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How do university education and clinical experience influence pre-registration nursing students' infection control practice? A descriptive, cross sectional survey

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SUMMARY

Aims: This study aims to explore nursing students' knowledge of infection control and investigate how university education and clinical experience influence their infection control practice.
Background: In order to prevent and control healthcare associated infections all healthcare staff must be knowledgeable about infection control. However, knowledge and practice of infection control are often sub-optimal. Education has had variable results in improving the infection control knowledge of healthcare professionals yet, there have been few studies examining this issue in relation to pre-registration nursing students in the United Kingdom.
Methods: This descriptive cross-sectional survey employed a questionnaire composed of predominantly closed questions for data collection. A non-probability, purposive sample of 354/444 (79.7%) nursing students from one university participated in the study.
Findings: Knowledge was generally adequate in questions related to pathogen transmission, hand hygiene principles, glove use, immediate action following sharps' injuries, and risk reduction in relation to sharps and waste management. Topics that received less positive results related to the chain of infection, the use of alcohol gel and *Clostridium difficile* and the definition of inoculation injury. University education was the main influence on knowledge and practice (340/353, 96.3%), but mentors (322/354, 91.2%), nurses (316/353, 89.3%), doctors (175/353, 49.4%) and other members of the multi-disciplinary team (213/352, 60.2%) were also deemed influential. Workload, time, and availability of facilities and equipment also contributed to the adoption of infection control precautions. The findings illustrated the importance of both theoretical and practical knowledge, supported by competent role models.
Conclusion: The study identified the complexities of knowledge acquisition and application in a practice based discipline. The support of a competent role model to assist in applying theory to practice is vital. The study has identified that there are many variables that affect IPC practice, both positively and negatively.

Introduction

The risk of healthcare associated infection (HCAI) is a major concern (World Health Organisation (WHO), 2007) and poses a significant threat to patient safety. HCAI is a substantial cause of morbidity and mortality and impacts on scarce resources. An infection prevalence rate of 7.6% has been identified in the UK and Republic of Ireland hospitals (Smyth et al., 2008) and effective infection prevention and control (IPC) is necessary to prevent avoidable harm to patients (NHS Wales, 2010).

To prevent and control HCAI, a knowledgeable workforce is vital. Education is a key element of a successful HCAI control and reduction programme (Farrington, 2007; Fraise, 2009). It is also a key component of all four of the UK devolved countries' infection control strategies which recognise the importance of a well educated workforce as a prerequisite for reducing HCAI (The Scottish Executive, 2002; Department of Health, Social Services and Public Safety, 2006; Department of Health, 2008; Welsh Government, 2011).

IPC education for nurses starts before qualification and is one of the Essential Skill Clusters for pre-registration nursing education identified by the Nursing and Midwifery Council (NMC, 2010) and contributes towards a culture of patient safety (Milligan, 2007).

Background

There are limited UK studies concerning IPC knowledge and practice among nursing students. However, there is no reason to suppose that

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parallels cannot be drawn with findings from international studies. Vandijck et al. (2008) revealed that student nurses' knowledge of IPC varied between satisfactory and disappointing. Other studies suggest knowledge levels of between 49.6% and 89.3% (Askarian et al., 2007; Tavalocci et al., 2008; Jennings-Saunders and Jury, 2010; Darawad and Al-Hussami, 2012). Despite the variation, superior knowledge has been recognised among nursing students compared to students on other health related programmes including medicine, physiotherapy and radiology (Askarian et al., 2007; Tavalocci et al., 2008; Van De Mortel et al., 2011).

Siegel et al. (2007) identified education as a fundamental requirement if healthcare workers are to understand and comply with IPC guidelines. According to Wu et al. (2009) and Wang et al. (2003), IPC education improved student nurses' knowledge and practice. Within our university, initial infection control education is provided for all pre-registration nursing students in their first module. The content of these sessions includes the material deemed necessary by the NMC (2010), as well as other relevant information determined by the IPC team. The aim of these sessions is to ensure that students have the necessary knowledge to safely undertake clinical placements. After this initial period the students continue to receive IPC education throughout their degree programme using a variety of methods aimed at accommodating a range of learning styles (Kolb, 1984). These include lectures and small group work together with interactive, practical and scenario-based sessions which are aimed at promoting critical thinking, problem solving and skills' acquisition (Stanley and Dougherty, 2010). This avoids a totally lecture-based curriculum which may disadvantage those who favour a practical approach or lack the confidence to participate in large groups (Ward, 2011). Furthermore, IPC is reinforced in all clinical skills sessions and there is an expectation that the skills learned in university will be consolidated during clinical placements. This should result in an educational approach that facilitates the implementation of theoretical knowledge into clinical practice (Legg et al., 2009).

It is acknowledged that a combination of both theory and experience based knowledge determines individuals' practice (Higgs et al., 2008). Students understand the importance of practice supported by theory and often base good practice on what they have been taught combined with local policy and positive role models (Levett-Jones et al., 2009; Ward, 2010). However, evidence suggests that joint responsibilities for education are not always met (Ward, 2011). Inappropriate practice can exert both a negative and a positive effect on students (Ward, 2010) illustrating the complex nature of behavioural practice (Snow et al., 2006; Whitby et al., 2006; Barrett and Randle, 2008; Erasmus et al., 2009; Ward, 2010). There is also the expressed need to fit into the culture and some students may follow the practice of clinical staff even if incorrect. The need to fit in is a powerful influence on behaviour and the ability to develop both personally and professionally. This makes it hard to challenge poor behaviour (Barrett and Randle, 2008; Levett-Jones et al., 2009).

Sub-optimal practice among healthcare workers may be exacerbated by the absence of appropriate education and this could have an impact on students. In Wales, it is recommended that all clinical and non-clinical staff members undertake a comprehensive induction programme and on-going education much of which is delivered in the workplace or via e-learning (Welsh Government, 2011). However, evidence suggests that attendance at training sessions is patchy (Cutter and Jordan, 2012).

While knowledge and understanding are clearly important in maintaining high standards of IPC, there is insufficient understanding of other factors that may influence nursing students' practice while on clinical placements. Therefore, this study aims, within one Welsh University, to explore nursing students' knowledge of IPC and investigate how university education and other variables influence their IPC practice.

Methods

This was a descriptive, cross-sectional survey. Data were collected via paper-based, self-administered questionnaires comprising predominantly closed questions; although some open questions were included. The questionnaire was designed to identify nursing students' knowledge and the variables that influence their clinical practice in relation to IPC. The questionnaire was developed following a literature review combined with aspects of a previously validated questionnaire used with the permission of the authors (Vandijck et al., 2008).

Setting and Sample

Adult nursing students enrolled on the BN (Hons.) programme from four cohorts across two campuses of one university in South Wales were surveyed. Students in the middle of their third and final year (cohort 1); the end of their second year (cohort 2); midway through their second year (cohort 3) and at the end of their first year (cohort 4) were included in the study. Other first year students were excluded because of their limited clinical experience as were those at the end of the third year due to the pressures associated with the proximity of their completion date. Four hundred and forty-four students were invited to participate.

Data Collection

Following approval from the College Research Ethics Committee, a pilot study was conducted with 33 final year nursing students not included in the main study. This contributed to the reliability and validity of the questionnaire. It also identified structural flaws, ensured clarity, checked ease of analysis and completion time, ensured completeness and allowed for redrafting (Boynton, 2004). Only minor adjustments were required following the pilot study. A copy of the questionnaire is available on request.

The questionnaire was administered to four cohorts of students on each campus during normal university hours. Therefore, the questionnaire was administered on a total of eight occasions. Potential respondents were given an information sheet outlining the details of the study and guaranteeing anonymity both in the completed study and in any resulting publications. Those not wishing to take part left the room (90/444, 20.3%).

Data Analysis

Data were analysed using the Statistical Package for Social Sciences (SPSS) version 16. Descriptive statistics, including both frequencies and percentages, were calculated. Where there was the opportunity to consider the relationship between variables, bivariate analysis using the Chi squared (χ^2) test was undertaken (Polit and Beck, 2012). Parametric testing was rejected due to data being nominal and not conforming to a normal distribution curve (Petrie and Sabin, 2009).

Open questions were subjected to content analysis. Content analysis involves organising and integrating qualitative information in relation to common themes (Polit and Beck, 2012). The aims of the study guided content analysis. Coding was done independently on a sample of questionnaires by both authors, to ensure inter-rater reliability of the final categories (Parahoo, 2006).

Reliability and Validity

Cross checking between questions on the questionnaire contributed to internal reliability. All items on the questionnaire plus questions related to factors influencing the precautions taken by students were independently subjected to Cronbach's alpha test to determine their internal consistency.