Nurse Education Today 35 (2015) 97–103

Contents lists available at ScienceDirect

Nurse Education Today

journal homepage: www.elsevier.com/nedt

Performance evaluation of nursing students following competency-based education

Jun-Yu Fan [a,*], Yu Hsin Wang [a,1], Li Fen Chao [a,2], Sui-Whi Jane [a,3], Li-Ling Hsu [b,4]

[a] Department of Nursing & Graduate Institute of Nursing, Chang Gung University of Science and Technology, 261, Wen-Hua 1st Road, Kwei-Shan, Tao-Yuan 333-03, Taiwan
[b] Graduate Institute of Health Allied Education, National Taipei University of Nursing and Health Sciences, No. 365, Mingde Rd., Beitou District, Taipei City 112, Taiwan

ARTICLE INFO

Article history:
Accepted 3 July 2014

Keywords:
Competency-based education
Core competency
Metacognitive
Objective Structured Clinical Examination

SUMMARY

Background: Competency-based education is known to improve the match between educational performance and employment opportunities.
Objectives: This study examined the effects of competency-based education on the learning outcomes of undergraduate nursing students.
Design: The study used a quasi-experimental design.
Participants: A convenience sample of 312 second-year undergraduate nursing students from northern and southern Taiwan participated in the study.
Methods: The experimental group ($n = 163$) received competency-based education and the control group received traditional instruction ($n = 149$) in a medical–surgical nursing course. Outcome measures included students' scores on the Objective Structured Clinical Examination, Self-Evaluated Core Competencies Scale, Metacognitive Inventory for Nursing Students questionnaire, and academic performance.
Results: Students who received competency-based education had significantly higher academic performance in the medical–surgical nursing course and practicum than did the control group. Required core competencies and metacognitive abilities improved significantly in the competency-based education group as compared to the control group after adjusting for covariates.
Conclusions: Competency-based education is worth implementing and may close the gap between education and the ever-changing work environment.

Introduction

Healthcare institutions and organizations face numerous challenges, such as increasing amounts of information, the introduction of new technologies, decreased funding, and demands for accountability (Anema and McCoy, 2010). Most employers expect that new nursing graduates are prepared to perform a wide range of functions and have the skills to provide safe care; however, many employers are concerned that recent graduates are not competent to perform basic clinical tasks, or that their education and work competencies are disconnected (Tilley, 2008). This situation results in disappointed employers, frustrated new graduates, and dissatisfied patients (Anema and McCoy, 2010; Ruth-Sahd and Grab, 2012).

Competency-based education (CBE), an outcome-based approach, has shown promise in reducing the gap between education and employment (Anema and McCoy, 2010; Applin et al., 2011). However, nursing has been slow to implement CBE for several reasons, including the difficulty of defining and measuring competencies, and the divergent opinions of stakeholders (Applin et al., 2011; Axley, 2008; Cassidy, 2009; Cowan et al., 2007; National Council for State Boards of Nursing (NCSBN), 2005; National Education Framework, 2008; Pijl-Zieber et al., 2013; Tilley, 2008; Watson et al., 2002).

The majority of studies on CBE have focused on the definitional and theoretical aspects of competency or the clinical competence of graduates (Klein and Fowles, 2009). However, few studies have examined its implementation. This study analyzed the implementation of CBE in one course using outcome measures.

Background

As an outcome-based approach to education (Frank et al., 2010), CBE has received attention in the educational literature over the past 20 years. CBE focuses on learners' performance and outcomes on specific objectives and curricular goals (Pijl-Zieber et al., 2013). Operational

* Corresponding author. Tel.: +886 3 2118999x5519; fax: +886 3 2118866.
E-mail addresses: jyfan@gw.cgust.edu.tw, jyfan0921@gmail.com (J.-Y. Fan), yhwang@gw.cgust.edu.tw (Y.H. Wang), lfchao@gw.cgust.edu.tw (L.F. Chao), swjane@gw.cgust.edu.tw (S.-W. Jane), llhsu@ntunhs.edu.tw (L.-L. Hsu).
[1] Tel.: +886 3 2118999x3137; fax: +886 3 2118866.
[2] Tel.: +886 3 2118999x3135; fax: +886 3 2118866.
[3] Tel.: +886 3 2118999x3136; fax: +886 3 2118866.
[4] Tel.: +886 2 28227101x3169; fax: +886 2 28212143.

http://dx.doi.org/10.1016/j.nedt.2014.07.002
0260-6917/

definitions of core competencies, accurate and consistent evaluations of competencies, and the identification of appropriate measurement tools are needed to implement CBE (Garside and Nhemachena, 2013; Morris et al., 2012; Pijl-Zieber et al., 2013; Schoene and Kanusky, 2007).

In 1996, the National Council of State Boards of Nursing (NCSBN) defined competence (NCSBN, 1996) and in 2006, the American Association of Colleges of Nursing (AACN) identified the core competencies needed by baccalaureate nursing students to deliver high-quality patient care (AACN, 2006). Since then, nursing programs have reached a greater consensus on the core competencies of new graduates of baccalaureate nursing programs. Collaboration with stakeholders to develop approaches to assess competence is critical (National Education Framework, 2008; Pijl-Zieber et al., 2013). Unfortunately, "Competency" is a nebulous concept defined in different ways by different people. In our study, the term "competence" refers to the description of an action or behavior, whereas competency refers to an individual's behavior underpinning the competent performance (Tilley, 2008).

While nursing competence is traditionally assessed by observing students in clinical practice (Garside and Nhemachena, 2013), the measurement of competence is problematic (Yanhua and Watson, 2011). A comprehensive approach to competence evaluation should include quantitative and qualitative methods.

In general, grade point average (GPA) or final grade is the most popular quantitative indicator of academic performance in university settings. Other measures used in the recent studies include Schwirian's (1978) Six-Dimension Scale for Nurse Performance (6-D Scale); the Nurse Competence Scale (NCS), developed by Meretoja et al. (2004); and the Self-Evaluated Core Competencies (SECC) Scale (Hsu and Hsieh, 2009), which was revised by the same authors and named the Competency Inventory of Nursing Students (CINS) (Hsu and Hsieh, 2013). These instruments have demonstrated excellent validity and reliability in multiple studies (Klein and Fowles, 2009; Meretoja and Leino-Kilpi, 2001; Meretoja et al., 2004).

A commonly utilized qualitative approach in the assessment of competence is the practice portfolio, a purposeful collection of students' learning activities, progress, and achievements. Portfolios can promote and document active learning, critical thinking skills, and individual accountability in students (McCready, 2007; McMullan et al., 2003; Scholes et al., 2004; Taylor et al., 2009). Portfolio evaluation is a subjective process, and issues, such as aims, structure, composition, trialing electronic portfolios, and inter-rater reliability, require attention to improve their trustworthiness, quality and rigor (McCready, 2007; McMullan et al., 2003).

Several factors are involved in competence development. The development of competence in nursing students is influenced by their level of comfort, confidence, and self-efficacy (Pijl-Zieber et al., 2013). Nursing students must use a variety of mental processes, such as critical inquiry, reasoning, judgment, and creativity to solve problems, and apply procedures or therapies (Simpson and Courtney, 2002). These self-evaluation processes, called *metacognitive ability*, are important to clinical learning and practice (Quirk, 2006; Martinez, 2006). Baker (2002) suggested that they are closely tied to learning and Coutinho (2008) reported that students with high levels of metacognitive ability demonstrate better academic performance. Metacognitive awareness is required for *critical thinking* (Adams et al., 1997), the act of evaluating ideas for their quality, especially logic (Martinez, 2006). Anema and McCoy (2010) claimed that nursing students generally have weak skills in reading, writing, oral communication, critical thinking, problem solving, creative thinking, self-discipline, and working with groups. Thus, there is a clear need for new teaching and learning strategies in current nursing education to make students aware of the relationship between what they learn and how they learn it (Goudreau et al., 2009). Hence, teaching nursing students to think critically or challenging them to think is one way to cultivate their metacognitive ability. This skill should help them to recognize their limitations, change their learning strategies, and monitor their thinking to improve their performance in the ever-changing health care environment (Hill and Kirkwood, 2005; Hsu, 2010; Martinez, 2006; Sigler and Tallent-Runnels, 2006; Thomas and McRobbie, 2001; West et al., 2007).

Competence-based education, despite its limitations, has an important place in nursing education for the foreseeable future (Garside and Nhemachena, 2013). Unfortunately, the promises of CBE have not as yet seemed to pay off in nursing education, perhaps due to the many issues surrounding the assessment of competence and the widening theory–practice gap. Is CBE worth pursuing, given its limitations to date? Seeking to answer this important question, the purpose of this study was to examine the effects of CBE on the instruction and evaluation of learning outcomes of students in a medical–surgical nursing course.

Methods

In 2006, the Taiwan Nursing Accreditation Council (TNAC) established a set of core values for baccalaureate nursing programs, which included critical thinking and reasoning, general clinical skills, basic biomedical science, communication, teamwork capability, caring, ethics, accountability, and life-long learning (TNAC, 2013). These core values were incorporated into our institution's mission to form our own competencies and the development of the objective structure clinical exam (OSCE). Our development of the CBE curriculum incorporated these core competencies and teaching methods, consistent with adult-learning principles (Applin et al., 2011). The CBE curriculum was used as the intervention in the present study.

This quasi-experimental study was conducted at a private university in northern Taiwan from November 2011 to October 2012. The university has two campuses (the L and the C campus) and approximately 7600 students as of 2012. The undergraduate nursing program enrolls three classes of BSN students each year (about 160 BSN students per year) at each campus, which share the same syllabus.

The medical–surgical nursing course was chosen for the study because it is the most popular professional course, and the majority of our graduates seek employment in medical–surgical wards. Prior to implementing the CBE course, we held several faculty-training sessions to achieve consistency of content and teaching materials. The training course was led by one of the co-PIs, a nurse educator/professor with a doctoral degree in nursing education, who is also the university's Director of Nursing Education.

Using the professional core competencies, we narrowed the scope to the learning objectives of the medical–surgical nursing course taught in the second year of the program. Competency indicators were identified by focusing on the clinical application of knowledge rather than decontextualized theoretical knowledge. Regular laboratory practice sessions and the Objective Structured Clinical Exam (OSCE) were used to evaluate the degree to which students met the performance objectives. Other indicators assessed students' cognitive processes. Multiple choice, essay questions, and a pass/fail grading scheme were also used to determine whether the objectives were met. We also used reflection at the end of each simulation course to assess students' mental processes, such as critical inquiry, reasoning, judgment, and creativity in solving problems, otherwise known as metacognitive ability (Simpson and Courtney, 2002).

The primary variables/outcome measures were academic performance (final grade for the medical–surgical nursing course, including written examinations, reflection for simulation course, and five-station mini-OSCE summary evaluations); medical–surgical nursing practicum grade (clinical performance); and the Self-Evaluated Core Competencies Scale (SECC) (Hsu and Hsieh, 2009) and the Metacognitive Inventory for Nursing Students (MINS) questionnaire (Hsu, 2010).

We collected student demographic data that included gender, age, marital status, first- and second-year GPAs, and final grades on medical–surgical nursing course, OSCE and practicum. The MINS was developed to measure the association between learners' knowledge and awareness of their own thinking and behaviors (Hsu, 2010; Son and