



## An education intervention to improve nursing students' understanding of medication safety



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### ARTICLE INFO

#### Article history:

Accepted 9 November 2014

#### Keywords:

Medication administration  
Medication safety  
Systems factors  
Nursing students

### ABSTRACT

Medication safety is a significant issue. Whilst medication administration is a routine task, it is a complex nursing activity. It is recognised in the literature that medication related adverse events are most often related to systems failures associated with the complex process of medication administration. This paper examines student's perceived effectiveness of an educational intervention, designed to demonstrate the complex and multidisciplinary factors of systems related failures in medication administration. The intervention was underpinned by adult and experiential learning concepts and used a problem-based learning approach. A series of short digital recordings were developed along with discussion points to illustrate multidisciplinary interactions involved in medication administration. A small sample of second and third year undergraduate nursing students ( $n = 28$ ) evaluated the effectiveness of the educational resource. Our findings suggest that such resources are effective in demonstrating the complexity of medication related error and were authentic to practice. An educational intervention using problem based learning afforded nursing students the opportunity to engage with the systems factors that contribute to medication errors. Interventions that highlight these factors may play an important role in raising awareness of these issues and encourage students to carry this knowledge into clinical practice.

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### Introduction

Medication safety is a significant patient safety issue. It is estimated more than 1.5 million Australians suffer an adverse event from medicines each year ( ). An adverse drug event is defined as an incident which caused harm or injury to a patient (Australian Commission on Safety and Quality in Health Care, 2011). Using 2011–12 Australian hospital admission data, of the 9.3 million separations it is estimated there are 230,000 medication related hospital admissions every year, costing the community approximately \$1.2 billion annually (Roughead et al., 2013). Medication errors can occur during the phases of prescribing, dispensing, and administration, with system and human factors increasing the likelihood of an error or omissions (Evans, 2009; Latimer et al.,

2011). Whilst medication administration is a routine task for nursing, it is becoming an ever increasingly complex activity. For example, there are over 8000 medications commonly available for administration including 17, 000 different medication brand names. Additionally, advances in technology and increasing diversity in administration routes (Tang et al., 2007), reflect the changing nature of medication administration. Studies have traditionally focussed on the roles of individual professions related to medication administration error, for example, studies that establish which profession makes the most errors (Wilson et al., 1998). More recently there has been recognition in the literature that medication adverse events are related to systems failures (i.e. team, task, environment, individual and system factors) (Deans, 2005; Evans, 2009; Popescu et al., 2011; Roughead and Semple, 2009) associated with the complex process of medication administration, rather than individual or professional group factors (Roughead and Semple, 2009). Reported factors that increase the likelihood of a medication error occurring include knowledge-based mistakes, poor communication (Nichols et al., 2008), polypharmacy, and poor compliance with medication assessment practices such as

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medication reconciliation (Latimer et al., 2011). The aim of this study, conducted at an Australian university, was to examine Bachelor of Nursing (BN) student's perceived effectiveness of an educational intervention which promotes a systems approach to understanding medication adverse events and errors, as well as strategies to avoid such errors.

## Background

Factors that relate to adverse medication events are complex. Research indicates medication events or errors are often a result of system failures, that is, errors related to team, task, environment, individual and system factors (Deans, 2005; Evans, 2009; Popescu et al., 2011; Roughead and Semple, 2009). The multifaceted nature of medication administration involves the contribution of medical staff, pharmacists and nurses. Therefore team factors such as communication, the repetitive nature of a task, environmental factors such as noise and lighting, individual factors such as knowledge and skills and system factors such as access to protocols, all contribute to medication error (Brady et al., 2009; Nichols et al., 2008).

In acute care settings, medication administration involves multiple decisions by the multidisciplinary team. Three healthcare professionals are involved in the medication cycle: medical officers who prescribe medications, pharmacists who dispense medications, nurses who administer medications; with the monitoring of a therapeutic outcome a shared responsibility (Bullock et al., 2010; Popescu et al., 2011). The process of medication administration accounts for a large proportion of nurses' time. Indeed, it is estimated that 40% of nurses' clinical time is spent managing the administration of medications (Meechan et al., 2011). Given the large amount of time taken to administer medications, and the complexity of the task, there is increasing concern that undergraduate nursing curricula may not sufficiently be preparing students to undertake this responsibility (Meechan et al., 2011b).

Students enrolled in BN curricula receive educational tuition on a variety of strategies to reduce the likelihood of medication errors. Developing students' abilities to undertake medication dose calculations (McMullan et al., 2010; Wright, 2005) is one such strategy. However, Harding and Petrick (2008) argue that this fails to take into consideration the complexity of the administration process. Other strategies include double checking of medications by two nurses prior to administration, however this assumes that a second nurse has the knowledge and skills to apply to the situation (Evans, 2009). Completion of the six rights (the right dose, the right route, the right patient, the right time and the right documentation) prior to medication administration (Pape et al., 2005), is primarily aimed at addressing issues related to incorrect patient identification and incorrect medication dosing (Pape et al., 2005). Elliott and Liu (2010) suggest the six rights should be expanded to include the right action, the right form and the right response. Alternatively, Tollefson (2012) proposes the additional rights of: the right reason, the right to refuse and the right education. Pape et al. (2005) implemented a protocol that involved two steps for checking the correct medication, using two patient identifiers and the use of signage (Do Not Disturb During Medication Administration) to prevent distractions. Evidence suggests some nurses resisted adopting this protocol, even though the number of interruptions by other nurses fell with the display of this signage (Pape et al., 2005).

Interventions that assist BN students to develop critical thinking skills and increase interprofessional engagement, can shift medication administration from a task to a psychomotor activity (Tollefson, 2012). For example, Page and McKinney (2007) designed a 'medication safety day' for nursing students which included a lecture and workshops about medication safety with this initiative highlighting the multidisciplinary approach to safety in medication

administration. Papastrat and Wallace (2003) conducted a study that implemented a case study approach which aimed to increase students' critical thinking using problem based learning and a systems approach to medication administration. Finally, Backhouse-Mackeen and Murphy (2013) reported that clinical reasoning in BN students can be promoted through practical application of pharmacological concepts in a simulated clinical learning environment.

It is widely acknowledged that collaborative, team-oriented, and multidisciplinary approaches are required to raise awareness of the numerous factors that lead to medication adverse events (Popescu et al., 2011). More generally, teaching that includes a multidisciplinary focus affords ideal opportunities to gain necessary knowledge, skills and attitudes to enable health professionals to work in a patient-centred team (McPherson et al., 2001; Nisbet et al., 2008). There has been renewed interest regarding multidisciplinary (or interprofessional) learning and its role in providing safe, high quality health care yet progress in this area has been slow (Varpio et al., 2008). However, much of the literature affords a narrow view of multidisciplinary work by focussing on a particular aspect. For example, Varpio et al. (2008) focus on interprofessional communication related to medication errors and Manias and Street (2001) investigated communication processes through written orders.

Traditionally undergraduate education of healthcare professionals has occurred in silos (Barnsteiner et al., 2007; Engum and Jeffries, 2012), with few opportunities for interprofessional collaboration (Barnsteiner et al., 2007). Interprofessional learning (IPL) also referred to as interprofessional education, interdisciplinary education and multidisciplinary education, allows healthcare professionals to respectfully learn from each other and develop new communication techniques (Engum and Jeffries, 2012), with improved patient safety identified as a benefit from this approach (World Health Organisation, 2010) IPL is an important part of students' learning for professional practice and is considered essential to meet patients' complex needs and ensure effective patient management (Spath et al., 2011). Studies suggest that including IPL in undergraduate curricula has a positive effect on communication and teamwork between health professionals (Nisbet et al., 2008). Horsburgh et al. (2001) report that IPL is effective in developing teamwork skills when introduced into the first year of study for health professionals. Stewart et al. (2010) determined that an IPL approach in medication administration clinical practice improved students' knowledge about medications and causes of error. However, this was limited to education that pertained to doctors and nurses. Spath et al. (2011) contend that learning from interprofessional case scenarios helps students identify and articulate their own professional role in an interprofessional team.

One barrier to the implementation of IPL activities is coordinating a time and location for interprofessional students to engage. This may be due to class timetabling, clinical placement requirements or the delivery of healthcare courses at multiple university campuses. Given the benefits of IPL in increasing first year students knowledge about medications and error-producing situations (Horsburgh et al., 2001; Nisbet et al., 2008; Spath et al., 2011; Stewart et al., 2010), the development of an education intervention that does not solely rely on face-to-face IPL is needed. This study's education intervention was implemented within the first-year BN course 'Medications and Safe Administration' delivered at the university study site. This course aims to develop student's pharmacology knowledge with a focus on medication safety, and is underpinned by a safety and quality framework. The education intervention is a series of short digital recordings that portrayed the multidisciplinary team roles in systems related medication administration errors and near misses.

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