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Using e-learning to enhance nursing students' pain management education

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SUMMARY

Context: Absence of standardised pain curricula has led to wide diversity in the understanding and awareness of pain by healthcare students. Indeed pain management is frequently under-prioritised in nursing education, providing potential to negatively impact upon patient care. Yet the recent addition of Pain to the UK National Health Service's Essence of Care Benchmarks has highlighted the need to address this issue, and in response pain educators have called for the development of high quality, globally accessible e-learning resources in pain management.

Objectives: This study will determine the effectiveness of an e-learning intervention on pain management developed for nursing students.

Methods: Two variants of an e-learning resource on pain management were developed, each containing the same core content but one with a section focusing on pain assessment and the other on pharmacological management. Nursing students ($n=42$) were randomly assigned to trial one resource, after which they undertook a questionnaire adapted (to ensure alignment with the content of the e-learning resources) from Ferrell and McCaffrey's Nurses Knowledge and Attitudes Towards Pain Survey. Scores were analysed for each resource and year of study, and compared with scores from a standard non-intervention group completing the questionnaire only ($n=164$).

Results: Scores averaged 19.2% higher for students undertaking the e-learning resources ($p<0.005$). Specifically, undertaking the assessment resource improved assessment knowledge more, whilst assignment to the treatment resource particularly enhanced pharmacological knowledge ($p<0.005$). Correlation was found between year of study and pain knowledge.

Conclusion: Results support the effectiveness of the resources independent of voluntary-response bias. Conclusions recommend that introducing e-learning has substantial benefit to enhance pain education in nursing.

Introduction

Pain is a fundamental reason for patients seeking healthcare, but it is commonly acknowledged that the importance of pain management is often overlooked (Donaldson, 2009). In fact, 40% of patients in pain report that either they are not given analgesia, or that given is insufficient to relieve the pain (McNeill et al., 1998). The main barrier to comprehensive pain management is reported to be inadequacy in education; latest figures report pain education represents less than 1% of university-based teaching for healthcare professionals, with nurses receiving on average just 10.2 h of pain content across their entire programme (British Pain Society (BPS), 2009).

Moreover, most pain education is provided in the form of didactic lectures (BPS, 2009). Whilst this traditional learning delivery approach can increase knowledge, it does not always change behaviours or practice (McCluskey and Lovarini, 2005). Yet stereotypical attitudes and influence from nurses' personal beliefs directly affect the extent of pain experienced by patients (Chiang et al., 2006) so this may account for poor reports by patients regarding the management of their pain (McNeill et al., 1998). It has been proposed that the development of generic and accessible e-learning pain resources that can be implemented nationally might address current, inadequate standards of pain management but there is first a requirement to substantiate the educational value of such resources (Keyte and Richardson, 2010).

Background

Pain education

The few studies conducted that investigate students' knowledge of pain management report deficiency and a need to overhaul the current teaching of pain education (Plaisance and Logan, 2006; Lofmark et al., 2003; Chui et al., 2003). Most practice standards consider >80% as an acceptable score on a test of knowledge (Brown et al., 1999) and so when Plaisance and Logan (2006) reported finding that on average students scored just 64% correct when surveying their knowledge and attitudes towards pain ($n=313$) they

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concluded that pain knowledge was generally inadequate preparation for practice.

Furthermore, Lofmark et al. (2003) found two-thirds of nursing students (n = 32) were unable to complete a systematic pain assessment, and only half identified the need to re-evaluate the effect of suggested pain-relief interventions. Chui et al. (2003) also identified poor knowledge when assessing students using Ferrell and McCaffrey's Nurses' Knowledge and Attitudes Regarding Pain Management (NKASRP; Ferrell and McCaffrey, 1993), finding an average score of just 38.6% (n = 150). Though reliability of their data was enhanced by sampling students from across 3 different schools, a vast range in scores was found (0–70%).

Chiang et al. (2006) reported comparable results when they evaluated pain knowledge using the NKASRP, with students scoring on average 57% (n = 181). Results improved with the introduction of a targeted pain programme, but the initial questionnaire, reflecting the original curriculum, found pharmaceutical knowledge poor, with 84.4% of students believing patients to over-exaggerate their pain, and 79.6% overstating addiction risks to opioid analgesics.

Nevertheless, these available studies were cohort-based, from single-site locations with small sample sizes; hence generalisation of results is tenuous (BPS, 2009). Sample-selection bias was also present — by measuring knowledge in convenience samples of students, those with poorer knowledge may decline to participate, positively skewing findings (Chiang et al., 2006; Plaisance and Logan, 2006). Yet in a large, recent study the British Pain Society (BPS, 2009) surveyed 109 undergraduate healthcare programmes across the UK, analysing time allocation for pain management. Whilst time is only a surrogate measure of the quality of education, their findings suggested pain education in many courses was unsatisfactory due to insufficient time provision and a tendency to integrate pain topics into other modules, resulting in difficulty for the student to amalgamate knowledge.

Evidence from the BPS study showed that pain content for nursing averaged between 2–36 h (BPS, 2009), attributed to a limited emphasis on pain in the Quality Assurance Agency benchmark statements that underpin curricula (Johnson, 2010). Yet with the introduction of pain to the UK National Health Service's Essence of Care Benchmarks for Best Practice, the need to improve the quality of pain management has become paramount (Department of Health, 2010). In an attempt to address education, the predominantly lecture-based approach is becoming less popular, with recognition that appropriate attitudes and behaviours are essential skills in pain management but lecture-style teaching often fails to develop these (McCluskey and Lovarini, 2005). Alternatively a focus upon e-learning to supplement teaching strategies already in place has been suggested (BPS, 2009).

E-learning

By enabling users to engage more with the subject, especially where tasks and interactions are incorporated into programmes, e-learning enhances knowledge and improves computer-literacy (Wharrad et al., 2001; Atack and Rankin, 2002). It is particularly effective for subject areas where traditional lectures have been regarded 'dry' in nature — Lymn et al. (2008), for example, introduced e-learning to enhance pharmacological education, reporting success in enhancing students' knowledge and understanding. Moreover, its flexibility is valuable for vocational subjects like nursing, allowing for study around 12-hour shifts and irregular shift patterns (Lymn et al., 2008).

There are concerns however that the methodology used to evaluate e-learning effectiveness is weak, based on student opinions which are subjective and do not fully reflect educational outcomes (Bloomfield, 2008). For instance, Lewis et al. (2001) found regular design flaws in nurse-related e-learning studies such as small sample sizes, questionable reliability and validity of the research instruments and lack of random assignment. In this study we have tried to address some of these methodological issues.

Aim

The aim was to develop e-learning resources to supplement existing pain education, quantitatively measuring the impact of the resources on knowledge and attitudes towards pain management in student nurses.

E-learning development

Learning resources in the form of two reusable learning objects (RLOs) were developed. In essence, RLOs are bite-sized chunks of e-learning, each focusing on a specific topic. They are highly visual with an auditory component and high quality graphics and take the average student 10–30 min to complete. Learning material was subdivided between the two RLOs to cover a set of learning objectives acknowledged to be areas of pain knowledge deficiency; pain assessment and the treatment of pain (Ferrell and McCaffrey, 1998).

Content for each RLO focused around images to explain concepts, with interactions to engage the user and clear instructions for navigation of the RLOs. Quizzes and tasks tested knowledge as the user worked through a package and text was accompanied by audio commentary (Fig. 1).

RLO development was based upon the AGILE process, whereby each stage in the design process was optimised through rigorous evaluation (Boyle et al., 2006). Storyboards (screen-by-screen accounts detailing interactive elements, content sequence, links, media descriptions and text) were produced and processed iteratively in Microsoft Word prior to media development. Content was peer-reviewed at regular intervals by five pain specialists based worldwide, whose subject expertise and diversified backgrounds ensured that content accuracy was optimal, and set at an appropriate level for student nurses.

Conversion of the storyboards into RLOs was undertaken using Microsoft Office PowerPoint 2007. Articulate software (http://www.articulate.com/) was used to incorporate interactions, audio commentary and images. Quality of the technical aspects of the programme was enhanced via student testing of navigation and interactivity at frequent intervals during development. Where necessary, permissions to use images was gained otherwise original images were produced. Error trapping of the completed prototype RLOs was conducted by the authors and expert reviewers. The two RLOs were then loaded onto a testing website, each accessed via individual web-address links minimising contamination between the interventions.

Methods

Design

The study used a randomised cohort design to determine the effectiveness of a pain-focused educational intervention. The setting was a large, university-affiliated teaching hospital in the East Midlands, UK and data was collected over a three-month period, October–December 2010.

Sample

The sample of students was drawn from the undergraduate Masters nursing course; ethical approval was obtained from the University of Nottingham. All students enrolled in the course between September 2007–2010 (total 233 students across 4 cohorts) were invited via email to undertake one of the RLOs developed for the study. Informed consent was obtained from those choosing to