EFFECT OF CASE BASED LEARNING VERSUS DEMONSTRATION AND RE-DEMONSTRATION ON NURSING STUDENTS' CLINICAL PERFORMANCE AND CRITICAL THINKING

Fatma Shoeib Ali
Lecturer of Critical Care and Emergency Nursing, Cairo University, Egypt

Shaimaa Mohamed Elhadary
Assistant Professor of Medical Surgical Nursing, Faculty of Nursing, Cairo University, Egypt

Full Length Research

ABSTRACT

Nursing education and practice is expected to be compatible with the demands of the social environment, and it reflects one's thinking practice. Professional competence is contingent on the amount and complexity of knowledge acquired from a program of study. Because knowledge retention and clinical judgment constitute the core curriculum outcomes and the basis for safe and resourceful nursing practice, educators are prompted to stay abreast of the discipline's instructional strategies. **Aim of the study:** To evaluate the effect of case based learning versus demonstration and re-demonstration on nursing students' performance and critical thinking. **Research Design:** A Quazi-Experimental Control Group Study with a pretest and posttest design was used to achieve the aim of the current study. **Research hypothesis: H(I):** Students who exposed to case based learning will have higher mean scores of their performance than students who are exposed to demonstration and re-demonstration. **H(2):** Students who exposed to case based learning will have higher mean scores of their critical thinking skills than students who are exposed to demonstration and re-demonstration. **Setting:** The current study was conducted in a faculty of nursing affiliated to private university at Cairo, Egypt. **Tools of data collection**: (1) *Self-Administered Questionnaire Tool*: Concerned with data related to students' personal characteristics as gender, age, and the current studying courses. (2) *Objective Structured Clinical Examination (OSCE) test questions* were utilized as a tool to assess the students' performance. (3) *California Critical Thinking Skills Test Form B (CCTST)*. This tool was developed to measure students' critical thinking skills and it contains 34 multiple-choice questions. **Sample** A convenience sample of 100 nursing students (male and female), enrolled in Medical Surgical Nursing and critical care nursing of a baccalaureate nursing program. **Results:** A highly significant improvement in the CBL group in relation to their clinical performance when compared to the control group, while there was no statistically significant difference in critical thinking scores between the two groups. **Conclusion:** The findings of the present study suggest that the use of case based learning as an active learning and student centered method increase students' clinical performance level in a safe and controlled environment through objective structure laboratory stations. **Recommendations:** Nursing educators have to to adopt creative approaches to transform students into interactive participants. Also, Nurse Educators should be trained with respect to the philosophical background, theoretical base and practical usage of CBL.

Key Words: *case based learning (CBL), critical thinking-objective structured clinical exam (OSCE)*

INTRODUCTION

Nursing and health care related education is critically dependent on the development of nursing practical skills, which is important evidence evaluating core competency and nursing quality of students (Aiken, 2017). Clinical practice is therefore one crucial stage for nursing students transiting from class-based learning towards clinical practice. However, the teaching

of clinical skills still mainly depends on the teacher demonstration, followed by practice under supervision and evaluation, and largely ignoring cultivation of comprehensive analysis, communication, response and critical thinking features of students (Maehle, 2017).

Since the beginning of adult education, educators have realized that learners need to see the relevance and be actively engaged in the topic under study Knoles, et al. (2005). Traditionally, students in health care went to lectures and then transitioned into patient care as a type of *on-the-job* training. Nursing schools have realized the importance of including clinical work early and have termed the mixing of basic and clinical sciences as *vertical integration* (Eisenstein et al., 2014). Other human health-related fields have also recognized the value of illustrating teaching points with actual cases or simulated cases. Using clinical cases to aid teaching has been termed as case-based learning (CBL).

CBL has been used in medical fields since at least 1912, when it was used by Dr. James Lorrain Smith while teaching pathology in 1912 at the University of Edinburgh. Thistlewaite et al (2012) pointed out in a current review of CBL that "There is no international consensus as to the definition of case-based learning (CBL) though it is contrasted to problem based learning (PBL) in terms of structure. We conclude that CBL is a form of analysis based learning and fits on the field between structured and guided learning." They offer a definition of CBL: "The goal of CBL is to prepare students for clinical practice, through the use of authentic clinical cases. It links theory to practice, through the application of knowledge to the cases, using inquiry-based learning methods" (Brown & Chronister, 2009).

There is not a set description for CBL. An excellent definition has been proposed by Thistlewaite et al (2012) in a review article. In their 2012 paper, a CBL definition is "The goal of CBL is to prepare students for clinical practice, through the use of authentic clinical cases. It links theory to practice, through the application of knowledge to the cases, using inquiry-based learning methods."

Cases involve an authentic portrayal of a person(s) in a complex situation(s) constructed for particular learning purposes. Two features are essential: interactions involving explanations, and challenges to student thinking (Kong et al., 2014). Interactions involving explanations could occur among student terms, the instructor and a class; among distant colleagues; or students constructing interpretations in a multimedia environment. Cases may challenge students' thinking in many ways, e.g., applying concepts to a real life situation; connecting concept (and/or) interdisciplinary ideas; examining a situation from multiple perspectives; reflecting on how one approaches or solves a problem; making decisions; designing projects; considering ethical dimensions of situations. Brief vignettes, quick examples, or unedited documents are not cases (Walshe et al., 2013).

CBL is an instrument that involves matching clinical cases in health care-related fields to a body of knowledge in that field, in order to improve clinical performance, attitudes, or teamwork. This type of learning has been shown to enhance clinical knowledge, improve teamwork, improve clinical skills, advance practice behavior, and improve patient outcomes. CBL advantages include providing significance to the adult learner, allowing the teacher

more input into the direction of learning, and inducing learning on a deeper level (Shinnick et al., 2013).

Learners or students in nursing fields will one day need to interact with patients, and so education that relates to patient is predominantly relevant. Relevance is an important notion in adult education. CBL was found to be used in all continents. Even limiting the search to English and English translations, articles were found on all continuously inhabited continents (Merrick et al., 2012). This finding demonstrates that the use of CBL is not secluded to Western countries, but is used wide-reaching. In addition, based on the number and variety of fields of medicine and health care reported, CBL is used across multiple fields (Linnard, 2012).

RESEARCH AIM AND HYPOTHESES

The aim of the current study is to evaluate the effect of case based learning versus demonstration and re-demonstration on nursing students' performance and critical thinking. To fulfill the aim of the current study, the following hypotheses were formulated:

Hypothesis I: Students who exposed to case based learning will have higher mean scores of their performance than students who are exposed to demonstration and re-demonstration.

Hypothesis II: Students who exposed to case based learning will have higher mean scores of their critical thinking skills than students who are exposed to demonstration and re-demonstration

RESEARCH METHODOLOGY

Research Design

Research design is a plan or blueprint of how a researcher intends to conduct the research in order to answer the research questions. A Quazi-Experimental Control Group Study with a pretest and posttest design was used to achieve the aim of the current study. This design is one of the experimental designs in which data are collected from research subjects both before and after introducing the experimental intervention (Nieswiadomy, 2012). In the current study, this design helped to evaluate the effect of the independent variable (case based learning versus demonstration and re-demonstration) on the dependent variable (nursing students' clinical performance).

Setting

The current study was conducted in a faculty of nursing affiliated to private university at Cairo, Egypt.

Sample

A convenience sample of 100 nursing students (male and female), who were 19-21 years old, and enrolled in Medical Surgical Nursing and critical care nursing of a baccalaureate nursing program in a selected faculty were chosen as a study sample. Students, who were repeaters, expectorate, and those who were coming from technical nursing institutes were excluded from the study sample. Random assignment was done to determine the two groups; the

experimental group used an intervention (case based learning) and the control group used (demonstration and re-demonstration). This procedure was carried out through allocation of the study participants to the first odd or even identification student number. Considering that both study groups includes equal numbers of medical surgical and critical care nursing students.

Data Collection Tools

The researchers used three tools to gather data pertinent to fulfill the study aim as follows:

Self-Administered Questionnaire Tool: This tool was developed by the researchers in English language based on literature review and instruments related to the study scope .It concerned with data related to students' personal characteristics as gender, age, nationality and the current studying courses.

Objective Structured Clinical Examination (OSCE) test questions were utilized as a tool to assess the students' performance. This test was selected from four stations including oxygen therapy, wound care for medical surgical nursing students and hemodynamic monitoring and atrial dysrhythmia interpretation for critical care nursing students. Content validity of the research tools was assessed by 5 experts in the Medical Surgical and Critical Care Nursing fields and approved it. To assess the reliability as well test retest method was done.

California Critical Thinking Skills Test Form B (CCTST). This tool was developed to measure students' critical thinking skills and it contains 34 multiple-choice questions, designed in five categories of cognitive skills of critical thinking, which include analysis, inference, inductive reasoning, deductive reasoning and evaluation. Each person was awarded one score for each question which was answered correctly in the questionnaire and the total of correct answers constitutes the total score, the minimum and maximum of which were 0 and 34. Scores obtained in each section of the test was between the range of 0 and 16, such that in the analysis, inference, evaluation, inductive reasoning and deductive reasoning sections, 9, 11, 14, 16 and 14 scores were considered, respectively. (Shinnik, Woo, 2013). A pilot study was done with 10 students to assess the tools' feasibility and applicability and to test needed time for filling the tools. Required modifications were done accordingly and those students were excluded from the study.

Pilot Study

Pilot study was carried out on 10% of first year nursing students at Faculty of Nursing, to test clarity and feasibility of items included and to test needed time for filling the tools. Some items required clarifications from researchers with no modification needed. Participants who shared in the pilot study were not included in the study sample.

Ethical Considerations

The study protocol was approved by authoritative staff of faculty of nursing, to conduct the current study. Students were assured to that confidentiality and anonymity were applied through assigning a code number for each student instead of names to protect their privacy; students were informed that participation at the study was completely voluntarily and they

had the right to withdraw at any time with no effect on their grades and evaluation. The students were assured that data are confidential and used only for research purposes.

Procedures for Data Collection

Foremost, researchers obtained an official permission from the authoritative persons of the faculty of nursing to conduct the current study; as well as preparation of the study tools. The researchers arranged time to meet students and give full description about the aim of the study and written informed consents were collected from students who agreed to participate in the study. All the needed scenarios were prepared by the researchers after extensive review of literatures and revised by a panel of expert of medical surgical and critical care nursing. Data collection occurred during the period of January, 2018 to April 2018.During eight weeks training in all selected topics 2hours weekly, the control group receives classical demonstration and re-demonstration approach including teacher demonstration followed by student re-demonstration. In interventional group students received case based learning scenarios. Students of both interventional and control groups were evaluated at the eight week utilizing objective structured clinical examination and critical thinking test.

Example used in the current study: Case based learning scenario. This scenario is intended to demonstrate the nursing intervention associated with patient having oxygen therapy. 30 minutes have been allocated to the running of the scenario with an additional 10 minutes for discussion of relevant points at the end. Timings are very tight so please try not to over-run.

*A nurse working in medical word assigned to Mr. B an 82 year old male patient who was admitted with complaints of difficulty breathing. Upon inspection the nurse notes cyanosis of the lips and nail beds as well as severely clubbed nails. Vital signs are as follows: 143/82, 37.2 degrees celcius, respirations 30 and shallow, Sp02 65. He has a history of heart disease years ago.

Manage the following through the expected proper nursing interventions?

1. 1.What should be the initial nursing intervention for this patient? Rationale your intervention?

1.2. Which type's respiratory assessment of the nurse should perform for Mr.B?

1.3. What is the suitable position for him?

1.4. Explain the expected method of oxygen administration (mask or nasal cannula) you will connect the patient with and expected flow (low or high) considering patient condition .Rationale your intervention.

* Mr. B later becomes very confused and agitated and continues to remove his mask. He is unaware of his surroundings. Upon

Example used in the current study : Demonstration & re-demonstration scenario for a patient with oxygen therapy. This scenario is intended to demonstrate the nursing intervention associated with patient having oxygen therapy. 30 minutes have been allocated to the running of the scenario with an additional 10 minutes for discussion of relevant points at the end. Timings are very tight so please try not to over-run.

* A nurse working in medical word assigned to Mr. X, he is 70 year old male patient who was admitted with complaints of difficulty breathing. Upon inspection the nurse notes cyanosis of the lips and nail beds as well as severely clubbed nails.

1.1 Re-demonstrate the steps of administration of oxygen via mask?

1.2 Re-demonstrate the steps of administration of oxygen via nasal cannula?

1.3 Mention indication of oxygen therapy?

RESEARCH RESULTS

Table 1 shows that 60% of the study participants were female while 40% 0f the study participants were male. The mean of age of the study participants was 19.70 ± 0.95. The mean of grade point average of the study participants was 2.50 ± 0.45.The studied sample was homogenous in relation to gender, age, grade point average and interpersonal skills characteristics as there were no statistical significant differences between the two studied groups in relation to demographic variables.

Table 1: Homogeneity Comparison of General characteristics of the study participants (n=100)

Variables	Categories	Intervention Group n=50	Control Group n=50	$\chi2$	p-value
Gender					
	Male	10(40%)	10(40%)	1.00	1.00
	Female	15 (60%)	15 (60%)		
					t-test
Age	19 < 20	45(90%)	40(80%)		
	20 ≤ 21	5(10%)	10(20%)	0.02	1.12
		Mean ±SD 19.70 ± 0.95			
					t-test
GPA	3.0–3.9	7 (14 %)	9 (18%)		
	2.0–2.9	30 (60 %)	32 (64 %)		
	< 1.9	13 (26 %)	9 (18%)	1.012	0.231
		Mean ±SD 2.50 ± 0.45			
					t-test
Interpersonal Skills scores	High	44.05 ± 7.85	47.00 ± 6.85		
	Moderate	27.95 ± 5.75	29.85 ± 5.05	0.412	0.66
	Low	13.70 ± 3.35	14.33 ± 3.01		

Table 2 shows that there was a statistically significant difference between the case based group and demonstration & re-demonstration group in relation to oxygen therapy scenario among students studying medical surgical course with a t-test = 3.895 and p-value =0.001.While there was no statistically significant difference between the case based group and demonstration & re-demonstration group in relation to wound care s scenario among students studying medical surgical course with a t-test = 0.296 and p-value = 0.255.The same table illustrates that there was a statistically significant difference between the case based group and demonstration & re-demonstration group in relation to hemodynamic monitoring scenario and Atrial dysrhythmias interpretation scenario among students studying critical care nursing course with a t-test = 1.893and p-value = 0.030 & t-test = 3.013 and p-value = 0.005 respectively.

Table 2: Comparison of total mean scores from OSCE test (Performance level) in different 4 stations between the case based group (intervention) and demonstration & re-demonstration group (control) n= 100.

Courses	OSCE Stations	Case Based Group (Intervention)	Demonstration & re-demonstration Group (Control)	t-test	p-value
		Mean±SD	Mean±SD		
Medical Surgical Nursing	Oxygen therapy scenario	8.95 ± 1.85	6.23 2.48	3.895	0.001
	Wound care scenario	8.23 ± 1.03	8.21 ± 0.534	0.296	0.255
	Hemodynamic monitoring scenario	8.97 ± 0.865	8.15 ± 1.40	1.893	0.030
Critical Care Nursing	Atrial dysrhythmias interpretation scenario	7.47 ± 1.97	5.71 ± 1.75	3.013	0.005

Table 3 shows that there was no statistically significant difference before and after demonstration & re-demonstration group in relation to categories of critical thinking ; analysis, evaluation, inference, deductive reasoning, and inductive reasoning among students studying medical surgical course with a t-test = 0.645 , p-value = 0.402, t-test = 1.093, p-value = 0.577, t-test = 1.481, p-value = 0.921, t-test = 0.287, p-value = 0.213, t-test = 1.300, p-value = 0.703 respectively.

Table 3: Comparison of subtotal mean scores from critical thinking skills test as reported by the study participants before conduction the demonstration & re-demonstration n= 25

Students' joining Courses	Categories of critical thinking	Before demonstration & re-demonstration Mean±SD	After demonstration & re-demonstration Mean±SD	t-test	P - value
Medical Surgical Nursing	Analysis	4.50 ± 1.69	3.39 ± 1.32	0.645	0.402
	Evaluation	4.04 ± 2.1	5.30 ± 2.19	1.093	0.577
	Inference	5.05 ± 2.1	4.8 ± 0.534	1.481	0.921
	Deductive reasoning	6.9 ± 2.38	7.1 ± 2.63	0.287	0.213
	Inductive reasoning	5.25 ± 2.80	4.30 ± 2.31	1.300	0.703

Table 4 shows that there was no statistically significant difference before and after case based learning group in relation to categories of critical thinking; analysis, evaluation, inference, deductive reasoning, and inductive reasoning among students studying medical surgical course with a t-test = 0.705, p-value = 0.301, t-test = 1.192, p-value = 0.523, t-test = 1.783, p-value = 0.701, t-test = 0.166, p-value = 0.114, t-test = 1.440, p-value = 0.563 respectively.

Table 4: Comparison of subtotal mean scores from critical thinking skills test as reported by the study participants before conduction the case based learning   n= 25

Students' joining Courses	Categories of critical thinking	Before case based learning Mean$\pm$SD	After case based learning Mean$\pm$SD	t-test	p-value
Medical Surgical Nursing	Analysis	5.60 ± 1.59	4.49 ± 1.32	0.705	0.301
	Evaluation	5.14 ± 1.50	6.40 ± 2.19	1.192	0.523
	Inference	6.15 ± 1.50	5.18 ± 0.534	1.783	0.701
	Deductive reasoning	7.19 ± 2.00	8.10 ± 2.63	0.166	0.114
	Inductive reasoning	6.35 ± 2.40	5.40 ± 2.31	1.440	0.563

Table 5 shows that there was no statistically significant difference before and after demonstration & re-demonstration group in relation to categories of critical thinking ; analysis , evaluation , inference, deductive reasoning , and inductive reasoning among students studying critical care nursing course with a t-test = 0.335, p-value = 0.322, t-test = 1.493, p-value = 0.432, t-test = 1.451, p-value = 0.521, t-test = 0.233, p-value = 0.013, t-test = 1.762, p-value = 0.623 respectively.

Table 5: Comparison of subtotal mean scores from critical thinking skills test as reported by the study participants before conduction the demonstration & re-demonstration n= 25

Students' joining Courses	Categories of critical thinking	Before demonstration & re-demonstration Mean$\pm$SD	After demonstration & re-demonstration Mean$\pm$SD	t-test	p-value
Critical care Nursing	Analysis	3.02 ± 1.19	2.63 ± 0.82	0.335	0.322
	Evaluation	2.74 ± 1.6	4.00 ± 1.68	1.493	0.432
	Inference	3.75 ± 1.6	3.50 ± 0.23	1.451	0.521
	Deductive reasoning	5.60 ± 1.88	5.80 ± 2.13	0.233	0.013
	Inductive reasoning	4.95 ± 2.30	4.00 ± 1.81	1.762	0.623

Table 6 shows that there was no statistically significant difference before and after case based learning group in relation to categories of critical thinking ; analysis , evaluation , inference, deductive reasoning , and inductive reasoning among students studying medical surgical course with a t-test = 0.665, p-value = 0.231, t-test = 1.180, p-value = 0.627, t-test = 1.577, p-value = 0.442, t-test = 0.153, p-value = 0.124, t-test = 1.530, p-value = 0.521 respectively.

Table 6: Comparison of subtotal mean scores from critical thinking skills test as reported by the study participants before conduction the case based learning n= 25

Students' joining Courses	Categories of critical thinking	Before case based learning Mean±SD	After case based learning Mean±SD	t-test	p-value
	Analysis	4.9 ± 1.19	3.79 ± 0.92	0.665	0.231
	Evaluation	4.44 ± 1.1	5.7± 1.79	1.180	0.627
Critical care Nursing	Inference	5.45 ± 1.1	4.48 ± 0.134	1.577	0.442
	Deductive reasoning	6.49 ± 1.6	7.4 ± 2.23	0.153	0.124
	Inductive reasoning	5.65 ± 2	4.7 ± 1.91	1.530	0.521

DISCUSSION

The development of modern nursing theory and practical requirement has made more requests for nursing education. Some scholars indicated that certain nurses, although having excellent score in knowledge, but lacking effective measurements when facing real patients. The revolution of teaching approach to improve critical thinking of clinical undergraduates is thus of critical importance. During CBL education, clinical cases were used as the carrier for medical knowledge and practical skills, and students were located in real-scenario of clinical practice filling with thinking from all dimensions to inspire them for learning interest and to solve problems, Shinnick &Woo, (2013). Therefore, the aim of this study was to evaluate the effect of case based learning versus demonstration and re-demonstration on nursing students' clinical performance.

While not generalizable, the results from data collected in this study showed that, more than half of the entire study sample was females. They were in the adulthood stage with the mean age of 19.70 ± 0.95. The mean of grade point average of the study participants was reported as 2.50 ± 0.45. In conclusion, the "Chi- square" tests showed that the subjects in both the control and intervention groups were homogenous and no statistically significant differences were found. This means that the randomization between the two groups worked well and the students' characteristics were comparable. These results were consistent with Yoo & Park (2015) who found in their study about "effect of case-based learning on communication skills, problem-solving ability, and learning motivation in nursing students", that the demographic characteristics of the intervention and control groups were homogenous and no significant differences were detected between the intervention and control groups.

In relation to Hypothesis I, the current study showed significant improvement in the CBL group in relation to their clinical performance when compared to the control group. So Hypothesis I was accepted. This finding was supported by previous study on Effects of case-based learning on communication skills, problem-solving ability, and learning motivation in nursing students by Yoo & Park (2014). They documented significant improvement in the CBL group, and deterioration in the group that received traditional lectures. In the same context Kong et al, (2014) confirmed that CBL effectively improve practical skills of nursing undergraduates compared to classical teaching approach. CBL improved student's skills in basic knowledge, practical skills, nursing evaluation, case analysis, health education, mocked emergency aid, communication skills, and professional attitude.

In relation to Hypothesis II, the current study findings showed that; there was no statistically significant difference in critical thinking scores between the two groups. So, Hypothesis II was rejected. This finding was supported by Wahl & Thompson (2013) & Zarifsanaiey, Amini, M. & Saadat, F. (2016). Who yielded the same results and concluded that a training course alone is not significantly correlated with the critical thinking, acquiring critical thinking skills needs long period of time and continuing education. In the same line Brune (2014) explained that absence of significance increase of overall critical thinking post-test scores might be derived from several factors related to the circumstances in conducting the study, the participants' perceptions and comfort level with participating in the study, seriousness in taking tests, the brevity of the experiment, and participants' developmental stages.

On the other hand, these findings were in disagreement with Husebø, et al. (2012) who found that CBL could improve critical thinking ability of students, suggesting that CBL-method in combined with case directed study significantly improved core competency of nursing undergraduates in solving clinical problems, and made them more competent for clinical practice in future. The researchers can explain these results as "acquiring the critical thinking skills needs long period of time and continuing education.

In this research, students were given the opportunities to deeply discuss and explore the scenario through the integration of simulation and critical thinking strategies. The theoretical knowledge obtained from the scenario analysis facilitates the transfer of theoretical knowledge to students' clinical performance during simulation as well as encourages the discussion after simulation synthesis and application of the knowledge.

CONCLUSION

The findings of the present study suggest that the use of case based learning as an active learning and student centered method increase students' clinical performance level in a safe and controlled environment through objective structure laboratory stations.

LIMITATION

The findings of this study are limited to the students' of one nursing faculty in Egypt; therefore, the results might be neither representative nor generalized.

IMPLICATIONS AND RECOMMENDATIONS

1. A longitudinal study is recommended to evaluate the development of critical thinking skills over an extended period or several semesters that uses case based learning throughout the whole nursing program curriculum, not just one course, with a pre-test post-test design at the beginning of the program and the end would be a more effective measure of the actual effect of CBL on student nurses' critical thinking skills over time**.**

2. A replicated research study is recommended with a larger sample size, and randomly selected nursing faculties in different regions in order to provide a more accurate and broader representation of nursing students in Egypt.

3. It is recommended for nursing educators to adopt creative approaches to transform students into interactive participants, open their minds, broaden and stimulate higher-level thinking and problem-solving abilities.

4. Nurse educators should be trained with respect to the philosophical background, theoretical base and practical usage of CBL.

5. Counseling sessions are needed to help students to verbalize their feelings about their clinical experience regarding different preferable clinical learning methods.

ACKNOWLEDGEMENT

REFERENCES

Aiken, L. H., Sloane, D., Griffiths, P., Rafferty, A. M., Bruyneel, L. McHugh, M., Maier, C. B., Moreno-Casbas, T., Ball, J. E., Ausserhofer, D. & Sermeus, W. (2017). Nursing skill mix in European hospitals: cross-sectional study of the association with mortality, patient ratings, and quality of care. BMJ Qual Saf, 26: 559-568.

Brown, D. & Chronister, C. (2009). The effect of simulation learning on critical thinking and self-confidence when incorporated into an electrocardiogram nursing course. Clin Simul Nurs. 5(1):e45–52.

Brune, M. E. (2014). Concept mapping: a strategy to increase critical thinking in nursing students: an action research study. (Order No 3645503).Available from ProQuest Dissertations & Theses Global. Retrieved from http://mplb.ekb.eg/MuseProxyID=1104/MuseSessionID=0811j3ynk/MuseProtocol=https/MuseHost=search.proquest.com/MusePath/pqdtglobal/docview/1626381135/9C7AA024ECEA4855PQ/2?accountid=178282.

Eisenstein, A., Vaisman, L. Johnston-Cox, H. Gallan, A. Shaffer, K. Vaughan, D. O'Hara, C. & Joseph, L. (2014). Integration of basic science and clinical medicine: the

innovative approach of the cadaver biopsy project at the Boston University School of Medicine cad. Med. 89(1):50-3.

Farrag, R. E. (2017). Concept mapping strategy: An effective tool for improving maternity nursing students' achievement. *Journal of Nursing Education and Practice,7* (3).Retrieved from:- http://jnep.sciedupress.com.

Husebø, S.I., Bjørshol, C.A., Rystedt, H., Friberg, F., & Søreide, E. A. (2012). comparative study of defibrillation and cardiopulmonary resuscitation performance during simulated cardiac arrest in nursing student teams, 20:1–1.

Knowles, M. S., Holton, E. F. & Swanson, R. A. (2005). The Adult Learner: The Definitive Classic   in Adult Education and Human Resource Development. St. Louis: Elsevier

Kong, L.N., Qin, B. Zhou, Y. Q., Mou, S.Y. & Gao, H. M. (2014). The effectiveness of problem-based learning on development of nursing students' critical thinking: A systematic review and meta-analysis. 51(3):458–69.

Linnard-Palmer, L. (2012). The use of simulation for pediatric oncology nursing safety principles: ensuring competent practice through the use of a mnemonic, chemotherapy road maps and case-based learning, 27: 283-286.

Maehle, V., Cooper, K. & Kirkpatrick, P. (2017). Absolute clinical skill decay in the medical, nursing and allied health professions: a scoping review protocol. JBI Datab Sys Rev Implement Rep, 15: 1522-1527.

Moattari, M., Moosavinasab, E., Dabbaghmanesh, M. H., ZarifSanaiey, N. (2014). Validating a Web-based Diabetes Education Program in continuing nursing education: knowledge and competency change and user perceptions on usability and quality, 13(1):1.

Merrick, E., Duffield, C., Baldwin, R., Fry, M. (2012). Nursing in general practice: organizational possibilities for decision latitude, created skill, social support and identity derived from role, 68: 614-624.

Nieswiadomy, R. (2012). Foundations of Nursing Research. (6th ed.). Person prentice hall. Upper Saddle River. PP:114-1129.

Romanko, L. (2016).The role of concept mapping in the development of critical thinking skills in student and novice nurses: a quantitative meta analysis. Available from:- https://open.library.ubc.ca/media/download/pdf/24/1.0228162/4.

Shinnick, M. A. & Woo, M. A. (2013). The effect of human patient simulation on critical thinking and its predictors in prelicensure nursing students. Nurse Educ Today, 33(9):1062–7.

Thistlethwaite, J.E., Davies, D., Ekeocha, S., Kidd, J. M., MacDougall, C. Matthews, P., Purkis, J. & Clay, D. (2012). The effectiveness of case-based learning in health professional education. A BEME systematic review Med Teach, 34(6):e421-44.

Thistlethwaite, J. E., Davies, D., Ekeocha, S., Kidd, J. M., MacDougall, C., Matthews, P., Purkis, J., Clay, D. (2012). Scientific method for medical practitioners: the case method of teaching pathology in early twentieth-century Edinburgh. Sturdy S Bull Hist Med. Winter; 81(4):760-92.

Wahl, S. E. & Thompson, A.M. (2013). Concept mapping in a critical care orientation program: A pilot study to develop critical thinking and decision making skills in novice nurses. *J. Contin.Educ.Nurs, 44*,455-460.

Walshe, N., O'Brien, S., Murphy, S. & Hartigan, I. (2013). Integrative learning through simulation and problem-based learning. Clin Simul Nurs, 9(2):e47–54.

Yoo, M. S. & Park, H.R. (2015). Who found in their study entitled "Effects of case-based learning on communication skills, problem-solving ability, and learning motivation in nursing students"Nurs Health Sci 2015; 17: 166-172.

Zarifsanaiey, Amini, M. & Saadat, F. (2016). A comparison of educational strategies for the acquisition of nursing student's performance and critical thinking: simulation-based training vs. integrated training (simulation and critical thinking strategies). *Bio Med   Central(BMC) Medical Education,16*(294), 1-7.