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The effects of using problem-based learning in the clinical nursing education on the students' outcomes in Iran: A quasi-experimental study

Mahnaz Khatiban, Gita Sangestani*

Mother & Child Care Research Center, Hamadan University of Medical Sciences, Hamadan, Iran

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ABSTRACT

There are some strategies including problem based learning (PBL) that could enhance the learning experience. This quasi-experimental design was conducted to compare the effects of PBL with traditional clinical education that is commonly used for nursing students. The effects were observed by monitoring differences in their special and general competencies, performance and attitudes towards learning experiences. In 2010, 70, undergraduate nursing students were assigned into two groups as either PBL ($n = 34$) or Control group ($n = 36$) at Hamadan University of Medical Sciences in Iran. The research tools used in this study were: the "students' competency self-evaluation" and the "students' attitudes toward their learning experiences" questionnaires, and also a "Coding system of performance" checklist. The groups were similar in most demographic characteristics.

The PBL students' general and special competencies improved in the post-test significantly more than those of the control students ($P < .001$). The PBL students' attitude was significantly better than the control group ($P < .01$) as well. There was also an incredible enhancement only in the PBL students' performance ($P < .01$). Therefore the Problem-based learning fostered nursing students' competency, attitude, and performance.

Introduction

Educated nurses must be capable of responding to the patients' changing needs in the health care environments. They must also be able to apply their knowledge in a variety of clinical settings (Giddens and Brady, 2007; Higuchi and Donald, 2002; Oldenburg and Hung, 2010; Tanner, 2006). When the nursing students enter clinical settings, they will meet conditions that need the critical innovative responses to complicated problems. Although the main goal of nursing education is to decrease the gap between the theoretical concepts taught in the classroom and the actual practice of nursing (Etheridge, 2006; Tiwari et al., 2006), it has been frequently observed that nursing students with appropriate theoretical bases have insufficient skills in the clinical environments (Morgan, 2006). Therefore, it is necessary for the nursing students to have an educational program which includes strategies to solve the problems (Wang et al., 2004). It can be obtained by making changes in the traditional educational strategies (Tiwari et al., 2006) particularly in the clinical nursing education.

Clinical education is one of the most important components in the nursing education. Clinical environments are the places where the nurses grow, develop and learn the nursing practice (Herrman, 2002). There are some strategies that could enhance the learning experiences, one of them commonly used is problem-based learning (PBL) (Rideout et al., 2002).

The use of PBL began at McMaster University in Canada, in the late 1960s (Alexander et al., 2002). Nursing educators at the universities have supported the notion of the self-directed PBL for a long time (Badeau, 2010). It is active and student-centered instructional strategies which can help the students utilize their knowledge and skills in new situations (Williams and Beattie, 2008). PBL strategy improves students' learning and helps them to solve the real-life problems by searching the scientific data (Niemer et al., 2010).

In Iran, the nursing clinical education is traditionally a trainer-focused strategy. It means that a trainer directly trains, supervises and evaluates an 8–10 student group in each clinical course. The education is commonly limited due to differences in nursing

* Corresponding author. Hamadan, Iran. Tel.: +98 813 8380150; fax: +98 81 38380447.
E-mail addresses: gsangestani@yahoo.com, sangestani@umsha.ac.ir (G. Sangestani).

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practical duties according to the routines of the wards. Hence, we tried to apply the PBL strategy in the nursing clinical education for the first time. As the experts suggested that, regardless of using any educational strategy, students' outcomes evaluation should be considered (Pazargadi et al., 2009), we evaluated the students' outcomes to know the PBL effectiveness.

We know the outcomes of an educational program are challenging. On the other hand, the students' knowledge, skills, attitudes and behaviors could be measured as the outcomes of a new training method (Kraiger et al., 1993). Two learning outcomes categories are considered: specific and generic. The first one is the knowledge and skills which are directly related to the discipline, while the second one is linked to any disciplines such as the problem solving (Adam, 2004). As there is a similarity between the steps of the Nursing Process (NP) with those of the problem-solving method (Alfaro-Lefevre, 2002; Lee and Brysiewicz, 2009), we considered the students' knowledge, skills and performances in NP as the students' outcomes. NP provides a practical approach to evaluate students' competences (Kimberly, 2007). This study was conducted to evaluate the effects of the PBL compared with the traditional method (non PBL = NPBL) on the students' outcomes as follows:

1 Comparison of the students' general and special knowledge and skills self-evaluation between the NPBL and PBL group before and after clinical course.
2 Comparison of the PBL and NPBL students' attitudes toward their learning experiences after clinical course.
3 Comparison of the PBL and NPBL students' performances in using NP to solve the patients' problems after the clinical course.

Literature review

There are numerous studies about the effectiveness of PBL in medical and nursing education in the classes (Gurpinar et al., 2005; Tiwari et al., 2006; Sand-Jecklin, 2007; Dehkordi and Heydarnejad, 2008; Badeau, 2010; Lin et al., 2010; Sangestani and Khatiban, 2013), but we found very few evidences of using it in the nursing clinical education. In this regard, Ehrenberg and Häggblom (2007) studied the second year nursing students and their preceptors' experiences of the PBL in a clinical education project. 45 students and 30 preceptors answered a questionnaire and participated in an interview. The researchers found that the students and their preceptors had perceived the educational project positively. In addition to this, students felt more freedom and responsible for their education. Wang et al. (2004) also integrated a set of Problem Solving strategy with Nursing Process (PSNP) in the core courses in a post-RN baccalaureate nursing program at a university in Taiwan. They assessed effectiveness of PSNP by observing the students' ability in solving the clinical problems. The overall students' scores showed that their abilities were increased.

Methods

Research design

This quasi-experimental study was performed with a nonequivalent control group pretest-post-test design; and a nonequivalent control group only post-test design for the students' attitudes and performance (Polit and Beck, 2004). It performed at Hamadan University of Medical Sciences, Iran in 2010.

Participants

All the 70 third-year undergraduate nursing students that were registered for one-credit clinical course of the "Hematologic and Oncologic Nursing Care" were invited to participate in the study. These students belonged to two separate classes and were assigned randomly to either PBL (34 students) or NPBL group (36 students). Each of these groups also included four internship subgroups with 8–9 students. The mentioned credit takes three days per week for 10 days (60 h) in a semester to complete. The two groups were trained in the same ward of the hospital in the morning for two three-days of a week. The two groups also stayed in different dormitories or own houses, so the possibility of their interactions was very low.

Intervention

NPBL group

All the students in the NPBL group were trained in the nursing care as routine, meaning that they were mostly practicing based on the task assignments. They performed the procedural care without any nursing care plan. They also had a lecture about the patients' disease in the ward and wrote an NP for their patients at the end of training using the textbooks.

PBL group

The PBL clinical course plan used was designed according to Alfaro-Lefevre (2002), who stated that the 5 steps of problem solving method are similar to those of the nursing process (including nursing assessment, nursing diagnosis, planning, implementation and evaluation). This course plan had three episodes as follows: 1- The first day was for orienting and familiarizing the students with the ward, objectives, expectations, training tasks, and assessment methods. 2- For the other days, all the students had to study a patient's problem for the following day based on the compiled curriculum. Every morning, the students discussed about a patient's problem written on the white board and then attempted to write an NP to solve it for about 20–30 min together. A tutor coordinates these sessions and the students' efforts in the ward. After that, each student was asked to write a nursing care plan to solve his/her patient problems every day. In the most cases, the selection of the patients was delegated to the students in order to maximize their participation in organizing education. 3- On the last day, the students were evaluated with their cooperation. In order to control the quality of intervention, the developed PBL clinical course plan was approved by the Nursing Medical Surgical Department of Hamadan University of Medical Sciences.

Data collection

The research instruments were three questionnaires and a checklist. We developed and modified these instruments according to the related literature. Our study tools and aims were sent to 11 academic members of three major Iranian Universities of Medical Sciences with the purpose of ascertaining the content and face validity. Adjustments were made according to their comments. The internal consistency of the instruments was estimated by the Cronbach's α. The instruments were as follows:

1) The demographic characteristics questionnaire included items such as students' age, gender, marital status, current living place, GPA in the last semester and the GPA in the high school. It was designed based on Safari et al. (2006) study.
2) The "Students' competency self-evaluation" questionnaire with two parts: 1-a) the "General expected knowledge and skills in

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