



The influence of situation awareness training on nurses' confidence about patient safety skills: A prospective cohort study

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ABSTRACT

Background: Several studies report that patient safety skills, especially non-technical skills, receive scant attention in nursing curricula. Hence, there is a compelling reason to incorporate material that enhances non-technical skills, such as situation awareness, in nursing curricula in order to assist in the reduction of healthcare related adverse events.

Objectives: The objectives of this study were to: 1) understand final year nursing students' confidence in their patient safety skills; and 2) examine the impact of situation awareness training on final year nursing students' confidence in their patient safety skills.

Methods: Participants were enrolled from a convenience sample comprising final year nursing students at a Western Australia university. Self-reported confidence in patient safety skills was assessed with the Health Professional in Patient Safety Survey before and after the delivery of a situation awareness educational intervention. Pre/post educational intervention differences were examined by repeated measures ANOVA.

Results: No significant differences in confidence about patient safety skills were identified within settings (class/clinical). However, confidence in patient safety skills significantly decreased between settings i.e. nursing students lost confidence after clinical placements.

Conclusion: The educational intervention delivered in this study did not seem to improve confidence in patient safety skills, but substantial ceiling effects may have confounded the identification of such improvement. Further studies are required to establish whether the findings of this study can be generalised to other university nursing cohorts.

1. Introduction

Health professional education emphasises acquisition of technical psychomotor skills and evidence-based knowledge that leads to the proficient implementation of such skills in clinical practice (Mansour 2013). In nursing, technical skills include physical assessment, physiological observations, wound management, and medication administration. Despite continual advances in health professional education, one in ten patients will experience an adverse event, of which one in five will be serious, and one in three will be fatal (Aljadhey et al. 2013; IOM 2000; Wilson et al. 1995; Wilson and Van der Weyden 2005).

Initiatives to minimise the occurrence of adverse events in the delivery of healthcare have focused on correcting system and organisational processes that contribute to errors, and also on enhancing health professionals' knowledge and technical skills (Carayon and Wood 2010). Addressing such issues plays an essential role in enhancing

patient safety, but an area that has received relatively less attention involves the improvement of non-technical skills (White 2012). These non-technical skills broadly concern the manner in which health professionals communicate and co-operate with each other (Crichton et al. 2013; Yule et al. 2006). The importance of non-technical skills needs to be emphasised, as estimates suggest that 70–80% of medical errors result from a breakdown in non-technical skills (Dunn et al. 2007; Glavin and Maran 2003).

Situation awareness is a non-technical skill that contributes to the reduction of errors that lead to medical adverse events (Brady and Goldenhar 2014; Gillespie et al. 2013; Stubbings et al. 2012). It has been defined as “the perception of elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future” (Endsley 1995). In plain terms, within clinical settings, situation awareness assists health professionals to handle and process information about what is occurring

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around them.

Issues that detrimentally impact on situation awareness can be categorised as either context, individual, or cognitive factors (Gluyas and Morrison 2013). Context factors comprise noisy environments, distractions and interruptions, poor workplace and equipment design, workload, and poor teamwork (Endsley 2012; Thomas et al. 2014). Individual factors include experience and competency in clinical practice, along with issues such as anxiety, illness, fatigue, and negative life events (Endsley 2012). Finally, cognitive factors consist of attentional tunnelling, information overload, and the propensity to undertake familiar tasks automatically which results in an inability to recognise changes in the situation (Endsley 2012; Flin et al. 2008; Gluyas and Harris 2016).

Limited evidence indicates that poor situation awareness may be responsible for almost half of the serious adverse events that occur in hospital settings (Brady et al., 2013a, 2013b; Muething et al. 2012). The essential principles of situation awareness, and the techniques that enhance situation awareness, can readily be taught to individuals (Endsley 2015). Such training results in the acquisition of skills that maintain situation awareness and an understanding of conditions that impair situation awareness. Health professionals may not be able to influence some context, individual, or cognitive factors that degrade situation awareness, but understanding these factors can nonetheless assist in the maintenance of situation awareness (Brady et al., 2013a, 2013b; Gartenberg et al. 2014; Salas et al. 2008; Stubbings et al. 2012). Therefore, inclusion of these skills in undergraduate health professionals' curricula is important as it is reasonable to assume that they will not be gained through clinical experience alone (Flin et al. 2008; Milligan 2007).

This study reports on the implementation of a situation awareness educational intervention that was developed to improve nursing students' confidence in their patient safety skills. The objectives were to: 1) understand final year nursing students' confidence in their patient safety skills; and 2) examine the impact of situation awareness training on final year nursing students' confidence in patient safety skills.

2. Methods

A single-group, two-time point repeated measures design was used in this study. Nursing students' self-reported confidence in patient safety skills was assessed with the Health Professional in Patient Safety Survey (H-PEPSS) before and after the delivery of a situation awareness educational intervention (Ginsburg et al. 2012). Ethical approval was obtained for this study from the Murdoch University Human Research Committee (approval number: 2016/009).

2.1. Participants

Participants were enrolled from a convenience sample comprising final year nursing students at a Western Australia university. A research staff member publicised the study in lectures and distributed information letters. Participation was voluntary and students were notified that withdrawal at any point in the study would have no adverse effect on their enrolment or grades. Potential participants were asked to complete the H-PEPSS shortly before undertaking the situation awareness educational intervention, and also ten weeks later at the conclusion of a clinical placement. In total, 96 students were recruited to the study.

2.2. Educational Intervention

The situation awareness educational intervention was delivered as a two-hour interactive workshop at the commencement of the second semester. The intervention covered fundamental principles that promote the maintenance of situation awareness, situation and organisational factors that inhibit situation awareness and lead to errors, and strategies that enhance situation awareness. In addition, videos and

interactive scenario problem solving were used to enable students to implement situation awareness strategies in situations that provoke errors.

2.3. Survey Instrument

Data were collected using the previously validated H-PEPSS, which captures details about six socio-cultural dimensions that are integral to patient safety (Ginsburg et al. 2012). These dimensions comprise: working in teams with other health professionals (three items); understanding human and environmental factors (two items); managing safety risks (three items); communicating effectively (three items); culture of safety (three items); and recognising and responding to adverse events. For each item, respondents are directed to report separately about their confidence in what they learnt in the classroom setting and clinical setting. Each item is scored from 1 to 5 on five-point Likert scale with response options that range from strongly disagree to strongly agree. Mean scores are reported separately for the class and clinical settings across each of the six socio-cultural dimensions.

2.4. Data Analysis

Data were analysed in SPSS v.22. Demographic characteristics and aggregated scale scores were reported descriptively. Principal components analysis, with a direct oblimin rotation, was used to evaluate the structure of the survey instrument. Cronbach's alpha was used to assess the internal consistency of the six social dimensions associated with patient safety. Pre/post educational intervention differences in the six dimensions aggregated scale scores were examined by repeated measures ANOVA. Finally, floor and ceiling effects were examined by using the 15% threshold for respondents recording the lowest and highest possible score (Lim et al. 2015; Terwee et al. 2007; Wang et al. 2009).

3. Results

The response rate for this survey was 65.6% ($n = 63/96$).

3.1. Demographic Characteristics

The overwhelming majority of participants were female (90.3%). The mean age of the participants was 28.1 years (SD = 8.9).

3.2. Evaluation of the H-PEPSS' Structure

Table 1 displays the results of the principal components analysis (note that only item loadings above 0.30 are shown). As the results demonstrate, the items strongly loaded onto the dimensions established in the initial validation study (Ginsburg et al. 2012). Cronbach alpha values for each of the HPEPSS dimensions are shown in Table 2. All dimensions evidenced adequate levels of internal consistency, which further supports the dimensionality of the instrument.

3.3. Between Setting Changes in the H-PEPSS Scores

Tables 3 and 4 display the between setting mean scores for the six HPEPSS dimensions before and after the administration of the educational intervention. Pre-intervention, significant differences between the class and clinical settings were identified for all dimensions with the exception of "Managing Safety Risks". Post-intervention, significant differences between the class and clinical settings were only identified for the "Working in Teams with other Health Professionals" and "Recognising and Responding to Adverse Events" dimensions.

3.4. Within Setting Changes in the H-PEPSS Scores

Tables 5 and 6 display the within setting mean scores for the six

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