wound may contribute to the scarcity of studies by nurses. One way to facilitate the application of the nursing process is by using established nursing care taxonomies. One such taxonomy is the Nursing Outcomes Classification (NOC), developed in 1991 by a research team in Iowa to implement practices specific to nursing that were different from the traditional clinical practice (<http://www.nursing.uiowa.edu>).

In addition to helping guide outcome dependent nursing interventions directed toward the individual, family, or community, NOC indicators may be used to assess the patient's baseline condition. Therefore, it is necessary to evaluate specific indicators to determine whether they are indicative of the outcome of interest. 'Tissue Integrity: Skin and Mucous Membranes' is an important outcome within the NOC taxonomy (Moorhead et al 2003). Maintaining skin integrity, including prevention of PU is a key element of nursing management in the hospital, rehabilitation center, or long-term care facility. When compared to treatment, PU prevention reduces costs, decreases hospital length of stay, and avoids the morbidity associated with these significant wounds.

Previous studies suggest that Stage I PU tend to be underreported (Rogenski and Santos 2005; Ferreira 2001). In addition, Stage I and II PU may be confused with incontinence associated dermatitis when they occur in the sacral region of persons with urinary or faecal incontinence. Nevertheless, it is important to accurately differentiate the underlying aetiology of skin damage because of differences in prevention and treatment. This distinction is especially important for patients with other risk factors for pressure ulceration, such as immobility and diminished coetaneous sensations frequently seen in patients with spinal cord injury or multisystem trauma.

One of the instruments recommended to verifying the pressure ulcer risk is Gosnell's Scale (Gosnell 1989). A prospective study that compared the predictive validity of four scales for the pressure ulcer risk concluded that Gosnell's Scale was the most appropriate of the 4 scales for predicting PU risk in orthopaedic and neurologic populations (Jalali and Rezaie 2005). This scale is base on five criteria for rating PU (Mental status, Continence, Activity, Mobility, and Nutrition). Under each criterion are subcategories that are given points. At the end of the assessment the points are added up, and the minimum is five points that represent a low risk for PU and the maximum is 20 points that represent a high risk for PU (Gosnell 1989).

On the other hand, there are no studies comparing the concurrent validity of NOC indicators related with the tissue integrity and other predictive scales for pressure ulcer risk. The use of NOC indicators also may help identify clinical signs that aid the nurse to assess risk indicators for loss of skin integrity via development of a PU. Although the NOC taxonomy is well known in the United States of America, it is in an initial phase of implementation in other countries. Therefore, in the present study, skin inspections in patients with multisystem trauma or spinal cord injury were performed in order to evaluate the presence of risk indicators for PU development using a questionnaire that incorporated indicators of the NOC descriptor 'Tissue Integrity: Skin and Mucosa'.

METHODS

A cross-sectional study was conducted in a public emergency hospital that specialises in trauma care located in Fortaleza, Ceará, in north-eastern Brazil. The research sample comprised patients with spinal cord injury or multisystem trauma who were conscious, capable of expressing themselves verbally, and 14 to 65 years

of age. These criteria were selected to ensure a relatively homogeneous sample, and to avoid age-related factors affecting PU risk at the extremes of life. Study procedures were approved by the Research Ethics Committee at Federal University of Ceará; informed consent was obtained from each participant.

The sample size was calculated from an equation developed for cross-sectional studies (Hulley et al 2003). This equation is based on an assumption that subjects are drawn from an infinite population. Our sample was calculated using a significance level of .05 and a sampling error of 10%. A PU prevalence rate of 85% for the calculation was used, based on the findings by Ferreira (2001), which identified a range of PU prevalence rates in paraplegic and quadriplegic patients between 25% and 85% (incorporating all PU stages). Calculation of the equation based on these parameters yielded a sample size of 49 individuals.

The exclusion criteria were one or more Stage II, III or IV PU based on the National Pressure Ulcer Advisory Panel (<http://www.npuap.org/resources.htm>) or having missing data on the questions on the form used in this study. Presence of a Stage I PU was not an exclusion criterion since these lesions did not involve a compromise of the skin's integrity.

Data were collected using a standardised form that included the indicators for 'Tissue Integrity: Skin and Mucous Membranes', defined in the NOC scheme (Moorhead et al 2003). The form was designed to identify factors indicating an increased likelihood of developing a PU (Appendix A). The indicators of 'Skin intactness', 'Sensation', 'Hydration', 'Elasticity', 'Colour', 'Texture', and 'Hair growth' were selected in order to better evaluate their ability to predict PU occurrence. The indicator 'Continence' was added because of its association with PU occurrence. Additional information was obtained from the participant's medical records and from direct queries. The indicators were measured using a 1-to-5 point Likert scale, where one represented the most unhealthy response and five the most healthy response. A total score was calculated by summing the score of each item.

Data Analysis

Data analysis was performed in two stages, using the SPSS 13.0 software. In the first stage, demographic and pertinent clinical findings were described. In the second stage, the 'Tissue Integrity: Skin and Mucosa outcome' was evaluated using scores from the NOC indicators. For a general evaluation of the main outcome, values of central tendency and variability were calculated. The Kolmogorov-Smirnov test was used to evaluate the symmetry of the NOC scores. In addition, absolute and relative frequencies were calculated for each indicator and sub-indicator.

To verify the concurrent validity, the data of NOC indicators were compared with the indicators of Gosnell's scale. The value final scores of Gosnell's scale were evaluated previously regarding the symmetry. Afterwards, it was verified the correlation (Pearson's coefficient) and the consistency (Cronbach's Alpha) between the final scores of the two scales.

FINDINGS

Forty-nine individuals participated in the study. The majority ($n = 46$) were male. Their mean age was 32.4 years \pm 11.31 (mean \pm SD). They completed an average of 7.02 \pm 4.3 years of education. Most were victims of multisystem trauma (77.6%), or spinal cord injury (20.4%). Almost half of the group (42.9%) were unable to bathe themselves. Their average fluid intake was 1592.86 ml/day (\pm 879.749), and their average hospital stay was 30.04 days (\pm 35.721).

Over half the sample (55.1%) did not use pressure redistribution devices; the most common was a pyramidal foam mattress. However, 65.3% also used an alternative positioning device. The most commonly used positioning device was a pillow placed underneath bony prominences (51%). Many also used sheets or towels to reduce tissue interface pressures in susceptible areas.

Assessment of the skin using NOC indicators revealed that the sacral region showed alterations in temperature (warmer) (42.85%) and colour (erythema) (26.53%). Although 25 patients (51%) presented with relevant heat in the scapula region, this region showed changes in colour in only two patients (4%). Of all patients, 10% were more sensitive to pain on their heels, and only 2% were sensitive to temperature in that region. The sciatic region showed the least amount of alterations.

Among the NOC indicators, texture was the most affected (mean score 3.39), with some PU areas having completely thinned skin. Skin texture was classified as smooth and firm, rough and wrinkled and/or thin. These characteristics were evaluated by inspection and palpation of the limb (Jarvis 2007). The tissue temperature was the second most compromised (mean score 3.79). Based on the 5-point Likert Scale values, both texture and tissue temperature were considered moderately compromised. Fluid intake was deemed adequate, and all other indicators were classified as slightly compromised (table 1).

Table 1: Descriptive statistics of the operational indicators of tissue integrity for skin and mucous membranes based on NOC criteria and the indicators of Gosnell Scale (n=48).

| Indicators | Mean | Standard deviation | 25 th Percentile | 50 th Percentile | 75 th Percentile |
|-------------------------|------|--------------------|-----------------------------|-----------------------------|-----------------------------|
| 1. NOC Criteria | | | | | |
| Tissue temperature | 3.80 | 0.912 | 3.00 | 4.00 | 5.00 |
| Sensation | 4.90 | 0.368 | 5.00 | 5.00 | 5.00 |
| Hydration | 4.02 | 1.164 | 4.00 | 4.00 | 5.00 |
| Elasticity | 4.84 | 0.426 | 5.00 | 5.00 | 5.00 |
| Colour | 4.02 | 1.283 | 3.00 | 5.00 | 5.00 |
| Texture | 3.43 | 1.791 | 1.00 | 4.00 | 5.00 |
| Contenance | 4.59 | 1.079 | 5.00 | 5.00 | 5.00 |
| Hair growth on skin | 4.86 | 0.612 | 5.00 | 5.00 | 5.00 |
| Final classification | 4.31 | 0.496 | 4.06 | 4.25 | 4.68 |
| 2. Gosnell Scale | | | | | |
| Mental status | 1.00 | 0.000 | 1.00 | 1.00 | 1.00 |
| Contenance | 1.43 | 1.000 | 1.00 | 1.00 | 1.00 |
| Nutrition | 1.53 | 0.793 | 1.00 | 1.00 | 2.00 |
| Activity | 2.10 | 1.159 | 1.00 | 2.00 | 3.00 |
| Mobility | 2.49 | 1.063 | 2.00 | 2.00 | 3.50 |
| Final Score | 8.55 | 2.558 | 7.00 | 8.00 | 10.50 |

Although 25% of participants were found to have extremely compromised skin texture (score 1) and moderately compromised tissue temperature (score 3) the mean value across all indicators (final classification) was high, as were the values for the 25th, 50th and 75th percentiles.

Regarding the concurrent validity analysis, the final scores presented symmetrical distribution (NOC – $p = 0.228$; Gosnell – $p = 0.180$). The Pearson's correlation coefficient showed high inverse correlation ($R = -0.727$; $P = 0.000$). The negative value it relates with the inverse orders of the scales to define high risk to develop PU (for the NOC scales the worst health condition is related to a low scores, while in the Gosnell's Scale occurs the opposite). Cronbach's Alpha for consistency between both scales also was high and negative (-0.746) indicating good consistency between scales.

This study had some limitations. It was a cross-sectional study, and there is a scarcity of studies that conducted skin inspections through NOC indicators, which inhibits the ability to make comparisons. However, the authors were able to develop classification parameters for the NOC indicators, and verified its applicability.

DISCUSSION

Existing evidence demonstrates that preventive strategies can reduce the incidence and severity of hospital acquired PU in the acute care setting (Cardoso et al 2004). The results of our study, based on NOC indicators, suggest that the sacral region and the scapula regions are susceptible areas, since they showed high temperatures.

According to the *European Pressure Ulcer Advisory Panel (EPUAP)*, a risk assessment tool should include, among other factors, the level of skin damage. In a study by Rocha and Barros (2007), among the items assessed in the Waterlow scale, non-healthy skin was a statistically significant predictor of the development of PU. It also found that 86% of the patients who developed PU had skin that was very thin, dry, with oedema, moist, sticky (at a high temperature), blanchable, tearing, or macerated, and it found that such a result was observed in all the three risk assessment scales that were evaluated. The findings of the present study are consistent with this, as the texture indicator was the most compromised, indicating rough and/or thin skin. Therefore, this condition of the skin may increase the occurrence of pressure wounds because it indicates tissue fragility. The hydration item showed somewhat lower than perfect values, and this slightly lower hydration may have contributed to patients' dry and brittle skin. In addition, there were slightly lower than perfect values for the tissue temperature, which may have contributed to sticky skin. Although the study included patients with spinal cord injury, the sensation indicator showed high scores in pressure areas, probably due to incomplete and low-complexity injuries. The hair growth item, which is included in the list of NOC indicators but not included in other assessment scales, was also not compromised, probably because there were not hairs in some of the problematic bony prominence areas.

Using the NOC and the indicators established by NOC allowed to evaluate which parameters were important as risk indicators for developing PU. Although patients with multiple trauma or spinal cord injuries are supposedly at high risk for developing PU, this study showed that such patients were not compromised based on the NOC indicators.

It is important to remember that the use of forms to measure risk is an important tool to help guide nurses in ultimately improving the quality of health care, reducing costs and reducing the pain and suffering of patients. The use of assessment techniques should, however, be combined with the clinical judgment of the professional, and there should be agreement in the two evaluations with each particular situation. A clinical instrument with clear terms can be used to guide health care workers to effectively allocate the physical and human resources.

Using the NOC skin integrity assessment may be an effective method to evaluate the presence of risk indicators for the development of PU, and it can guide nursing actions according to the observed needs. Thus, the skin condition can become a specific quantitative indicator for the nursing team. Other advantages of this type of form include the fact that it can assess the degree of compromise and the fact that it can be easily applied.

CONCLUSIONS

In terms of the operational NOC indicators, texture showed the most change, followed by tissue temperature. The sacral region showed the most change in terms of colour and temperature, while the scapula showed changes exclusively in temperature. Approximately 70% of patients presented a final score of five (out of five maximum score), which meant they had non-compromised skin. The correlations between study variables were evaluated, and no significant correlations were found. The used indicators showed satisfactory concurrent validity when compared to the Gosnell's scale.

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APPENDIX A - INSTRUMENT FOR EVALUATION

I. SOCIOECONOMIC DATA:

Age: _____ Gender: _____

Occupation: _____ Years of education: _____

II. CLINICAL DATA:

Days in-hospital: _____ Date: _____

Medical diagnosis: _____

Other health alterations: _____

Last glycaemia result: _____ Date: _____

Last Haematocrit/Haemoglobin results: _____ Date: _____

Last Leukometry: _____ Date: _____

Daily fluid intake: _____ ml

Referred weight: _____ Body Mass Index: _____

Referred height: _____ m

Diuresis:

- Diuresis in diapers
 Use of female/male catheter
 Diuresis in bedpan or male urinal
 Diuresis in the toilet

Use of preventive mattress ()Yes ()No

- Standard hospital mattress
 Eggshell mattress
 Water mattress

Hygiene:

- Bath on bed
 Bath on the chair
 Shower bath

- Articulated mattress
 Other option

Use of pressure-reducing ()Yes ()No

- () pillow
- () gloves with water
- () inflatable cushions
- () Other option

III. DATA RELATED TO TISSUE INTEGRITY: SKIN AND MUCOSA:

1 2 3 4 5

1. Temperature
 2. Sense
 3. Hydration
 4. Elasticity
 5. Colour
 6. Texture
 7. Continence
 8. Growth of hair
- Total score

1. Temperature

1.1 Body Temperature

Score

| | |
|--|---|
| Normothermic during all measures | 5 |
| Temperature changed once a day | 4 |
| Altered temperature twice a day | 3 |
| Altered temperature three times a day | 2 |
| Altered temperature four times a day or more | 1 |

Result:_____

1.2. Temperature on pressure areas

Score

| | |
|---|---|
| Without temperature changes | 5 |
| High temperature on one pressure area | 4 |
| High temperature on two pressure areas | 3 |
| High temperature on three pressure areas | 2 |
| High temperature on four pressure areas or more | 1 |

Result:_____

Overall score

Classification

| | |
|--------|-----------------------------------|
| 10 | Without impairment or compromised |
| 8 or 9 | Slightly impaired or compromised |
| 6 or 7 | Moderately impaired |
| 4 or 5 | Substantially impaired |
| 3 or 2 | Extremely impaired |

1.1 Areas of pressure with changes in temperature

Area _____ Score _____

Area _____ Score _____

Area _____ Score _____

Area _____ Score _____

(total number of areas with changes)

2. Sense**2.2 Sensation (sense)**

| | Score |
|--|--------------|
| Pain sensitivity, superficial sensitivity and deep sensitivity all over the limb. | 5 |
| Pain sensitivity, deep sensitivity and lack of superficial sensitivity in some area of the limb. | 4 |
| Pain sensitivity, lack of deep sensitivity and lack of superficial sensitivity in some area of the limb. | 3 |
| Lack of pain sensitivity and superficial sensitivity, but deep sensitivity in some area of the limb. | 2 |
| Lack of pain sensitivity, lack of deep sensitivity and lack of superficial sensitivity in some area of the limb. | 1 |

2.1 Areas of pressure with changes in sense

Area _____ Score _____

Area _____ Score _____

Area _____ Score _____

Area _____ Score _____

Area _____ Score _____

(total number of areas with changes)

3. Hydration**Score**

| | |
|---|---|
| Hydrated skin | 5 |
| Dry or humid skin | 4 |
| Peeled or intumescing skin | 3 |
| Skin with superficial fissures or excessively wet | 2 |
| Skin with deep fissures or macerated | 1 |

3.1 Areas of pressure with changes in hydration

Area _____ Score _____

Area _____ Score _____

Area _____ Score _____

Area _____ Score _____

(total number of areas with changes)

4. Elasticity**Score**

| | |
|--|---|
| Skin returns to normal immediately | 5 |
| Skin returns to normal after 1 second | 4 |
| Skin returns to normal after 2 seconds | 3 |
| Skin returns to normal after 3 seconds | 2 |
| Crease | 1 |
| Result: _____ | |

5. Colour**Score**

| | |
|-------------------|---|
| Normal staining | 5 |
| Pallor | 4 |
| Mild erythema | 3 |
| Moderate erythema | 2 |
| Intense erythema | 1 |

5.1 Areas of pressure with changes in colour

Area _____ Score _____

Area _____ Score _____

Area _____ Score _____

Area _____ Score _____

(total number of areas with changes)

6. Texture**Score**

Normal texture (smooth and firm)

5

Rough skin

4

Rough and wrinkled skin

3

Wrinkled and thin skin

2

Completely thin skin

1

6.1 Areas of pressure with changes in texture

Area _____ Score _____

Area _____ Score _____

Area _____ Score _____

Area _____ Score _____

(total number of areas with changes)

7. Continence**Score**

Continent

5

Occasional incontinence

4

Urinary incontinence

3

Faecal incontinence

2

Urinary and faecal incontinence

1

Result: _____

8. Hair growth**Score**

Normal amount of hair

5

Little decrease of hair

4

Moderate decrease in amount of hair

3

Great decrease in amount of hair

2

Alopecia

1

8.1 Areas of pressure with changes in amount of hair

Area _____ Score _____

Area _____ Score _____

Area _____ Score _____

Area _____ Score _____

(total number of areas with changes)

Graduate entry to practice in nursing: exploring demographic characteristics of commencing students

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KEY WORDS

accelerated program, graduate entry, masters, nursing, pre-registration, second-degree

ABSTRACT

Objective

Graduate entry to nursing programs are new to Australia. This paper reports on an analysis of students enrolled in an accelerated, pre-registration, masters-level nursing course in Melbourne, Australia.

Design

Quantitative surveys were used to gather data on a range of demographic characteristics and factors relating to students' choice to undertake nursing.

Setting

The study was conducted at one campus of an Australian university.

Subjects

Seventy-nine students from the first two cohorts of the Master of Nursing Practice participated in the study.

Main outcome measure(s)

Descriptive statistics were used to examine age and gender distributions, previous education and employment history, along with reasons surrounding students' application for entry to the course.

Results

Findings revealed higher male participation than traditional undergraduate nursing programs and students originated from a wide range of cultural and disciplinary backgrounds. Students' previous education ranged from bachelor degree to doctoral levels. A wide range of reasons were given for moving to a nursing career. Predominant reasons were career stability, being part of a caring profession and previous personal or family experience with the health care setting.

Conclusion

Accelerated programs such as this have the potential to add to the nursing workforce in a way other programs do not, build diverse expertise and professional knowledge. Understanding the characteristics of people attracted to these courses will assist with appropriate tailoring of programs, as well as assisting with marketing the nursing profession.

INTRODUCTION

Graduate entry to nursing programs, aimed at providing accelerated pathways to nursing practice for graduates from other disciplines, are relatively new to Australia. In the United States of America (USA) such programs have been offered for over thirty years, primarily initiated as a move to address nursing workforce shortages (Aktan et al 2009). It is argued that such courses provide attractive options for adults seeking second careers as they are completed in a shorter time, and graduates bring broader perspective than graduates from traditional pathways (Johnson and Johnson 2008).

The presence of an aging nursing workforce, and subsequent demands on health care systems, is also significant in the Australian context. One response to these issues was the development of the Master of Nursing Practice (MNP) which commenced at the authors' University in semester two, 2009. The course is an intensive, accelerated pre-registration program offered in four semesters over 18 months, utilising one summer semester to facilitate acceleration. In addition, the course currently has two intakes per year. In order to enter the program, applicants are required to hold a bachelor degree in a discipline other than nursing and demonstrate previous tertiary level study in human biology. This paper provides an overview of the demographic characteristics of students enrolled in the first two intakes of the program.

LITERATURE REVIEW

Graduate entry nursing programs have been offered in the USA since the 1970s. Such courses have rapidly proliferated as a means for managing nursing shortages (Cangelosi and Whitt 2005) and have increased in popularity (Cangelosi 2007a). These programs are delivered in an accelerated mode and are designed to meet pre-registration requirements. Programs described in the literature range in length from twelve to eighteen months and have been predominantly offered at bachelor degree level. However, recently similar programs at masters level have been offered (Cangelosi and Whitt 2005). Currently, there are 230 bachelor degree level programs and 65 masters level programs offered in the USA with others under development (American Association of Colleges of Nursing 2010). It has been argued that masters level courses are particularly popular as they facilitate accelerated entry into nursing at the same time as obtaining a higher degree (Johnson and Johnson 2008).

Some previous work has explored the demographics of people entering graduate entry courses in the USA. This work suggests these courses attract groups that are underrepresented in traditional programs. Seldomridge and DiBartolo (2007) compared changing demographics in one program from 1997 to 2006. During this period their findings included a progression towards students from older age groups, increasing numbers of multiple degree holders, higher numbers of males and students from international backgrounds. Simultaneously, they reported decreases in students with degrees in education and increases in those with business degrees. The authors suggest that nursing is seen to offer competitive remuneration, employment stability as well as flexibility, in a context where economic downturns have impacted on employment in some fields. In their review of two student cohorts from one university, Rouse and Rooda (2010) reported 35% being men and 35% being non-Caucasian, along with retention of 58%. The reasons students did not complete the program was attributed to a wide list of factors ranging from ill health to academic dismissal.

The students that accelerated courses attract possess maturity, real world experience and perspectives on "the potential impact they can have on the outcome of patient care" (Cangelosi 2007a, pp.95). Yet, they have been found to have similar attitudes towards nursing as traditional students (Toth et al 1998). Despite this, accelerated programs provide many unique challenges for learners. Balancing competing demands in tightened timelines can be particularly difficult (Cangelosi 2007a). Walker et al (2007) examined preferences

for teaching methods of second-level and traditional baccalaureate nursing students. Second-degree students were found to be more self-directed and motivated to learn, expected more classroom structure and academic guidance, while being more focused on grades they received. The majority preferred case study learning, web-supported learning, and relied on faculty to explain what they needed to know. With the need to learn at a rapid pace, clinical educators have been found to play an important role for these students. Cangelosi (2007b) found graduates from these programs valued clinical educators who took time to integrate classroom learning with what they were encountering in practice and transform clinical experiences into learning events. However, possessing greater independence and confidence, these students may find close supervision and monitoring in practice uncomfortable (Seldomridge and DiBartolo 2007).

Teaching second-degree students presents different challenges for academics and clinical teaching staff that may require altering normal educational approaches. Although learning in a new discipline, these learners bring skills in self-directed learning and broad life experiences to integrate into their new learning (Cangelosi 2007a). In her study, Cangelosi (2007a) found that students valued being challenged and facilitated to make connections between their previous learning and nursing. However, teaching these students can be uncomfortable for some academics as students are more likely to challenge them and ask questions (Lindsey 2009; Seldomridge and DiBartolo 2007). Nevertheless, students require support from academics to manage the pace of course delivery, as well as their lives outside of the course (Sweeney Rico et al 2010). In another study, Cangelosi and Moss (2010) examined the experiences of academics teaching students in accelerated programs. Participants described being challenged and exhausted by teaching these students. They reported a need for “direct, constructive and respectful feedback” (Cangelosi and Moss 2010 pp.141) as well as assisting them to socialise into nursing as particularly important with this group.

METHOD

This quantitative study sought to examine characteristics of individuals in the first two cohorts undertaking the MNP at the authors' university, including demographic details, previous education, and rationale for pursuing change of career, in order to better understand their learning needs. Surveys were developed through examining available literature and questions arising from within the course management team. Ethics approval was sought and provided by the university human ethics committee prior to commencement of data collection. Soon after commencement in the course, students were informed of the study during allocated lecture time and informed that participation was voluntary and responses anonymous. An academic staff member not directly involved in managing units or the course distributed, collected and analysed the surveys to minimise the potential for coercion or bias. Data were entered into SPSS (Statistical Package for the Social Sciences v.18) and analysed using descriptive statistics.

FINDINGS

From the surveys of students in the first two cohorts, response rates of 93% (n=26) and 100% (n=53) respectively were achieved.

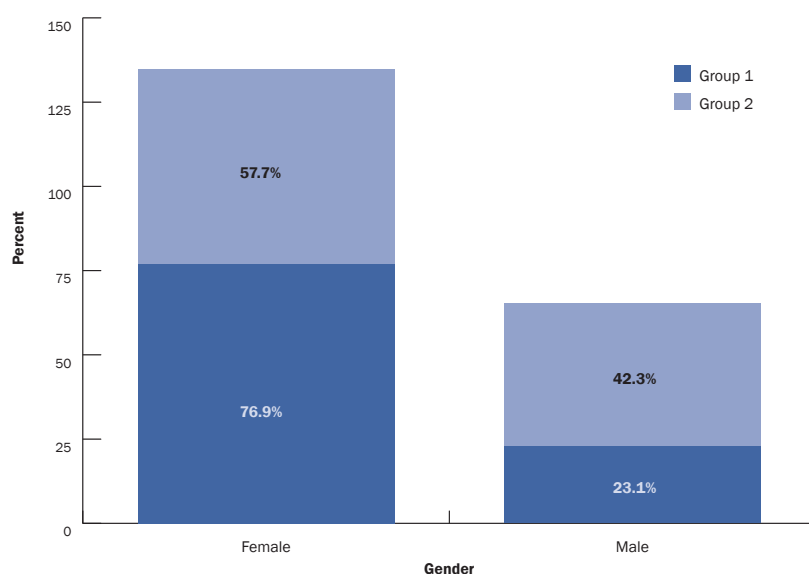
Demographic data

Ages of participants across combined cohort data were widely distributed (Table 1). Unexpectedly, the largest group represented was 21-25 years (24.1%, n=19) indicating that many students had not completed their previous degrees a long time before commencing this course.

Table 1: Age distribution

| Age ranges (yrs) | Frequency (n=79) | % |
|------------------|------------------|------|
| 21-25 | 19 | 24.1 |
| 26-30 | 15 | 19.0 |
| 31-35 | 13 | 16.4 |
| 36-40 | 10 | 12.7 |
| 41-45 | 13 | 16.4 |
| 46-50 | 6 | 7.6 |
| 51-55 | 2 | 2.5 |
| Not stated | 1 | 1.3 |

Gender distributions revealed higher male participation than traditionally seen in nursing education. Overall, across the two groups 29.1% (n=23) were male and 69.6% (n=55) female. However, as highlighted in Figure 1, 42.3% of participants in the first cohort were male.

Figure 1: Gender distribution

Across the group, 45.6% (n=36) identified themselves as coming from non-English speaking backgrounds, reflecting a culturally diverse group.

Previous Education

Participants were asked to identify their highest level of education to which the majority (74.7%, n=59) identified bachelor degree. The remainder reported higher qualifications: graduate diploma (6.3%, n=5), masters degree (13.9%, n=11) and doctoral level (5.1%, n=4).

Participants were also asked to identify the discipline of their initial bachelor degree (Table 2). Findings highlight the diversity of backgrounds existing in the group. Science (39.2%, n=31) was the most frequently reported discipline, with business (13.9%, n=11) the next most frequent. Thirty-seven participants (46.8%) reported undertaking their bachelor degree outside Australia.

Table 2: Discipline of bachelor degree

| Discipline | Frequency (n=79) | % |
|------------------------|------------------|------|
| Business | 11 | 13.9 |
| Education | 4 | 5.1 |
| Engineering | 1 | 1.3 |
| Information technology | 2 | 2.5 |
| Law | 4 | 5.1 |
| Medicine | 4 | 5.1 |
| Pharmacy | 2 | 2.5 |
| Psychology | 4 | 5.1 |
| Science | 31 | 39.2 |
| Other | 16 | 20.3 |

Employment History

Diversity was also evident in length of time participants had spent in the workforce. As shown in Table 3, the majority (68.3%, n=54) had spent ten years or less in the workforce. In order to ascertain whether participants were likely to remain in the nursing workforce, they were asked how many career moves they had experienced. The majority (65.8%, n=52) reported one or no moves indicating that they were not normally mobile and likely to move again.

Table 3: Years in the workforce

| Year range | Frequency (n=79) | % |
|------------|------------------|------|
| 0 - 5 | 26 | 32.9 |
| 6 - 10 | 28 | 35.4 |
| 11 - 15 | 11 | 13.9 |
| 16 - 20 | 5 | 6.3 |
| > 21 | 9 | 11.4 |

Move to nursing

Participants were asked how long they had been considering a career in nursing. Responses again were widely distributed. Nineteen participants (24.1%) reported less than six months, seventeen (21.5%) six to twelve months, while thirty one (39.2%) reported considering nursing for longer than two years. Participants were also asked their main reason for undertaking a nursing course. Table 4 indicates that participants considered career stability, diversity of practice and the caring nature of nursing highly. A number also indicated being influenced by personal experience with the health care system as an influencing factor for pursuing a nursing career.

Table 4: Reason for nursing course

| Year range | Frequency (n=79) | % |
|---|------------------|------|
| Career stability | 52 | 65.8 |
| Difficulty getting employment in current field | 22 | 27.8 |
| Following personal or family experience in health care system | 33 | 41.8 |
| Diverse practice experiences | 47 | 59.5 |
| Seeking a caring profession | 51 | 64.6 |
| Other reason | 16 | 20.3 |

A question was asked as to why participants chose to enrol in the course at this time (Table 5). Availability of family support (32.9%, n=26) and eagerness to become qualified (78.5%, n=62) being the most common influences. Finally, participants were asked why they chose this course over other available nursing courses. In this question, participants were permitted to select more than one response. Fifty one (64.6%) reported choosing it because it was offered at postgraduate level, the length of the course was identified by 74.9% (n=59), the accelerated nature of the course (72.2%, n=57), location of offering (35.4%, n=28), because of the university offering it (30.4%, n=24) and other reason (7.6%, n=6).

Table 5: Why enrol in this course now?

| Reason | Frequency | % |
|--------------------------------------|-----------|------|
| Current unemployment | 13 | 16.5 |
| Current job dissatisfaction | 16 | 20.3 |
| Family support available now | 26 | 32.9 |
| Keen to qualify and start practising | 62 | 78.5 |
| Other | 8 | 10.1 |

DISCUSSION

In the National Review of Nursing Education (Heath 2002) the need for multiple entry points in Australian nursing education was recommended. However, graduate entry nursing programs are still relatively new, few in number and not well understood in the Australian context. While this study was focused on examining characteristics of students to inform teaching and learning delivery and development, the data gathered adds to a very limited body of knowledge and suggests that there may be particular benefits for the Australian nursing profession from graduate entry pre-registration programs. Findings reinforce those from studies conducted in the USA that highlight that students in these programs bring significant knowledge and professional expertise (Seldomridge and DiBartolo 2007) and real world experience. A number of participants in this study reported having higher qualifications than bachelor level. This, in itself, may be challenging for academic staff who themselves are working on higher degrees and warrants some exploration, given that some staff can feel challenged by teaching these students (Lindsey 2009; Seldomridge and DiBartolo 2007).

Similar to the work of Seldomridge and DiBartolo (2007) and Rouse and Rooda (2010), this study revealed higher numbers of minority group representation than in traditional courses, that is, more males and more students from non-English speaking backgrounds. This suggests that graduate entry courses may over time have a positive influence on correcting gender and cultural balances within the nursing workforce. Ongoing monitoring will evaluate such aspects.

While some graduate entry nursing programs are offered at bachelor level, the findings of this study suggest that accelerated programs offered at postgraduate level could be particularly enticing for prospective students. This reinforces Johnson and Johnson's (2008) suggestion that offering opportunities for both obtaining a nursing qualification simultaneously with a higher degree is particularly popular. The current study found that participants were eager to qualify and commence practising as nurses, hence their decisions to undertake an accelerated program rather than enter a traditional course with credit for prior learning. This suggests that individuals seeking access to accelerated courses may originate from a different potential pool of future nurses that has not yet been optimised, yet has the potential to significantly add to the nursing workforce. Given existing workforce shortages, this warrants further exploration.

Anecdotally, there is a perception that students undertaking graduate entry courses are mature aged and are unlikely to spend significant time in the nursing workforce. This notion is reinforced by Seldomridge and DiBartolo (2007) who reported participants to be progressively older. The nature of the cohort in this study negates such perceptions with the majority being between 21 and 24 years of age. Many reported not being

long out of their undergraduate degrees. The high percentage of science graduates may reflect difficulty finding relevant work in the field, while the numbers of business graduates may reflect changes in the global financial context. Further work is needed to fully understand this phenomenon.

LIMITATIONS

There are clearly limitations to this study, which limit generalisations to other populations. The study was conducted in only one program at one Australian university and captured students early in their courses. Therefore, data about students' experiences of learning in an accelerated program and the challenges that this poses and this certainly remains a gap in the literature. A larger, longitudinal study across different programs is recommended to provide more substantive data about graduate entry courses and the students undertaking them.

A lack of research around graduate entry courses in Australia warrants further attention. In particular, research is needed to explore the experiences of students in intensive, accelerated programs, including retention and clinical placement issues. This includes examining how prior learning influences learning in nursing. In addition, it is important to understand the challenges faced by academics and clinical teaching staff involved with these students. Furthermore, research is needed to explore the longer-term impact of graduates from these programs on the nursing workforce. Clearly, it would be beneficial to understand how previous disciplines of study are utilised in practice and enhance the work of these graduates and nursing more broadly.

CONCLUSION

Graduate entry nursing education is relatively new to the Australian context, despite being available for decades in the USA. Such courses have the potential to add to the nursing workforce, building new expertise and professional knowledge. The accelerated nature of these programs may attract individuals who would not otherwise enter nursing, as well as contribute to addressing gender and cultural imbalances in the workforce. Overall, there is a need for enhanced understanding of the potential impact of graduate entry courses on the nursing workforce in Australia.

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Consumer perceptions of the effectiveness of a breast care nurse in providing coordinated care to women with breast cancer in Queensland, Australia

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KEY WORDS

Breast Cancer, Breast Care Nurse, Model of Care

ABSTRACT

Objective

To assess the effectiveness of a breast care nurse (BCN) in supporting women with breast cancer.

Design

Phone interview using a semi-structured questionnaire.

Setting

Large Australian regional health service.

Subjects

Women with breast cancer who either received care from the BCN (n=28) or did not receive care from the BCN (n=22).

Main outcome measure

Patient views of the value of information and support between the two groups.

Results

Significant differences were evident between the two groups. For 17 of 18 factors about information needs and quality participants supported by the BCN reported that more information and support needs were met than those without BCN support with statistically greater satisfaction ($p < .05$) demonstrated for five of the factors. There were also significant differences between the two groups for the timing of support pre and post treatment with those with BCN input indicating higher support in all cases.

Conclusion

The BCN model has been slow to be adopted in Queensland and this study supports continuation of the program and the creation of additional positions. There is clear evidence that a BCN role is accepted and effective in the health service. Furthermore the model of care coordination, support, information and referral has implications for other cancer streams.

INTRODUCTION

Breast cancer in Australia is diagnosed more than double the number of times of the next most common (bowel) cancer (AHIW and NBOCC 2009). Increased survival rates and lack of certainty of a cure present the challenge that women must find ways to live with their disease, confronting the short and long-term psychosocial as well as physical consequences. This in turn has led to a greater focus on providing holistic care to women with breast cancer and the need to address the reported unmet support need of participants (Connell et al 2006)

A degree of emotional distress is almost inevitable following diagnosis; however the level and type of that distress is likely to vary significantly between women and across time (NBCC 2000a). Psychosocial functioning is central to a woman's capacity to manage her breast cancer and psychological distress which is unrecognised, persistent and not treated is likely to have adverse effects including complying with treatment, and long-term survival (Love 2004).

The Australian National Breast Cancer Centre (NBCC) developed psychosocial guidelines for health professionals working with women with breast cancer (NBCC 2000b). In addition a number of strategies have been employed to improve the psychological wellbeing of women with breast cancer.

One strategy involves Breast Care Nurses (BCN) who provide continuity of support to breast cancer patients from diagnosis to completion of treatment. The position which has been in existence in the UK since the 1970's has been shown to enhance the early recognition of support needs, decrease psychological distress, and improve continuity of care and understanding of the disease and its treatment (Clacey et al 1988; Maguire et al 1983; Maguire et al 1980; McArdle et al 1996; Watson et al 1988).

The first BCN position in Australia was in an Adelaide hospital in 1979 (White 1999) but uptake was poor. Nearly 20 years later a national survey revealed that only 14% of women with early breast cancer had received structured support of three or more meetings with a BCN (Campbell et al 2006; Williams et al 2004). The benefits to those women agree with reports from Victoria (Cuss and Woodcock 2003; Oerlemans and Ham 2002), New South Wales (Szwajcer et al 2004) and South Australia (Halkett et al 2006). However despite positive results Australia's uptake of the BCN model has been small and largely limited to metropolitan areas. In the State of Queensland in 2008 at the time of this study there were only 16 BCN positions for a population of four million¹.

In 2008 the authors were commissioned by the State Health Department to provide an independent evaluation of the effectiveness of a BCN service one year after its creation. The perceptions of the clients are reported herein.

METHODS

This research reports on the perspectives of care received by women with breast cancer who had access to the BCN in 2007-2008 compared to women who had been treated for their cancer in 2005-2007 prior to the establishment of the BCN service.

Initial contact by health service staff determined consent to be interviewed by the researchers who were then provided with the patient's name and contact details. Phone interviews were conducted with 28 women who received BCN support throughout all or most phases of their diagnosis, treatment and recovery and 22 women who had no access to the BCN during any of these phases.

¹ In Queensland Specialist Breast Care Nurse is used in the public sector to denote nurses whose role is consistent with that outlined in the National Breast Cancer Centre competency standards (NBCC 2005).

Questionnaire

A questionnaire, developed for a previous evaluation (Eley et al 2008) was used. The questionnaire consisted of 20 questions each of which required selection of an answer from a Likert scale. At the end of the interview participants could add additional comments. The questionnaire covered coordination of care offered and the value and timing of information and support during diagnosis, treatment and recovery given by the BCN or in the absence of BCN by the provided service.

Comparisons were undertaken between Group A (women who had access to the BCN) and Group B (women who had no access to the BCN). Comparisons of answers were undertaken by chi square test with alpha set at 10% (i.e. $p < .1$).

Ethics approval was received from both the university and health service.

RESULTS

The mean age of participants at the time of their surgery was 55.0 years (SD = 9.9) for Group A and 52.5 years (SD = 11.0) for Group B. All participants had received surgery and one or more of the following treatments: chemotherapy, radiotherapy, hormone therapy.

Prior to the establishment of the BCN position patients received information from various health staff. After creation of the BCN position most information was provided by the BCN. Patients were asked to rate their information needs and the nature of quality of the information that was provided in a number of areas (Table 1). For all factors bar information about side effects Group A were more satisfied than Group B with statistically greater satisfaction demonstrated for five of the factors.

Table 1: Comparison between Group A and Group B responses in response to questions about Information needs and quality

| | | |
|--|---|--|
| Information needs | Your cancer | $p = .120$ |
| | Your treatment choices | $p = .284$ |
| | The treatment itself | $p = .142$ |
| | Side effects of the treatment | $p = .943$ |
| | Caring for yourself at home | $p = .018$ |
| | Dealing with family issues | $p = .006$ |
| | Support services | $p = .377$ |
| | Travel or accommodation | $p = .178$ |
| | Getting a prosthesis | $p = .176$ |
| | Understanding how long you would be in hospital | $p = .151$ |
| | Understanding what would happen after discharge | $p = .121$ |
| | Information quality | Allowed you to show your real feelings |
| Was good at explaining things | | $p = .167$ |
| Gave you too much information | | $p = .518$ |
| Helped you cope or feel a little better about things | | $p = .049$ |
| Offered information at the time you most need it | | $p = .126$ |
| Where to seek spiritual support | | $p = .111$ |
| Was open to discuss alternative therapies with you | | $p = .001$ |

The majority of participants (24 of 28) believed that the right amount and type of information was received from the BCN on all factors. Typical Group A responses were:

She was excellent... very knowledgeable.

She left me in no doubt as to what kind of cancer it was and the best way for it to be treated.

She sent me books that I could read.

In contrast only 10 of 22 Group B believed that the information they received from all sources was enough. Several participants indicated information not being presented in a suitable manner:

I would have liked to talk to someone.

I think they did their best nothing that was adequate

Two particular telling remarks were:

What I needed was emotional support specifically related to breast care.

We need women who are technically and psychologically trained... You need professional training with this sort of thing because it's a multifaceted problem ...the physical – the woman's self image about herself, the psychological and the fear of dying and the physical unwellness...."

Participants from both groups were asked to assess support to help them to emotionally deal with their breast cancer, make appropriate treatment choices, communicate effectively with their treatment team, manage treatment side-effects and deal with family challenges. Although in all cases more Group A were satisfied there were no significant differences between the two groups (Table 2).

Table 2: Comparison between Group A and Group B responses to questions about the type and timing of support and referral pathway options

| | | |
|------------------------------|---|-----------------|
| Area supported | To deal with your diagnosis | p = .246 |
| | To make choice about treatment | p = .244 |
| | With relationship or communication with your doctor | p = .179 |
| | To deal with concerns your family had about your cancer | p = .430 |
| | To express and manage your feelings about the cancer | p = .221 |
| | To deal with side effects | p = .185 |
| Timing of the support | Before treatment | p = .038 |
| | During treatment | p = .202 |
| | After treatment | p = .035 |
| Referral pathways | Social worker or welfare worker | p = .036 |
| | Psychologist | p = .004 |
| | Breast Cancer Support Service Volunteer | p = .019 |
| | The Queensland Breast Cancer Fund Service | p = .007 |
| | Breast Cancer Support Group | p = .030 |
| | Physiotherapist | p = .020 |
| | Chemotherapy nurse | p = .729 |
| | GP | p = .613 |
| | Community nurse | p = .015 |

There were also significant differences between the two groups for the timing of support pre and post treatment with Group A indicating higher support in all cases (Table 2). Significant differences were also found between the two groups for most of the referral pathway opportunities that were offered.

Participants reported they felt comfortable approaching the BCN for information or support because they knew that this was the focus of her work, and that she had time to respond to their needs. They were able to develop a trusting relationship in which they felt supported, were well informed, had someone to talk to, and someone to go to for help at any stage of their treatment. Accessibility of the BCN was mentioned as a highly positive feature of the role and having a familiar person always available to them was important and reduced their levels of anxiety.

DISCUSSION

The results of this evaluation clearly demonstrate that the BCN is highly instrumental in ensuring that there is continuity of care, and hence a better quality of care for women with breast cancer. Results add to other Australian data (Bourke 2004; Halkett et al 2006; Williams et al 2004) (Liebert and Furber 2004) and expand on our earlier findings in a nearby large regional setting (Eley et al 2008).

The incumbent breast care nurse in both locations was identified by participants as a highly motivated, knowledgeable, compassionate and dedicated person with “wonderful personality”. The research team reminded participants that it was the role and not the person which was under evaluation, but this was challenging as respondents had no prior BCN knowledge upon which to compare. However, despite this caveat it is our conclusion that the BCN role in these two services has directly improved quality of care for patients with breast cancer, via direct services to women with breast cancer, as well as through coordination of breast cancer services within the respective health services.

The comparison of results between those women with breast cancer who had access to the BCN, and those who did not, provided often poignant evidence of the need for the service. Participants with access reported that their care, support and referral was enhanced because of the support they received and would strongly recommend a hospital with a BCN to their friends. In contrast comments from participants without access to the BCN emphasise the psychosocial challenge confronting women who must come to terms with the diagnosis of a life-threatening illness as well as the consequences of her treatment. There is a clear recommendation from consumers for continuation of the program and additional study is now recommended to determine the actual savings to the health system as a result of the BCN program.

CONCLUSION

In conclusion this BCN model highlights the feasibility, appropriateness and effectiveness of having a highly experienced and knowledgeable advanced practice nurse provide a personalised service to patients and their families whilst working with other health professionals within the health service to ensure coordination of care for their particular patient group. Furthermore while health systems grapple with increases in demand for chronic illness care, the success of this role leads almost inevitably to a question about the applicability of it to other cancer streams and indeed to other disease states.

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Positive patient outcomes in acute care: does obtaining and recording accurate weight make a difference?

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KEY WORDS

adult weight, clinical practice, risk, adverse events.

ABSTRACT

Objective

A crucial part of the assessment process is access to an accurate patient weight. To understand how health care practitioners access recorded weight it is necessary to examine the possible barriers to this in everyday practice and the relationship to patient outcomes. This paper will examine how patient weight is integrated in existing health care systems which require accurate weight to ensure positive patient outcomes.

Setting

Australian hospitals.

Primary Argument

Health care standards would suggest that accurate weight measurement is used by healthcare providers for a variety of inpatient interventions which include safe prescribing practices, radiation and chemotherapies, manual handling, skin integrity management and identifying nutritional risk. The literature supported the notion that the admission process should include the recording of an accurate weight within the primary assessment during admission. However, it is evident that implementation of evidence based screening tools that require documentation of accurate weight, within patient admission procedures, does not automatically translate into every day clinical care.

Conclusions

There may be a difference between how weight measurement should be used and how it is used in practice. All healthcare practitioners require timely access to an accurate weight to inform the planning of interventions to ensure provision of appropriate, safe and quality care. Further work is needed to understand the barriers and drivers involved in obtaining and utilising recorded weight within acute care. Future research has the potential to inform healthcare practitioners of the positive impact of an accurate patient weight on patient outcomes and guide developments in clinical practice.

INTRODUCTION

Recording accurate patient weight must be standard practice for all hospital admissions with recorded measurement informing the delivery of safe and effective patient care. Health care practitioners require accurate weight to inform safe practice but, according to evidence, compliance with this performance measure is consistently poor. How has poor compliance in obtaining a patient's weight in contemporary acute care occurred? Within the health care setting, there are a range of systems and processes that require accurate weight as a vital component of health assessment. However, there is no clear indication of how practitioners use, or access, knowledge of a patient's weight for clinical practice.

Within the acute care context, it is widely accepted that vital information gained through primary assessment is collected to ensure the quality, relevance and timeliness of decision-relevant information for healthcare practitioners. The utilisation of an accurate and recorded weight measurement is required for a range of interventions. Clinical documentation of an accurate weight guides clinicians in assessment and safe practices in radiation therapy, safe prescribing and manual handling to identify just a few. From this basis, a number of publications reviewed advise that nurses record weight measurement as an fundamental component of standard practice (Lees 2009; Partridge et al 2009; Hahler 2002). However, obtaining and recording of an accurate weight does not seem to be broadly acknowledged, or consistent, in the admission process.

Obtaining weight is traditionally a task within nursing practice, however, despite the plethora of assessments to inform decision-making weight is often not recorded (Lees 2009). Failure to obtain an accurate weight, and re-assessment of weight, poses significant risks and should be seen as an unacceptable practice within the healthcare team. During any admission to hospital patients, and their families, should have full confidence the right dose of medication is prescribed and administered, or other interventions are undertaken to ensure optimal recovery. Recorded weight informs the planning of safe and quality care and minimises the risks to both the patient and the care providers.

In order to inform broader knowledge of the function of patient weight in acute care settings, the literature was searched to provide background understandings. The literature located clearly fell into broader categories related to assessment and safe prescribing practice. No evidence based practice or review documents were found despite an understanding that patients should be weighed on admission to acute care. Although the available literature includes the rationale for obtaining accurate weight, coverage of all of the significant aspects in one article could not be sited.

DISCUSSION

Accuracy of measurement

It is evident across the literature that the practice of visual estimation of patient weight in acute care is common, however is clearly identified as a suboptimal practice. Within the research, a significant finding was the rate and consequence of inaccuracies when any health professionals estimate weight (Partridge et al 2009; Kahn et al 2007; Corbo et al 2005; Hall and Larkin 2004). Of particular interest, a key finding was the large and unacceptable variance and inaccuracy in estimates when individual practitioners estimated the same patient's weight (Hall and Larkin 2004). Goutelle et al (2009) established that the practice of averaging weight estimates on the same patient by different care providers, with the aim of achieving a more accurate weight measurement, was unreliable. Furthermore, the significance of overestimating weight is the potential risk of over dosage and related clinical consequences of a medication related adverse event.

A few studies determined that estimation of weight reported by parents of paediatric patients (Partridge et al 2009) or by the patient (Corbo et al 2005) were more accurate than estimations by health care providers, yet discrepancy and error still occurred. The overall findings within the literature supports that patient weight recorded by estimation by clinicians, or patients themselves, to inform clinical intervention is not the preferred practice based on the recognised level of error and potential of harm.

A number of strategies are recommended to shift the unsafe practice of weight estimation. However, it is apparent that significant investments are required in improved technology to support easier access to weigh obese or acutely unwell patients. Additionally, to be of value, weight needs to be measured from a reliable baseline using equipment that is presumably calibrated to maintain accuracy and precision.

Safe prescribing

Within the literature, the importance of using weight related medication dosage is featured in safe prescribing practice. Of interest, accurate recorded measurement of paediatric weight is recognised when prescribing medications in clinical practice, whereas the same emphasis is not as evident in adult patients. Without access to an accurate weight, calculation of doses based on weight or body surface area (BSA) can be problematic in overweight or underweight patients with resultant doses exceeding the safe adult dose range. According to safe prescribing practice, prescriber's must confirm accuracy of patient weight for weight-based dosages, as well as record weight on medication chart to support safe dispensing (ACSQ 2009).

Within the acute care setting, there are a number of commonly prescribed and administered medications that require accurate weight measurement for safe prescribing, such as anti-thrombotics and other medications to regulate sedation and blood pressure. An Australian cross-sectional study by Hilmer et al (2007) examined safe prescribing practices of weight-based medications and the correlation with adverse drug events in two cohorts. The study identified significant medication safety concerns and a risk of adverse events in the non-weighed patient group (Hilmer et al 2007, p.649).

High risk medicines (HRM) can be defined as those which have a heightened risk of causing significant or catastrophic harm when used in error and include heparin and other anticoagulants as well as chemotherapy (QUM 2009). Adverse outcomes and risk of complication increases when patients are not weighed in prescribing HRMs (Dembrow 2009). Dembrow (2009) cites American statistics reported by the Pennsylvania Patient Safety Authority where 479 reports, received between 2004 and 2008, principally identified incorrect weight measurement as a contributing factor in medication related errors. Of interest, this was one of the few reports located demonstrating the impact of failure to obtain accurate weight or incorrect use of the measurement. To reduce rates of medication error the report strongly suggests prescribers, and systems, support an accurate weight is obtained, and recorded, on arrival to any care setting (Dembrow 2009).

Incidence of poor compliance in obtaining and recording of patient weight measurement occurs in a range of clinical settings (Jensen et al 2003; Lees 2009). However, the importance of an accurate weight measurement is clearly recognised in relation to safe prescribing and interventions within specialisations such as bariatric medicine (Hahler 2002), intensive care medicine (Determann et al 2007) and patients with renal impairment (Dembrow 2009).

In 2007, under the direction of the Australian Commission on Safety and Quality in Health care, a standard National Inpatient Medication Chart (NIMC) was fully implemented across Australia to reduce the harm to patients from medication errors. Following routine national audits to monitor and evaluate the NIMC, scope for improvement in documentation of weight has been identified with low percentages consistently reported. Researchers, Semple and Roughead (2009) identify that systems are in place to ensure a nationally coordinated approach to the ongoing optimisation of the NIMC, which include prescriber education in relation to the documentation of patient weight as a strategy towards improving compliance and safety.

Manual handling

The acute care environment is often unpredictable and changeable; patients are frequently of high acuity and complexity requiring specialist care and equipment. A significant problem in Australian healthcare facilities is obesity which is directly associated with increased risk of morbidity and mortality. As a result of the medical complexity, the planning of appropriateness of care and patient management differs between obese and non-obese patients. It is well identified in the literature that a clinical journey for a bariatric patient admitted to an acute care setting is significantly more problematic as every aspect of their care is affected (Hahler 2002). An increase in awareness of the escalating bariatric problem in the community had led to strategies to manage the risks healthcare providers face during the patient's journey within the acute care setting.

Accurate weight for obese patients has a significant influence on the selection of equipment to manage safe care, diagnostics and ongoing assessment. The use of accurate weight measurement with manual handling is highlighted in the literature and is predominantly related to patient safety and appropriateness of equipment. Common features to manual handling are the systems for completing manual handling assessments for all primary patient care tasks to reduce associated Occupational Health and Safety risks. The systems usually consider normal weight patients as well as bariatric patients in order to inform equipment, procedural and environment changes consequently reducing the manual handling risks.

Patients with a body mass index (BMI) of greater than or equal to 30 prompts an assessment of the patient's weight, their equipment needs, their clinical needs and the staffing levels required. Selection of the correct type of equipment for the right patient is integral as equipment may be weight limited or industry rated. This step is essential to ensure care can be undertaken safely by identifying and managing risk of potential harm to the patient and others (Hahler 2002). Unknown weight can create risk to both the patient and clinicians undertaking care, diagnostic procedures or interventions where the structural features have a weight limit or restrict the application of safe handling procedures.

Based on the level of risks during the bariatric patient journey, it is evident a collaborative approach is required to ensure a flow of information, such as an accurate weight, in order to safely manage manual handling. Supportive strategies may include a clear hospital pre-admission assessments process to ensure access to accurate recorded weight. A communication strategy with system alerts for identified patients would permit timely coordination of care and preparation of appropriate equipment.

Skin integrity

There are a number of risk factors to be considered with early assessment utilising evidenced based screening tools to identify patients at risk of altered skin integrity. The recording of a baseline weight, with regular updating, is identified in the literature as a vital element for ongoing assessment of weight loss, and nutritional status, to inform a range of therapeutic interventions (Kelly et al 2000; Hahler 2002). It is evident that even a patient's own body weight can cause excess pressure, bariatric patients, like those who are underweight, are at risk of compromised skin integrity. Furthermore, of significance and a growing concern is the reported level of malnutrition in hospital patients (Kelly et al 2000; Lazarus et al 2005; Butterworth 1974). Several recent Australian studies have indicated poor recognition of malnutrition in hospitals with malnutrition prevalence rates in Australian hospitals ranging from 6% to 53% (Walton 2009).

The research identifies that in the presence of malnutrition, the risk of pressure ulcers is doubled leading to poor patient outcomes and increased length of stay (Roosen et al 2010). Furthermore, the high cost of treatment and the detrimental effects on a patient's life indicate that efforts should be directed at appropriate risk assessment and prevention rather than treatment. Rather than estimating malnutrition, the importance of recording accurate weight measurement is required to support assessments and appropriate care planning for underweight patients.

Obtaining and recording weight

Within a metropolitan acute care public hospital, a routine audit to measure thoroughness of screening using nursing risk assessment tools identified a low rate of compliance in recording patient weight, reported at 18% (n = 813) (S&QU 2010). As a result of the audit, there was evidence that patients were not being weighed despite completion of the risk assessments. To provide an understanding of practice, a further audit was performed aimed at exploring the perceived barriers, perceptions and clinical practices in obtaining, recording and utilisation of recorded weight. A range of questions surveyed why patients were or were not weighed. To publish survey data obtained from this audit, an application for ethics exception was sought and received from the institution's Human Research Ethics Committee (S&QU 2010).

An exploration of the data in the audit further supports the findings across most of the literature reviewed (S&QU 2010). Representing a range of professional groups, nursing (48.6%), medicine (29.6%) and allied health (21.8%) the preliminary review of the data revealed less than half (43.7%) checked that patient weight was recorded on admission. When asked if recording accurate weight is important for safe and effective care, 79% of respondents agreed. Of significance, 24.8% identified that they estimated patient weight; 41.2% rely on patient weight to inform clinical decisions. In terms of barriers to obtaining weight, the respondents listed the main reasons as access to appropriate equipment (47.1%) and clinical status (81.5%). Of interest, is the similarity across the identified barriers to a smaller audit of nurses (n = 36) undertaken by Lees (2009) on an acute medical unit in the United Kingdom.

A finding of interest was 80.5% of respondents identified the importance of an accurate recorded patient weight to inform safe prescribing practices. Conversely, within this setting the most recent national audit on the NIMC reported 2% of adult charts had a recorded weight. Whilst anecdotal experience suggests that patient weight may be recorded in multiple areas including unit specific charts and the medical history, the findings in the NIMC audit are suggestive of medical practice issues. The optimal time for obtaining weight was clearly identified as during the admission process, however, one significant finding was the disparity between where weight is recorded and located by health practitioners. This may be suggestive that an initiative towards standardisation of an agreed single location for documenting and updating inpatient weight would lead to improving health outcomes. Based on final review of the audit data, it is intended that a set of recommendations will be developed to inform strategies to support an increase in awareness of the admission processes and improve compliance in obtaining, and recording, accurate patient weight (S&QU 2010).

CONCLUSION

Clinical documentation of an accurate patient weight is a vital component in the initial assessment in order to determine risk factors. Timely clinical assessment is crucial to inform appropriateness of care to ensure safe and effective practices in manual handling, safe prescribing and prevent of pressure injuries. These are a synergistic trio and in an acute care setting many patients require considered management in all three areas. However, the particular clinical task of obtaining a weight remains a challenge to nurses in 2011. The literature suggests that knowledge of patient weight in day to day clinical practice is an area of practice requiring further investigation. Importantly, there appears to be consistent finding in the identified barriers to obtaining accurate weight within the acute care setting. This illustrates a necessity for nurses to review current practices and explore ways to re-organise workload to ensure initial weight is obtained and ongoing reassessments are undertaken. An interprofessional approach needs to develop and maintain open communication about assessment practices to ensure all patients are weighed on admission. While it may be concluded that appropriate utilisation of an accurate patient weight may contribute to improved patient outcomes and minimise harm, the best way to achieve a change in practice remains inconclusive. It could be suggested that improved undergraduate and postgraduate education on the value of weight to reduce risk and minimise harm to patients is essential for all members of the healthcare team.

RECOMMENDATIONS

Patient weight must be considered a mandatory element in the admission process with supported systems for compliance monitoring. Planning or designing of acute care facilities should include a range of accessible alternatives to avoid the need for estimation of weight in obtaining weight such as inbuilt floor scales for trolleys and beds with inbuilt weigh scales in Emergency Departments. Research in this area of practice should be expedited to determine whether the focus of risk assessments in the nursing process has shifted practice, potentially influencing the view of priorities in care. The research should explore the current body of knowledge about the admission process regarding the health team's use of recorded weight, to inform the education programs and identify whether focussed education facilitates practice change and makes a difference in patient outcomes.

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