



Effectiveness of Blended Versus Traditional Learning Program about Nursing Care of Sciatica on Nurses' Performance, and Self-Efficacy

Fatma Mohamed Elmansy¹, Mohamed Nabil Hegazy² and Mohamed Goda Elbqry^{*3}

^{1,3}Lecturer of Medical Surgical Nursing, Faculty of Nursing, Suez Canal University, Egypt

² Lecturer of Neurology, Faculty of Medicine, Suez Canal University, Egypt

ABSTRACT

Sciatica is a type of back pain that occurs in a variety of intensity and duration. Nursing care is intended to provide crucial care to reduce the burden of this condition. Blended learning has distinguished advantages to improve nurses' performance. **Purpose:** This study was aimed to evaluate the effectiveness of blended versus traditional learning program about nursing care of sciatica on nurses' performance, and self-efficacy. **Methods:** A quasi-experimental research design was used to conduct the current study in the Neurosurgery Department, Suez Canal University Hospitals. **Sample:** A purposive sample of two nurse's groups were recruited at the study, a totally were (54) nurses. Four tools were used; (1) Self-administrated questionnaire to assess nurses' demographic data, and knowledge level; (2) Nurses' practice observational checklist to assess nurses' practice level; (3) Modified self-efficacy questionnaire to assess nurse's belief in their own ability and (4) Learning program's satisfaction questionnaire to assess nurses' satisfaction level. **Results:** Significantly an improvement of the nurses' knowledge, practice, self-efficacy, and learning program's satisfaction of the study group compared to control group at post phases. There was a significant correlation of self-efficacy between the study and control group at pre, post, and follow-up phases with a $p \text{ value} \leq 0.05$. **Conclusion:** It concluded that blended learning is crucial for improving nurses' knowledge, practice, and self-efficacy. It can decrease the time and effort of lecturing a repeated content. **Recommendation:** A blended learning program about nursing care of sciatica should be adhered to and applied at the orientation phase of nurses.

Keywords: Blended learning, nurses' performance, sciatica, self-efficacy, traditional learning.

Introduction:

Sciatica is a lumbosacral radicular syndrome, globally affecting 10% to 40% of the population relayed on controversial concepts (Jia-jia, & Min, 2021). Also is known as a debilitating disorder that is caused by pathology of the sciatic nerve or/and nerve root causes severe posterior radiating leg pain accompanied by neurological deficits (Ashbrook, Rogdakis, Callaghan, Yeowell, & Goodwin, 2020). A herniated disc is the most common cause of sciatica approximately 85% of cases, while lumbar stenosis, joint osteoarthritis, spinal cord tumors, rising height,

and exposure to vehicle vibrations have been associated with sciatica (Rashid, 2020).

Patients with sciatica experienced a burning sensation, debilitating pain affected only on one side that feels like an electric or jolt shock, bowel, bladder changes, or/and leg weakness from the low back to feet (Linton, & Matteson, 2019). Physical examinations, computed tomography (CT) scans, and magnetic resonance imaging (MRI) are essential to detect sciatica (Ter, et al. 2021). Conservative treatment is considered a first-line selection, medicine with over-the-counter pain relievers like ibuprofen with or without anti-

inflammatory drugs as corticosteroids can be used, while surgical intervention remains a late option (Harding, Kwong, Roberts, Hagler, & Reinisch, et al. 2019). Health care providers' staff require to promote their self-efficacy in dealing with the hospital's daily situations, while the hospital work is not only tradition but also shared beliefs and values to be productive and innovative (Elshani, et al. 2018).

Self-efficacy clarifies the belief in an individual's ability to carry out and regulate the necessary actions to manage the situation that will be faced, so that is crucial in nursing performance influences their behavior, attitudes, and involves clarifying or expressing when the patient is in serious condition (Wretman, Zimmerman, Ward, & Sloane, 2020). Despite in sciatica low back pain usually is a self-limiting and benign condition that leads to improving spontaneously over time, the effectiveness related to most of these interventions has not yet been demonstrated beyond doubt and consequently so that the therapeutic management of sciatica varies widely (Jia-jia, & Min, 2021).

Nursing care is provided to patients not only through drug administration and therapeutic psychological support, but also by positioning patients effectively to reduce the severity of pain and promote their cooperation, applying heat & cold compress, assessing the intensity of pain as well as through nonpharmacological measures such as encouraging patients to participate in aerobic exercise such as walking, running, or yoga, positioning effectively by avoiding lifting, bending, or sitting in a low, soft chair, and alternating dry heat and cold packs compress (De Campos, 2017 and Stein, & Hollen, 2020).

Nowadays, it is vital for health care providers to access opportunities of continuous learning to update their performance “knowledge and practice”, while

healthcare organizations encounter a variety of problems including training expenditures, staff absenteeism from clinical areas, and restricted time to attend classes (Wu, et al. 2020). A blended learning involves a systematic conjunction of face-to-face interactions and information technology-mediated interactions as a medium allows for virtual platforms for learner interaction at their own pace, which improves nurses' interaction in the learning process using a variety of tools through websites or apps (Moon, & Hyun, 2019).

Significance of the study:

Sciatica is the one of the most known debilitating conditions in the world associated with neurological dysfunction, as well as one of the leading causes of activity limitation and job absenteeism. It estimated to effect on 5% to 10% of the population with low back pain and loss of occupational time of 25–30% the adult working years. Therefore, several previous studies on nurses' performance have shown that the applying of e-learning plus traditional methods minimize the required learning time, effort, promotes their achievement, promote patients' nursing care, and consequently reduce hospital stay (Kang, & Seomun, 2018; Jowsey, Foster, Cooper, & Jacobs, 2020 and Jia-jia, & Min, 2021). Sciatica one of the most challenges for researchers in the field of work is to provide evidence of which nursing intervention by blended or face-to-face learning is a major benefit to promote nurses' knowledge and practice. So that; in this study, results on the effectiveness of a blended versus traditional learning on care of sciatica were presented.

Aim of the study

This study aimed to evaluate the effectiveness of blended versus traditional learning program about nursing care of sciatica on nurses' performance, and self-efficacy.

Research hypothesis

H1: The study group nurses who practice blended learning program will experience an improvement in their performance compared to the control group who practice traditional learning program at the post phase.

H2: The study group nurses who practice blended learning program will experience an improvement of their self-efficacy compared to the control group who practice traditional learning program at post phase.

Operational definition:

Nurses' performance: refers to nurses' level of knowledge regarding remembering, understanding, and summarizing about nursing care of sciatica, as well as nurses' level of practice regarding manipulation, applying, and precision of nursing care of sciatica "positioning, heat & cold compress and visual analog pain scale".

Subject and Methods

Design: A quasi-experimental research design was used in this study "two group pre posttest".

Setting: This study was conducted in Neurosurgery Department at Suez Canal University Hospitals.

Sample: A purposive sample (54) of nurses were recruited to conduct the current study. The participant who was being eligible are both gender and experienced more than 6 months, volunteers to participate, while those who were being excluded who rejected the participation, had a plan to catch a vacation and/or with any debilitating condition (chronic disease, pregnancy, low back pain, etc.) and who received previous educational blended learning program about the care of sciatica patients.

The sample has been classified randomly into two groups considering matching of demographic data: the first group was a study group that received a blended learning program (face to face and internet-

based e-learning) and the second group was a control group that received a traditional (face-to-face learning). The sample size was 27 subjects after adding 15% dropout for each group, were calculated according to the following equation $f = \text{value of } (\alpha, \text{power}) \text{ for a two-tailed test} = 7.9$ at power 80 and significant level of 0.01, $p_1 = \text{pre-intervention} = 80\%$, $q_1 = 1 - p_1$, $p_2 = \text{post-intervention} = 40\%$, $q_2 = 1 - p_2$ and n (sample size) = 27 subjects after adding 15% dropout (Schneck, 2004).

$$n = \frac{(p_1q_1) + (p_2q_2)}{(p_2 - p_1)^2} \times f(\alpha, \text{power})$$

Tools for data collection

Tools were utilized to collect data for the current study, as the following:

Tool (I):

Self-administrated questionnaire: It was developed by the researcher in a simplified Arabic language after reviewing related literature review and previous studies, that filled from the nurses (Elshani, et al. 2018; Jensen, Kongsted, Kjaer, & Koes, 2019 and Linton, & Matteson, 2019). It consisted of two parts as follows: (1): It used to assess nurses' demographic characteristics involving age, gender, level of education, and experience. (2): It was 30 items used to assess nurses' level of knowledge regarding nursing care of sciatica concerned with the definition, prevalence, incidence, risk groups, causes, medical & nursing management, and complication. It was composed of 10 true or false questions and 20 multiple-choice questions that were collected from nurses.

Scoring system: The total score of knowledge was ranged from 0-30 grades, each correct answer was given one grade. It is considered $\geq 60\%$ as a satisfied level of knowledge regarding sciatica when the total grades are ≥ 18 grades.

Tool (II): Nurses' practice observational checklist: It was composed of three observational checklists that were established to assess nurse's level of practice, related to Positioning (18 items), Heat, & Cold compress (10 items), and Visual analog pain scale (7 items) regarding nursing care of sciatica. There was adapted and necessary modifications were done to simplify the steps of the procedure (Lynn, 2018 and Stein, & Hollen, 2020).

Scoring system: One grade was given when the step was done correctly, while zero point was given if the step was not done completely. Total practice scores were ranged from 0-35 grades. It is considered $\geq 60\%$ as a satisfied level of practice regarding sciatica when the total grades are ≥ 21 grades.

Tool (III): Modified self-efficacy questionnaire: It was a 13- items self-report questionnaire, adapted by the researchers in a simplified Arabic language to assess an individual's belief in their own ability to respond to difficult or new situations regarding nursing care of patients with sciatica (Safari, et al 2020 and Dahlbäck, Andréll, & Varkey, 2021).

Scoring system: The nurse was responding on a Likert scale to type rated from 1 to 10, the items about nursing care of sciatica as from 0:3 = weak self-efficacy (totally 13-50 grades), from 4:7= good self-efficacy (totally 51-100 grades) and finally 8:10= stronger self-efficacy (totally 101-130 grades).

Tool (IV): Learning program's satisfaction questionnaire: It's an 8 items valid survey in the form of an organized Arabic language questionnaire, that consisted of six objective questions on the overall level of understanding, degree, satisfaction, and interest of help in nurses' performance, and two subjective questions on the overall advantages and disadvantages of the program. A valid reliable questionnaire was tested by alpha Cronbach's test 0.81 and indicated high

internal consistency, while it was adopted from (Technical Innovation in Blended Learning, 2020).

Scoring system: the questions were used a 5-point Likert scale was ranged from 1=disagree, 2= slightly agree, 3= neutral, 4= agree to 5=strongly agree, with a higher overall score ≥ 26 grades indicating a positive satisfaction.

Operational design:

Preparatory phase: This phase has involved a reviewing of the past, current related literature, and studies, using available periodicals, magazines, articles, and books, to be acquainted with the different aspects of the study research problem and develop the study tool. A Blended Learning program was designed by the researchers relied on related nursing, medical literature reviews, and previous studies (Jensen, et al. 2019; Ashbrook, et al. 2020 and Stein, & Hollen, 2020). It was specially designed in a simple Arabic language to be compatible with nurses' knowledge deficits and practical needs about nursing care for patients with sciatica. It was analyzed for validation by a panel of experts in Medical-Surgical nursing and Neurology medicine. It adapted relied on the expertise general objectives and intended to improve nurses' level of knowledge, practice, and self-efficacy about the care of sciatica patients.

Tool content validity and reliability: A panel of seven experts in the fields of Medical-Surgical nursing and Neurology medicine reviewed the data collecting tools for validity, revealing understandable, complete, applicable, clearable, and adequate tools to meet the study's aim. Cronbach's alpha test was used to determine the coefficient of reliability of the data collection tools, which yielded values of the first three tools were 0.82, 0.80, and 0.79 in that order.

A pilot study: A pilot study (10%) of participants was carried out to test feasibility, clarity,

applicability, and to estimate the required time to fill each tool. Necessary modifications were established so that these results were not included in the study.

Ethical considerations: An official permission was obtained from the ethics committee to start data collection and from the head of the department of the Neurosurgery department in Suez Canal University hospitals. The aim of the current study was clarified to the studied nurses before starting, which they were assured of maintaining confidentiality and anonymity of collected data as well as they have the chance to withdraw from the study at any time, without any penalty or award.

Protocol and procedure

Pre- a blended Learning program implementation phase:

Sampling was started and completed within 6 months by the researchers using a simplified Arabic language to be suitable for the nurses. Researchers assessed the available location, time, equipment, supplies, and instructional materials for implementing the blended learning program, as well as related literature and previous studies on many areas based on precondition needs. The researchers greeted the studied nurses, introduced themselves, explained the study's aim, and were interviewed for 20 to 30 minutes using pre-designed tools. Nurses' levels of knowledge, practice, and self-efficacy about nursing care of sciatica were evaluated before they participated in the study using a pre-constructed tool.

Various teaching methods were used in the form of short lectures, group discussions, and demonstration & redemonstration. Furthermore, multiple teaching media were used such as mobile apps, videos, recorded PowerPoint, colored posters, and hand out. Copies of the validated tools were available at interviewing time to collect data. Collecting data from the control group

“they were received traditional learning program-face to face” was done with the same sequence of data collection from the study group “they were received a blended learning program a face to face and E-learning”. All administrative and ethical considerations were set.

A blended learning program implementation phase:

A learning program "Blended versus traditional Learning" was implemented within suitable planned time among the participant nurses within six months from June 2020 to November 2020 and the researchers were available planned time and date. The control group of nurses has received a traditional ‘face-to-face’ learning program in the educational classroom of the department for 3 weeks using suitable methods and media, while the studied nurses in the interventional group were additionally able to access the internet-based e-learning program at a suitable time and place. During this course, the participants in the field of work practices for 4-6 weeks provide patient-centered care relied on the received learning program. In each classroom, A learning program presented in an understandable, clear, comprehensive manner and a summary of what was given through the previous session.

At the end of each session, the nurses were greeted and informed about the content of the next session, its time, used methods, & media, and asked to give feedback. In the same concerns, the implementations took 18 hours in the form of traditional learning among the control group, while the study group in this course took 5 hours as traditional learning in combination with 7 hours in the form of web-based e-learning.

Post a blended Learning program implementation phase “Evaluation phase”:

At this phase level of nurses' performance

“knowledge, practice” and self-efficacy were re-evaluated immediately after applying a blended learning program for both the study and control group with program’s satisfaction questionnaire, while again reevaluated for the third time after one month of post immediate evaluation with the same constructed tools.

Statistical design

SPSS system files were used to handle, code, and recruit raw data (Version 21), the normality test was done by the Kolmogorov-Smirnov test and was none significant at ≥ 0.05 , presenting parametric data. Data were analyzed using statistical measures as frequency and distribution to describe different characteristics. The independent-sample t-test for related groups and repeated ANOVA Measures test were used to evaluate a correlation between variables and considered significant $p \leq 0.05$.

Results

Table 1: presented that 60% and 66.6% were female of the studied nurses and control group consecutively. The mean age was $27 \pm 3.5\%$ and 26 ± 2.9 of the studied nurses and control group in sequent. Concerning the duration of experience 48% and 48.1% had 1-<5 years, while 55.5% and 51.85% were had a technical institute degree of education of the studied nurses and control group respectively.

Table 2: revealed that more than two-thirds (76%) of the studied nurses have had a satisfied level of knowledge, while less than two-thirds (66.6%) of the control group was had a satisfied level of knowledge at post phase. Moreover, less than two-thirds (64%) of the studied nurses were had a satisfied level of knowledge, while less than half (40.7%) of the control group were had a satisfied level of knowledge at the follow-up phase about sciatica. There was a significant correlation between both groups at the post phase with p value= 0.002 and follow up phase with p value= 0.001.

Table 3: presented that more than three quarter (88%) of the studied nurses have had a satisfied level of positioning practice, while less than two-thirds (74%) of the control group at post phase. Moreover, more than two-thirds (84%) of the studied nurses have had a satisfactory level of heat & cold compress practice, while two-third (66%) of the control group at the follow-up phase. There was a significant correlation between the study group and the control group at the study phases.

Table 4: clarified that the findings of using repeated measures ANOVA test; there was a significant difference between the groups in self-efficacy about the care of sciatica patients. The mean scores for were self-efficacy 89.13 ± 7.32 and 87.90 ± 8.53 immediately after the post-learning program (a blended and face to face learning) implementation respectively, while 88.98 ± 9.98 and 85.18 ± 6.04 post one months thereafter. The result demonstrated there was a significant between the study and control group in pre and follow-up phases.

Figure 1: showed that more than two quarters (87%) of the studied nurses were satisfied regarding applied learning program "a blended learning 'face to face and internet-based e-learning", while more than two-thirds (79.8%) of the studied nurses were satisfied regarding applied learning program "face to face learning". Furthermore, there was an insignificant correlation between the study and the control group of the immediate posttest phase.

Table 1: Number and percentage distribution of studied nurses according to their demographic characteristics.

Demographic characteristics	Study group		Control group	
	(n=25)		(n=27)	
	No.	%	No.	%
Gender				
Male	10	40	9	33.3
Female	15	60	18	66.6
Age in years (mean \pm SD)	27.4 \pm 3.5		26.2 \pm 2.9	

clear, and simple written information administered as well as readiness with a curiosity of the studied nurses to copy and learn with new learning style.

These results are compatible with **(Tarimo, & Diener, 2017)** they clarified that most of the studied nurses who experience a blended learning program had an enhancement of their knowledge at the post phase compared with another program in the same phase. In the same line, this is supported with **(Shang, & Liu, 2018)** they found that the studied group surveys showed a preferring of the blended course over classroom traditional courses, which the most highly rated advantages of the blended course were a flexible learning effort, time, and enhancing of independent study skills. This finding is contradicted with **(Khatoni, Nayery, Ahmady, & Haghani, 2011)** they reported that the superiority of traditional face to face learning to instructions based virtual, while may be attributed due to equipment's unavailability, decrease or absence of the required necessary infrastructure, different interest's level among the studied group in the taught topic, or absence of supportive measures.

Concerning nurses' practice regarding care of a patient with sciatica, there was a significant improvement of nurses' satisfactory level regarding nursing care of patient's practice "positioning, heat & cold compress, and visual analog pain scale" among the studied nurses who experienced a blended learning program "face to face and internet-based learning" relatively compared to the control group who experienced a traditional learning "face to face" about nursing care of sciatica at the post and follow up phase. Fortunately, from the researchers' point of view, this because of a blended learning program for nursing staff is critical in developing and refining the skills required to offer high-quality care to their patients through advanced crucial and valuable new strategies.

This is supported by **(Jowsey, et al. 2020 and Ropero-Padilla, et al. 2021)** they found that majority of the studied nurses have had an improvement of their nursing skills to provide nursing care about sciatica at the post phase relayed on the advanced learning process that combined internet with traditional learning. This disagreed with **(Mesner, Foster, & French, 2016)** they revealed that traditional learning "face to face" was had an effective role in the promotion of nurses' skills compared with other applied methods.

Regarding the level of the self-efficacy among the studied nurses about the care of sciatica; the study findings presented that an improvement of self-efficacy score of the studied nurses about nursing care of sciatica of both the study and control group at the post and follow up phase in comparing with pre-phase, but slightly increasing were being recognized in the mean score of the study group that was experienced a blended learning program "face to face and internet-based learning" about nursing care of sciatica at post immediate implementation and follow up phase, but this elevation did not differ a significantly between the study and control groups at post immediate phase.

Furthermore, from the researchers' point of view, there is a considerable condition that describes the more motivated judgmental ability of the studied nurses to advocate, educate, and apply needed care for a patient with sciatica relied on an applied blended learning program. However, this is supported by **(Genuino, 2018; and Puschmann, et al 2020, and Liu, et al 2021)** they clarified that this study, applied a blended learning program that integrated e-videos and the face-to-face lecture was found an effective in improving the studied group level of self-efficacy.

Moreover, involving the learning program's satisfaction level; the results of the current study

demonstrated that the learning program's satisfaction level was similar in both two groups, but the substantiality of the learning courses content was higher in the study group at post immediate implementation phase as compared with the control group in the same evaluation time. Thus the researchers' team point of view; these current findings suggest that the studied nurses could learn nursing care about sciatica as actually required in their job during work breaks and effective clearable educational objectives with the available necessary equipment, while the traditional lecture-type learning was limited by there being a insufficient time to cover the needed educational course content.

In the same way, this is agreed with (Khatoni, et al. 2011; and Wu, et al. 2020) they supported these study findings, applied a blended learning program that combined e-videos and the face-to-face lecture was found a highly statistically significant level of satisfaction among the studied nurses as the study phases, while this is contradicted with (Thurmond, 2003; and Sung, Kwon, & Ryu, 2008) they found that low level of satisfaction at the time of implementation a defining strategies interaction to enhance the interactions in web-based contents among the studied group.

Conclusion: In this research findings, concluded that a blended learning program had a significant improvement of nurses' knowledge, practice, self-efficacy, and program's satisfaction level with the study group compared to the control group at post phases; The present study highlighted the statistically a significant correlation between the two groups at the post phase and follow up phase with $p \text{ value} \leq 0.05$. Furthermore, it supported suggested research hypotheses.

Recommendations: The results' study recommended that; a blended learning program about nursing care of sciatica should be adhered to and applied at the orientation phase of nurses. Furthermore, a needed the educational program ought to be actively established and developed in a blended learning format and applied to a wide range of topics. The study should be replicated on a bigger probability sample in different places to ensure generalizability.

Limitations of the study: Accidental withdrawal of two nurses from the studied group due to technical obstacles used internet, and limited studies about sciatica specifically nursing care with or without relying on a blended learning program.

Budget source: The researchers are responsible for their expenses because they do not receive any other support.

Conflict of interest: It clarified that there was no conflict of interest.

Ethics approval: Approved from Faculty of Nursing, Institutional Review Board.

Acknowledge: A deep of thanks and appreciation to the study's participants and the head of the department from the university hospitals.

Author Contributions: All the researchers participated significantly to the data collection, analysis, and interpretation. ME and FE had complete access to all the data and are solely responsible for the data analysis' correctness. The manuscript was written by ME, MH, and FE, which contributed significantly to the manuscript's critical revision for crucial intellectual substance.

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