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The European Proceedings of
Social & Behavioural Sciences
EpSBS

eISSN: 2357-1330

ICEEPSY 2016 : 7th International Conference on Education and Educational Psychology

Non-technical Skills in Undergraduate Nursing Education: Consideration for a Training Course Development

S. Pires[a,b]*, S. Monteiro[a,b], A. Pereira[a,c], D. Chaló[d], E. Melo[d], A. Rodrigues[d]

* Corresponding author: Sara Pires, sarapires23@ua.pt

[a]*Education and Psychology Department, University of Aveiro, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal, de-sec@ua.pt*
[b]*Cintesis – Center For Health Technology and Services Research, Faculty of Medicine, University of Porto, Rua Dr. Plácido da Costa 4200-450, Porto, Portugal, cintesis@med.up.pt*
[c]*CIDTFF – Research Center Teaching and Technology in Training of Trainers, University of Aveiro, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal, cidtff@ua.pt*
[d]*School of Health Sciences, University of Aveiro, Edifício 30 – Agras do Crasto, Campus universitário de Santiago, 3810-193 Aveiro, Portugal, essua.secretaria@ua.pt*

Abstract

Until nowadays, formal training of nurses has focused predominantly on developing knowledge, clinical expertise and technical skills. These skills are necessary but not sufficient to promote and maintain high levels of patient care and safety. Therefore, although recent literature has highlighted the importance of introducing non-technical skills training and assessment within healthcare, nursing education has still to fully include these skills on the training process. International research has shown that many errors and adverse events are due to a lack of non-technical skills rather than clinical knowledge (Dieckmann, 2010; Irwin & Weidmann, 2015; Lyk-Jensen, Jepsen, Spanager, Dieckmann, & Ostergaard, 2014). Patient safety issues and the incidence of errors are important to all healthcare professionals and public health organizations. Errors do occur in healthcare as in other industries but when these errors involve the risk to human life, the concern is paramount. Thus, one of the most important strategies for error reduction involves prevention (Lindamood, Rachwal, Kappus, Weinstock, & Doherty, 2011). In the light of this, it is essential for undergraduate nursing students to develop not only technical but also non-technical skills. Moreover, developing and implementing a non-technical skills training course may significantly improve students' performance and better prepare them for their future clinical practice. Consequently, consideration must be given in integrating NTS training into undergraduate nursing education curriculum.

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Keywords: Non-Technical Skills, Nursing Education, Undergraduate Nursing Students, Patient Care and Safety, High-Fidelity Simulation, and Healthcare.

1. Introduction

The term non-technical skills (NTS), sometimes referred to as crisis resource management (CRM),

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was primarily used in the aviation industry in a simulation-based safety training program known as crew resource management. This program was designed to educate pilots and their crews about the limitations of human performance, understanding cognitive errors, behavioral analysis, communication, conflict-resolution, and decision-making. The successful training prototype from aviation provided a simulation-based model for teaching NTS to healthcare professionals (Lindamood et al., 2011). NTS are the cognitive (decision-making, situation-awareness) and interpersonal (communication, teamwork, leadership) skills that underpin technical proficiency (Nguyen, Elliott, Watson, & Dominguez, 2015). These skills require training, and proved to be a necessary equation for error reduction (Flin & Maran, 2015; Gundrosen, Solligård, & Aadahl, 2014; Lyk-Jensen et al., 2014). Therefore, nurses must improve their understanding of NTS as these are described as vital for patient safety (Yule et al., 2008).

High-fidelity simulation-based (HFSB) training uses realistic scenarios and immediate after-action debriefing discussions which allow fully realizing and learning from the consequences of actions in ways that would not be possible in situations involving real patients (Rosenstein & O´Daniel, 2006). Properly conducted, HFSB creates an ideal educational environment because learning activities can be made to be predictable, consistent, standardized, safe, and reproducible. This encourages learning through experimentation and trial-and-error with the ability to rewind, rehearse, and practice without negative patient outcomes (Okuda et al., 2009), as it provides a safe place for students to practice before entering the clinical setting (Goodstone et al., 2013).

The training of not only technical but also NTS in high-fidelity simulation, is based on the premise that students will be able to integrate and replicate them together and effectively in the solution of real-life clinical challenges (Lyk-Jensen et al., 2014), as it affects knowledge, attitudes, and behaviors about team skills (Robertson et al., 2009) and have been applied extensively throughout healthcare in many specialties and procedures (Dunn et al., 2007) such as anesthesia (Gaba, Howard, Fish, Smith, & Sowb, 2001), emergency medicine (Shapiro et al., 2004), neonatal resuscitation (Thomas et al., 2007), perinatal emergencies (Freeth et al., 2009; Nielsen et al., 2007), critical care air support (Lamb, 2007), and surgery (Chaer et al., 2006).

2. Problem Statement

In the last two decades, several studies have emphasized that hospitalized patients may be harmed as a result of errors and incidents during their care. It is estimated that 70% to 80% of healthcare errors can be attributed to a NTS failure (Andersen, Jensen, Lippert, & Ostergaard, 2010). Incidents are possible even when healthcare professionals are skilled and committed to their work (Sara-aho, 2015). Thus, patient safety requirements in nursing have changed the educational needs and curriculum, and NTS promotion and training is a part of quality and risk management (Sara-aho, 2015).

3. Research Questions

Taking into consideration what was previously mentioned, our study aimed to review the existence of evidence on, if and whether, NTS training could improve undergraduate nursing students'

http://dx.doi.org/10.15405/epsbs.2016.11.32
eISSN: 2357-1330 / Corresponding Author: Sara Pires
Selection and peer-review under responsibility of the Organizing Committee of the conference

confidence, self-efficacy and clinical performance, as well as if its training should be integrated on undergraduate nursing curriculum.

4. Purpose of the Study

The study focuses on the importance of NTS training regarding errors prevention and the improvement of undergraduate nursing students' confidence, self-efficacy and clinical performance before starting their future practice. This training course development may be an added value in education for undergraduate nursing students, as shown in different studies with healthcare students and professionals. In this sense, Milligan (2007) purports that essential changes in nurse education from the outset of their training programmes, with the inclusion of NTS, is a pre-requisite to patient safety. Therefore, our study aims to act as a prevention and improvement strategy for healthcare behaviors, because although errors cannot be eliminated, efforts can be made to minimize, identify and mitigate them by ensuring that undergraduate nursing students have appropriate skills to cope with the risks and demands of their future work (Flin & Maran, 2015).

5. Research Methods

A literature research was conducted to locate and review articles focusing on NTS training for undergraduate nursing education, as well as its importance for error reduction in healthcare, and impact on clinical performance and patient outcomes. Between January and December 2015, we searched online resources on PubMed Medline, Sciencedirect, ProQuest and Google Scholar databases, on such keywords as: non-technical skills; nursing education; undergraduate nursing students; patient care and safety; high-fidelity simulation; and, healthcare. The articles were selected if they referred and/or described studies on NTS training for nurses, undergraduate nursing students and/or other healthcare students and/or professionals (inclusion criteria). They were initially screened based on title and abstract. When abstracts appeared to meet the inclusion criteria, then full articles were read. The articles meeting the inclusion criteria were included in the review**.**

6. Findings

The Institute of Medicine in the report on medical error and patient safety, To *Err is Human: Building a Safer Health System* (Kohn, Corrigan, & Donaldson, 2000), determined that healthcare organizations should establish team training programs for professionals in critical care settings (emergency departments, intensive care units, and surgery) using proven methods such as CRM. Nonetheless, because of the growing awareness of the need for the development of strategies to improve patient safety it is expectated that high-fidelity simulation-based training on CRM should become routine in all applicable healthcare settings (Gaba et al., 2001).

Our review found several articles referring to the importance of NTS training for healthcare and patient safety (Andersen, Jensen, Lippert, & Ostergaard, 2010; Andrews, 2014; Baker, Capella, Hawkes, Gallo, & Clinic, 2011; Boet et al., 2014; Boet, Reeves, & Bould, 2015; Briggs et al., 2015; Brunckhorst et al., 2015; Burton & Ormrod, 2011; Capella et al., 2010; Clark, 2009; Cooper, Endacott,

& Cant, 2010; Cooper et al., 2010; Cooper & Cant, 2014; Dieckmann, 2010; Dunn et al., 2007; Fletcher et al., 2003; Flin, O'Connor, & Crichton, 2008; Flin & Patey, 2011; Flin & Maran, 2015; Freeth et al., 2009; Gaba et al., 2001; Garbee et al., 2013; Gillman et al., 2015; Gundrosen, Solligård, & Aadahl, 2014; Gururaja, Yang, Paige, & Chauvin, 2008; Hicks, Coke, & Li, 2009; Hull et al., 2012; Irwin & Weidmann, 2015; Jepsen, Ostergaard, & Dieckmann, 2014; Kiesewetter & Fischer, 2015; Kodate, Ross, Anderson, & Flin, 2012; Kohn, Corrigan, & Donaldson, 2000; Kutzin, 2010; Légaré el al., 2012; Lindamood et al., 2011; Lyk-Jensen et al., 2014; Martinou et al., 2015; Milligan, 2007; Mitchell & Flin, 2008; Nguyen, Elliott, Watson, & Dominguez, 2015; Paige et al., 2014; Pearson & McLafferty, 2011; Ponton-Carss, Kortbeek, & Ma, 2016; Riley et al., 2011; Roberts et al., 2014; Robertson et al., 2009; Robertson et al., 2014; Sara-aho, 2015, Sevdalis, 2013; Shapiro et al., 2004; Thomas et al., 2007; Wisborg & Manser, 2014; Yule et al., 2008; Yule & Paterson-Brown, 2012; Ziesmann et al., 2013) and/or describing studies relating to NTS training in different healthcare settings and/or for different healthcare students and/or professionals (Brunckhorst et al., 2015; Capella et al., 2010; Dunn et al., 2007; Freeth et al., 2009; Garbee et al., 2013; Gillman et al., 2015; Hull et al., 2012; Lindamood et al., 2011; Lyk-Jensen et al., 2014; Martinou et al., 2015; Nguyen, Elliott, Watson, & Dominguez, 2015; Paige et al., 2014; Riley et al., 2011; Roberts et al., 2014; Robertson et al., 2009; Thomas et al., 2007; Ziesmann et al., 2013).

All the studies found refered to NTS improvement after its training courses (Brunckhorst et al., 2015; Capella et al., 2010; Garbee et al., 2013; Hull et al., 2012; Lindamood et al., 2011; Lyk-Jensen et al., 2014; Martinou et al., 2015; Nguyen, Elliott, Watson, & Dominguez, 2015; Paige et al., 2014; Riley et al., 2011; Robertson et al., 2009; Thomas et al., 2007; Ziesmann et al., 2013). In resuscitation teams, Thomas et al. (2007) aimed to integrate a team training and human error curriculum to the Neonatal Resuscitation Program and measure its effect on teamwork, hypothesizing and then concluding that teams that received the new course exhibited more teamwork behaviors during simulated resuscitations than others. On the other hand, Capella et al. (2010) demonstrated that strucutured simulation-based trauma resuscitation team (surgery residents, faculty, and nurses) training improves team performance, resulting in improved efficiency of patient care, proposing that formal teamwork training should be included in surgery residency training. Then, trauma team training programs have been shown to provide important education on NTS (Ziesmann et al., 2013) and the implementation of these programs has resulted in improved team performance in subsequent simulated and real-time scenarios (Capella et al., 2010 ; Roberts et al., 2014). Ziesmann et al. (2013) evinced that a national multidisciplinary trauma CRM curriculum is feasible, has high satisfaction among participants (surgical residents, nurses, respiratory therapists, trauma surgeons, emergency physicians, and intensivists), and can improve attitudes toward the importance of simulation and CRM principles with the ultimate goal of improving patient safety and care. Finally, the Simulated Trauma And Resuscitation Team Training (STARTT) course showed that participants (physicians, nurses and respiratory therapists) maintained high levels of satisfaction and significant improvements in CRM skills as a team as they advanced through the course (Gillman et al., 2015).

Moreover, Robertson et al. (2009) in their study with perinatal healthcare professionals (attending physicians, nurses, resident, and nurse midwives) demonstrated a positive change in their attitudes;

perception of individual and team performance, and overall team performance in a simulated environment, concluding that the ability of individuals to accurately assess their performance improved as a result of training, and that the crisis team training model is applicable to obstetric emergencies.

On the other hand, Riley et al. (2011) refered to their interdisciplinary team training program using in-situ simulation as the first evidence providing a clear association between simulation training and improved patient outcomes and perinatal safety in a hospital setting, proving that didactics alone were not effective.

Also, the study on the development of the Neonatal Intensive Care Multidisciplinary Crisis Resource Training Program, was well received by those experiencing it (physicians, nurse practitioners, nurses, and respiratory therapists) (Lindamood et al., 2011).

Thus, there is general acceptance that the introduction of NTS concepts into healthcare via training, development and research has had an impact on clinical outcomes. On surgery, Hull et al. (2012) concluded that NTS can and do have an effect on surgeons' technical performance. On the other hand, in a study with undegraduate medical students, those participating on the programme to improve NTS, demonstrated better NTS. Therefore, authors considered that offering an intense programme may significantly improve medical students' NTS and consideration must be given in integrating a simulation curriculum into the medical education curriculum, as simulation on surgery using human tissue samples could help students become more proficient in handling surgical instruments before stepping into a real surgical situation (Martinou et al., 2015). On another study, with the purpose to examine the effect of simulation-based training on NTS performance of general surgical residents during simulated laparoscopic cholecystectomy, as surgical proficiency is 75% in NTS and 25% in technical skills, it could be reasonably argued that improved NTS of surgeons could improve surgical outcomes (Nguyen, Elliott, Watson, & Dominguez, 2015). Paige et al. (2014), after investigating the immediate impact of conducting interprofessional students (nursing, nurse anesthetist, and medical students) in operating room team training using high-fidelity simulation on students' team attitudes and behaviors, indicated that the team training improved students' team attitudes and behaviors.

Then, Garbee et al. (2013) when evaluating the efficacy of using CRM principles and high-fidelity human patient simulation for interprofessional team training of students from undergraduate nursing, nurse anesthesia, medical, and respiratory therapy, suggested it as an effective pedagogy for teaching communication and teamwork skills to interprofessional students' teams; and Lyk-Jensen et al. (2014) also reinforce that collaboration on a patient does not solely depend on clinical and technical skills, but of the interaction between professionals and human factors such as nurses' self-insight, attitudes to work and their way of being, as playing a substantial role that affects the clinical work.

Finally, Brunckhorst et al. (2015) had demonstrated that integrating technical and NTS within one training pathway is not only feasible, but also educationally valuable, and that this may be useful for the development of future curriculum for other procedures. In this study, 32 novice participants with no prior practical ureteroscopy experience were included within the data analysis, and was proved that strong correlation between technical and NTS performance exists, which was demonstrated to be irrespective of received training. This supports the importance of training both of these skills together within one curriculum.

After our review, we were able to understand that NTS training, such as communication, teamwork, leadership, decision-making and situation-awareness, has proved to improve professionals' performance (Irwin & Weidman, 2015). Although there are still limited studies related to NTS training in undergraduate nursing education, nursing has begun to recognize these skills as playing an important role to increase patients' care and safety and successful clinical outcomes, and the use of high-fidelity simulation as a learning approach to NTS awareness (Pearson & McLafferty, 2011). Thus, inclusion of NTS training in formal education programs must be taken into consideration (Gururaja, Yang, Paige, & Chauvin, 2008).

7. Conclusions

Research evidence portrays successful outcomes in clinical performance and patient care and safety after high-fidelity simulation-based NTS training in many different clinical settings (Boet et al., 2014). This suggest that NTS are essential skills to acquire across specialties, healthcare professions, and clinical conditions (Boet, Reeves, & Bould, 2015).

In nursing education, NTS training is the interface between nurses' internal environment and the real professional world, in which they will enter. Therefore, improving these skills is becoming a strategic priority within healthcare institutions at international level (Sevdalis, 2013). Thus, is essential for students to acquire and train not only technical but also NTS. So, consideration must be given in integrating its training in undergraduate nursing curriculum.

Our study highlighted the importance and the intent for the development of a NTS training course for undergraduate nursing students in response to patient safety goals and improvement of clinical performance. Therefore, the development of a NTS training course may significantly improve undergraduate nursing students' performance, confidence, and self-efficacy, and be an added value as it can help them to adjust to the complex clinical context, and increase patient care and safety.

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