The Effect of Online Computer Assisted Instruction on Knowledge, Self-Efficacy, and Satisfaction of Nursing Students

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Abstract

Background: Computer assisted instruction is integrated to nursing education lecture class. It is not assessed in online teaching of maternal-newborn nursing and Midwifery class.

Purpose: To examine the effectiveness of online computer assisted instruction of nursing care for pregnant women with diabetes on knowledge, self-efficacy, and satisfaction of nursing students.

Methodology: Quasi-experimental research was designed in this study. Participants were selected using systematic random sampling. Eighty nursing students were enrolled in this study. Forty students in experimental group was assigned to learn via online computer assisted instruction of nursing care for pregnant women with diabetes, where as another forty students was assigned to learn in lecture class. The pretest and posttest mean scores of students' knowledge and self-efficacy of nursing care for pregnant women with diabetes were analyzed and compared within group and between group.

Results: The posttest mean score of students' knowledge and self-efficacy of nursing care for pregnant women with diabetes in the experimental group was significantly higher than those in lecture class. The overall students' satisfaction with online computer assisted instruction was 82.50 percent. These findings suggested that online computer assisted instruction could enhance students' learning outcomes and satisfaction.

Keywords: *Online teaching, computer assisted instruction, nursing education.*

Introduction

Pandemic of Covid-19 has impacts on education management worldwide. Many abruptions change the way of daily living, working, teaching and learning. Educators have to modify their teaching methods from academic face-to-face to online class. Several educational innovations emerge to support teaching and learning demands such as online computer assisted instruction, simulation, e-learning, and blended learning[1-2]. Educators require to manage the well-planned instructions in order to motivate students' engagement and response to learning style varieties[3]. Effectiveness of these online education strategies need to be evaluated and promoted.

Philosophies and principles of online education management are published and applied in all organizations. They are integrated with prior constructivism, student-centered, problem-oriented, twenty-first century skills, and outcome-based educations[4-6]. Advanced in media technology and

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online applications were offered for all[7]. In addition, the online teaching -learning environments were modified in all classes. Everyone has to cope with these unavoidable changes and put efforts to overcome these situations.

In nursing education, many online classes have to implemented. However, teachers and students face some obstacles. Many workshops on online teaching and supporting innovation technology were provided for all teachers[8-9]. Students also received guidelines and trained to learn via online classes[10]. In the early phase of application of these online courses, lack of supporting education resources was found in nursing education[11]. Development of educational innovations should be promoted and evaluated. Doing classroom research can help to improve online education management and enhance learning outcomes. This study aimed to examine the effectiveness of online computer assisted instruction (CAI) of nursing care for pregnant women with diabetes on knowledge, self-efficacy, and satisfaction of nursing students.

Research Methodology

Quasi-experimental research was employed in this study. The setting was Faculty of Nursing, Prince of Songkla University, Thailand. The studied population were 218 third-year nursing students who were enrolled in Maternal-Newborn Nursing and Midwifery course during the first semester of 2020 academic year. Systematic random sampling was used to recruit 80 students. Forty subjects were enrolled in experimental group assigned to learn from online CAI of nursing care for pregnant women with diabetes. On the other hand, another 40 subjects were enrolled to usual lecture class of nursing care for pregnant women with diabetes. The contents on CAI of nursing care for pregnant women with diabetes and data collection forms were assessed by three experts. The index of item-objective congruence (IOC) was 0.88. The test-retest reliability was 0.83. The participants were asked to complete the pretest questionnaire on the week before class. Then, the participants in the experimental group were assigned to learn online using the developed CAI on nursing care for pregnant women with diabetes, whereas students in the controlled group took the usual online course. Finally, all participants were asked to complete the posttest questionnaire. Measurements of students' knowledge, self-efficacy and satisfaction with online CAI were analyzed and compared between the two groups using paired t-test and independent t-test.

Findings

The sample of students participated in this study were 21-22 years of age. Fifty-five percent of students reported that they had previously used CAI in high school and some courses in the university. None of them had have experiences in using CAI via online classes. The efficiency (E1/E2) of online CAI of nursing care for pregnant women with diabetes was 80/92.

The students' knowledge posttest mean score in the experimental group (*M* 8.50, *SD* 1.26) was higher than those in the control group (*M* 4.35, *SD* 0.89) at .05 significant levels.

Students' posttest mean score of self-efficacy on nursing care for pregnant women with diabetes in the experimental group (*M* 79.00, *SD* 6.32) was higher than those in the control group (*M* 37.25, *SD* 11.54) at .05 significant levels.

The overall students' satisfaction with learning online using CAI of nursing care for pregnant women with diabetes was 82.50 percent *(SD 10.40)* (Table 1).

Table 1: Comparison of posttest mean scores of knowledge and self-efficacy on nursing care for pregnant women with diabetes (n=80)

Dependent Variables	Experimental group		Control group		t	P
	mean	SD	mean	SD		
Students' knowledge of nursing care for pregnant women with diabetes	8.50	1.26	4.35	0.89	16.98	.000
Students' self-efficacy of nursing care for pregnant women with diabetes	79.0	6.32	37.25	11.54	20.06	.000

Discussion

The students who had learned with online CAI showed higher mean scores of knowledge and self-efficacy on nursing care for pregnant women with diabetes than those participated in usual classroom. It demonstrated that the online CAI was effective to enhance student learning outcomes. Using CAI in online classes can support interactive learning process and enhance self-efficacy on application of knowledge. Prior systematic review suggests that online classes can improve students' attitude, knowledge and skills[12]. In addition, implementation of e-learning program illustrates improvement of caring behaviors [13]. Nursing students perceived that online learning in Covid-19 pandemic is positive opportunity to select and practice advanced technology of educational innovations[14]. Application of CAI in online course is effective and suitable to support self-directed learning and interactive learning environment [15]. Moreover, learning experiences in online courses can promote active-adult learner behaviors [16]. As a result, the students can develop self-efficacy on nursing care for pregnant women with diabetes. The overall students' satisfaction with learning online using CAI of nursing care for pregnant women with diabetes was high (82.5%).

However, nursing students face some problems and barriers during taking online course that include availability of internet access and online learning equipment, home environment, overload course works, assignments and examinations [17]. Some students feel stress and tension because of difficulty of the studied contents, teaching-learning technology, and development of clinical skill competencies[18]. Preparing and providing high speed internet and advanced technology supporting online course management would be helpful to implement online educational innovations [17].

Conclusion

Online computer assisted instruction of nursing care for pregnant women with diabetes was developed and assessed the effect on students' knowledge, self-efficacy, and satisfaction. The results showed that it was effective to enhance learning outcomes and suitable to combine in online teaching method.

Conflict of Interest: Nil

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