
EFFECT OF COMPUTER BASED LEARNING ON NURSING STUDENTS' KNOWLEDGE AND SKILLS RETENTION REGARDING PLACENTA EXAMINATION

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Abstract

The aim of this study was to determine the effect of computer - based learning on nursing student's knowledge and skills retention regarding placenta examination. A quasi- experimental **research design** was utilized. The study was conducted at clinical skills obstetric laboratories and the computer laboratory at Faculty of Nursing, Damanshour University. It comprised a random sample of 80 nursing students who were enrolled in the obstetric nursing course during the second semester of academic year (2015-2016). Students were randomly assigned to two groups namely; Computer - based Learning (CBL) group and a traditional learning approach group. **Two tools** were used for data collection Tool (I): Nursing Students' Knowledge concerning Placenta Examination Questionnaire. Tool II: Placenta Examination Performance Observational Check List. **Study results** revealed a statistically significant difference between the study and control groups in relation to their knowledge and clinical performance immediately, one week and one month after teaching sessions ($p=0.001$). **The study concluded** that students using computer-based learning had better knowledge and skills retention than those of the traditional group at all three time periods. It was recommended that computer-based learning should be incorporated in obstetric clinical nursing education to increase the level of students' knowledge and clinical performance.

Keywords: computer -based learning, placenta examination, knowledge and skills retention.

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I. Introduction

Around the world, approximately 830 women die daily from pregnancy or childbirth-related complications. Almost all (99%) of these maternal deaths occur in developing nations. One of the targets under Sustainable Development Goal III is: "to reduce the global maternal mortality ratio to less than 70 per 100 000 births between 2016 and 2030". The primary causes of maternal deaths are, namely: hemorrhage (mostly bleeding after childbirth), sepsis, and pre-eclampsia. Beside the indirect causes triggered through the interaction between preexisting medical conditions and pregnancy.^(1,2)

Postpartum hemorrhage (PPH) is one of the most serious obstetric emergencies especially in the presence of pre-existing maternal anemia and / or antepartum hemorrhage. Globally, it is the primary cause of nearly one quarter of all maternal deaths. In developing countries including Egypt, postpartum hemorrhage is the first leading direct cause of maternal mortality. Specifically, it was the attributable cause of 21.3% of all direct maternal deaths in Egypt 2013^(3,4).

Postpartum hemorrhage (PPH) is defined as "bleeding from the genital tract during or after the third stage of labor or within 24 hours of expulsion of placenta to the amount of approximately 500 ml of blood or it is the loss of blood irrespective of its amount which causes deterioration of the general condition of the mother"⁽⁵⁾. Most PPH related-deaths are avoidable through proper, diagnosis and management. The nurse has a crucial role toward PPH prevention through timely and appropriate management during the third stage of labour.

The third or placental stage begins with the delivery of the fetus and ends with expulsion of the placenta. It lasts from 5 to 20 minutes for both primiparae and multiparae. This stage includes three phases: placental separation, expulsion and control of bleeding. Once the baby is born, the uterine cavity immediately becomes smaller, resulting in a reduction in the size of the placental attachment site, which leads to separation of the placenta from the uterus. This is indicated when the uterus becomes spherical in shape, and rises upward in the abdomen; supra-pubic area plugs; the umbilical cord descends further through the vagina

as it losses impulse; and a sudden gush of blood occurs. The nurse midwife can make an important contribution in improving women's healthcare during childbirth to prevent and treat PPH. Through ensuring monitoring blood loss and checking the uterine contractility. Beside clamping the cord following observation of uterine contraction (at around 3 minutes) and delivery of placenta by controlled cord traction. In addition to that, maternity nurse should encourage both skin-to-skin contact immediately after birth and the newborn's first attempt for breastfeeding, which consequently augment maternal oxytocin levels, and strengthen the uterine contractions that will help the placenta to separate and the uterus to contract to prevent hemorrhage.^(6,7)

Moreover, placental examination is one of the most important procedures for maternity nurses and can yield information that crucial in the immediate and later management of mother. The nurse must carefully examine the placenta and membranes as soon as possible after birth. During the examination placenta's size, shape, consistency and completeness should be determined, and the presence of any accessory lobes, hemorrhage, tumor and nodules should be noted. Maternal surface should be inspected to be certain that all cotyledons are present. Fetal membranes should be evaluated for the color, luster and odor, as well as it should be inspected for past the edges of the placenta. Large vessels beyond these edges indicate the possibility that an entire placental lobe (e.g., succenturiate or accessory lobe) may have been retained and lead to PPH. Finally, the umbilical cord should be assessed for length, insertion, number of vessels, thrombosis, knots and the presence of Wharton's jelly.⁽⁸⁾

Obstetrics is procedural and a high hazard medical specialty; therefore, nursing students are required to be proficient in many tasks, but opportunities to enhance proficiency are limited by many factors such as the increasing number of students with a limited number of faculties which makes supervision in the clinical settings difficult. In addition, the change in students' preferred learning styles. Current students are also at a disadvantage because there is less contact time with patients due to reduced length of stay, higher acuity and staff shortage. These factors place pressure on obstetrics nursing program opportunity to develop a curriculum that maximizes faculty instruction practice time. Despite a reduction in overall patient contact, performance standards must remain in place to ensure that the quality of nursing education is not diminished.^(9,10)

Traditional teaching methods allow for knowledge and skill acquisition, but do not always allow for these skills to adequately be applied in realistic environments. Clinical skills represent an essential aspect of nursing practice. Yet, there is an international debate about the most effective techniques for teaching these skills. The literature supports the need for innovative strategies that include the development of interactive multimedia technology, where computer-based learning (CBL) is gaining popularity as an alternative way of delivering clinical skills education.^(11,12)

Computer-Based Learning (CBL) refers to "self-paced learning activities delivered on a computer or handheld device." CBL often delivers content via CD-ROM, website, and typically presents content in a linear fashion, much like reducing an online book or manual. It can be learned in a computer or learning laboratory, at home, or in any location in which students can use a mobile computing device at any time convenient for the student. Computer-based multimedia learning environments – consisting of pictures (such as animation) and words (such as narration), that offer a potentially powerful venue for improving student understanding. However, all multimedia messages are not equally effective^(12,13). Nursing education has evolved from traditional teaching methods to modern methods using technology for knowledge acquisition. Computer technology has been used for a variety of educational purposes in nursing education, either to supplement or to replace conventional teaching methods. Computer-based learning is used to denote the use of computerized technology to facilitate the educational process⁽¹⁴⁾.

Using CBL in clinical nursing education has many benefits. Namely, it allows nursing students to develop individualized learning by de-centralizing the teaching process and facilitating independence, flexibility and self-direction. It also plays an important role to enhance student's practice of skills in a safe environment and to view repeated demonstrations of procedures as often as required until the competency is achieved. Moreover, the interactive nature of CBL motivates students, promotes their learning, reduces instructional time and improves students' satisfaction, as well as enjoyment^(15, 16). The use of CBL is a fast-growing strategy in nursing education nowadays. However, its effectiveness is still in debate as there is a lack of evidence about its impact on obstetrics and gynecological nursing. Therefore, this study proposed the application of CBL strategy for enhancing students' knowledge and clinical skills maintenance concerning placenta examination in obstetrics nursing.

Aim of the study

The study aimed to determine the effect of computer based learning on nursing student's knowledge and skills retention regarding placenta examination.

Research hypothesis:

Nursing students who are instructed through computer based learning exhibit higher knowledge retention regarding placenta examination than those who are instructed by traditional methods.

Nursing students who are instructed through computer based learning display higher performance skills regarding placenta examination than those who are instructed by traditional methods.

Operational definition

Computer-Based Learning (CBL)

In this study CBL refers to the use of computer as a learning method in obstetric and gynecological nursing. It gives the opportunities to both students and teacher to learn by their speed and combine active learning with computer technology.

II. Materials And Method

Materials

Study design:

A quasi-experimental research design was utilized in this study.

Setting:

The study was conducted in clinical skills obstetrics and gynecological laboratory of obstetrics and gynecological nursing department and computer laboratory at Faculty of Nursing, Damanhour University. The clinical skills obstetrics laboratory contains obstetrics simulators, equipment's, and supplies. The computer laboratory contains 10 personal computers are available beside data show unit.

Subjects: The subjects of the study included nursing students enrolled at the obstetrics nursing course during the second semester of the academic year 2015-2016. Random sample of 80 students from 200 nursing students were selected through posting the inclusion criteria (having computer skills, and having personal computer). Then 80 students were randomly selected by using simple random table. Students' name list was used, the first student was selected by pen drop technique after that every two students were selected. Students were equally randomly assigned to either study group [computer based learning (CBL) group] or control group [traditional learning group (demonstration)]. Every group included 40 students. Then each group was divided into four subgroups. This size was the maximum number that could be followed at four weeks after the teaching session during the semester.

- **Study group: (CBL) group:** include 40 students; they received their teaching about placenta examination using computer based learning instruction (CBI).
- **Control group: Traditional learning group (demonstration):** include 40 students; they received their teaching about placenta examination using traditional demonstration method.

Tools:

Two tools were used for data collection:

Tool I: Nursing Students' Knowledge concerning Placenta Examination Questionnaire:

A structured questionnaire was developed by the researchers after thorough review of related literature to determine nursing students' knowledge about placenta examination. It included two parts as follows:

Part I: Socio Demographic data and computer skills of Obstetric Nursing Students:

It included student name, age, sex, residence and academic degree. In addition assessment of computer properties, skills and internet access.

Part II: Nursing Students' Knowledge about Placenta Examination:

This tool comprised 31 items to assess nursing students' knowledge about placenta examination. It consisted of eight main groups of questions. These main groups includes definition (n= 1 item), purpose (n= 3 items), function (n= 6 items), position (n= 3 items), general characteristics (n=4 items), surfaces and membranes (n= 4 items), cord (n= 3 items) and abnormalities (n= 7 items),

Subjects' responses for each item varied between: correct & complete answer (3), correct & incomplete answer (2) and wrong answer or don't know (1). Accordingly subjects total scores ranged from 31- 93. Accordingly each subject's knowledge was categorized as follows: Poor for a total score of knowledge >51, Fair for a total score of knowledge level 51 < 71, and Good for a total score of knowledge ≥ 71 .

Tool II: Placenta Examination Performance Observational Check List:

It was developed by the researchers based on review of related literature to assess obstetrics nursing students' performance about placenta examination. It consists of 17 steps that involved preparation, actual examination of the placenta and documentation. Each point was checked and given a score ranging from (1 to 3). Students' performances were scored as follow: 3 for completely done, 2 for done but incomplete, 1 for not done. The total performance score ranged from 17 to 51 distributed as follows: Poor < 28, Satisfactory 28 < 39, and Good ≥ 39 .

III. Method

The study was executed according to the following steps:

1. An official permission was obtained from the responsible authority of the setting (Obstetric Nursing Department Faculty of Nursing, Damansara University) after explaining the aim of the study.
2. Both tools (Nursing Students' Knowledge Concerning Placenta Examination Questionnaire and Placenta examinations Performance Observational Check List) were developed by the researchers after review of recent relevant literature.
3. Tools were tested for content validity by a Jury of five experts in the field. The recommended modifications were done and the final form was prepared after proving valid.
4. Tools reliability was accomplished by Cronbach's alpha test and the result was statistically acceptable. The value of tool (I) was 0.78 and tool (II) was: 0.84.
5. A pilot study was carried out on randomly selected 8 students (who studying obstetric nursing in the first semester 2015 - 2016) from the same settings and were excluded from the actual study. To ascertain the clarity, feasibility and applicability of the tools and to identify obstacle that might interfere with the process of data collection. After the pilot study tools were revised and the necessary modifications were done.
6. The present study was implemented in three phases (preparation, implementation and evaluation phase).

1: Preparation Phase

I: Researchers Preparation: Before starting data collection, the researchers developed a theoretical and practical foundation about placenta examination through reading recent references, attending workshop on staff development held by expert in the obstetric nursing department.

II: Content: Intended Learning Outcomes (ILOs), theoretical content for placenta examination were selected and organized guided by Obstetric Nursing Procedures Manual & Maternity Book.

III: The CBL module

This module was purposefully developed for the study and designed by the assistance of an educational information technology specialist.

The theoretical content was identical to that of the traditional teaching method.

- The teaching content regarding placenta examination, converted to PowerPoint slides, and accompanied by a summative text, static pictures, and pre-recorded video, was uploaded to the website; this formed the basis of web-based education procedures. to stimulate interest and promote learner's engagement.
- CBL module was composed of: placenta examination demonstration video, PowerPoint presentation and checklists. Two instructional resources were developed, aimed to fulfill the CBL module.
- First, a website was designed especially for this study, with a username and password to promote students' full individualized engagement in this module. The access to this website was conducted at the faculty's laboratory only; this was due to the limitations if the internet access at students' homes.
- Finally, computer module CD-ROM was also prepared and was given for them in CBL group for their usage at home, which doesn't need any internet access. Students were instructed to work through the module independently for the duration of the teaching session (self-learning), by using these dual resources at both faculty and home.

IV: Environment: the study was conducted at two setting:

a. Obstetric nursing laboratory

Equipment was prepared e.g. gloves, apron, round basin or large iodine bowl, and tray, placenta model.

b. Computer laboratory

The computers were checked for its efficiency, adequate numbers and application of placenta examination module.

V: Students: Students of both groups were assessed for their characteristics and knowledge about placenta examination by using tool 1 (part I&II). Students were assured that the assessment were formative and that results would not contribute to their grades or affect their academic progress. CBL group was oriented about the module.

Phase (II): Implementation

It was conducted based on unit objectives and it was divided into two sessions

Session (1): knowledge related to placental examination

This session was conducted on the first day of the clinical rotation at computer lab at the faculty of nursing for students of study group about the theoretical part of placental examination. It lasted about five hours. It included the following:

- a. The students were informed in detail about the registration procedure and use of the website.

- b. The website was activated in March 2016 and kept open for four weeks. Students who wanted to enter the website had to register by typing their name or school number and a predetermined code number, which had been sent to them previously.
- c. The researchers used CBL module power point presentation as well as video about placental assessment animated multimedia, high quality photographs and links to relevant website .
- d. Following the web-based education, the knowledge tests (Tool I) were administered in a computerized classroom under the supervision of researchers.
- e. Every student in the study group was given a copy of placenta assessment CD ROM that briefly organized and summarized.

Session (2): Demonstration of placental examination

This session lasted for two days each day was four hours based on the session schedule. The students were divided into small groups and they practiced performing placental examination on mannequins in the simulation laboratory of the obstetrics nursing department.

- a. The researcher revised and discussed the important elements and procedure steps of placenta assessment with students using CBL module .
- b. Demonstration of placenta examination procedure on placenta model
- c. Students were asked to observe the researchers carefully during the demonstration of placental assessment procedure because every one of them will re-demonstrate the procedure and they will be evaluated by the researchers.
- d. Each student was allowed to re-demonstrate the placental examination on mannequins in front of the researchers in 15 minutes.
- e. During re-demonstration, each student's performance was observed and evaluated by the researchers using Students Performance Observational Checklist.(Tool II)
- f. The researchers emphasized that this session was done for teaching purposes not for evaluation, so mistakes were allowed and corrected immediately.

For Control group: The students in control group were studying using traditional method of teaching: face to face demonstration of placenta examination procedure in obstetric nursing laboratory. After the web-based education was completed, control group students, were divided into small groups and practiced Placental examination procedure on mannequins

Phase (III): Evaluation

Knowledge and skills related to placenta examination were evaluated three times for all students in both groups, immediately following the teaching session (immediate follow-up), after one week and one month later. The comparison between two groups was done to evaluate the effect of computer based learning on students' knowledge and skills retention regarding placenta examination.

8- Data were collected over a three months consecutive period extending from February to May 2016.

9- Ethical consideration that are considered all over the study phases:

Written informed consent was obtained from each obstetrics nursing student who was involved in the study for their participation after explaining the aim of the study. Confidentiality was assured also data used only for the purpose of the study and not involved in evaluation of obstetrics nursing course. This helped in gaining full cooperation of the students. Students had the right to withdraw at any time

Limitations of the study:

Small sample size so results cannot be generalized. "It was not possible to include the total number of the students in the study subjects due to lack of sufficient time to follow all the groups after 4 weeks of their teaching."

Data Analysis:

The collected data was revised, categorized, coded, computerized, tabulated and analyzed using Statistical Package for Social Sciences (SPSS) version 20. The following statistical measures were used: Number and percentage were used for describing and summarizing qualitative data. Fisher's Exact test, Chi-Square test were used for test of significance. The 0.05 level was used as the cut off value for statistical significance (e.g. significant at $p < 0.05$).

IV. Results

Table (I) shows the number and the percent distribution of the study subjects according to their socio-demographic data and computer skills. The vast majority (95% & 87.5%) of the study and control groups were 20 to less than 22 years old, respectively. More than two-thirds of both study (72.5%) and control (67.5%) groups were female. A sizeable proportion of the students (87.5% & 72.5%) in the study & control

groups respectively were rural dwellers. The majority (77.5%) of the study group compared to more than one-half (57.5%) of the control group had technical nursing institute certificate.

The same table also reveals that one - half and more (52.5% & 50%) of the study & control groups respectively had very good computer skill as perceived by student. The majority (85% & 82%) of both groups respectively, had personal computer respectively. The entire study group (100%) compared to almost the entire control group (97%) know their computer capabilities. About two-third of study group (65%) compared to more than one- half of the control group (57.5%) had internet access. All (100%) the study and control groups students had an e-mail address.

No statistically significant differences were found between the study and control groups in relation to socio-demographic data and computer skills. This means that both groups were matching.

Table (I): Number and percent distribution of the study subjects according to their Socio-Demographic data and computer skills

Socio-Demographic data and computer skill	CBL Study (n=40)		traditional Control (n=40)		$\chi^2(P)$
	No	%	No	%	
Age (years):					
• 20-	38	95.00	35	87.50	1.79 (0.408)
• 22-	2	5.00	4	10.00	
• 24-26	0	0.00	1	2.50	
Sex:					
• Male	11	27.50	13	32.50	0.238 (0.625)
• Female	29	72.50	27	67.50	
residence:					
• Urban	5	12.50	11	27.50	2.812 (0.093)
• Rural	35	87.50	29	72.50	
Academic degree:					
• Secondary	9	22.50	17	42.50	3.647 (0.0562)
• Technical nursing institute	31	77.50	23	57.50	
Computer skill:					
• Excellent	6	15.30	2	05.00	2.831 (0.242)
• Very good	21	52.50	20	50.00	
• Good	13	32.50	18	45.00	
Personal computer:					
• Yes	34	85.00	33	82.50	0.092 (0.761)
• No	6	15.00	7	17.50	
Computer software capabilities:	n=34		n=33		
• Yes	34	100.00	32	97.00	1.046 (0.306)
• No	0	00.00	1	3.00	
Internet access					
• Yes	26	65.00	23	57.50	0.474 (0.491)
• No	14	35.50	17	42.50	
Having an email account					
• Yes	40	100.00.00	40	100.00	-
• No	0		0	0.00	

$\chi^2(P)$: Chi-Square Test & P for χ^2 Test*: Significant at $P \leq 0.05$

Table (II) donates the number and percent distribution of the CBL and control groups according to their total score of knowledge about placenta examination. In relation to CBL group, before providing teaching session, most (90%) of students had poor total scores of knowledge and none of them had a good total score of knowledge. After providing teaching session, students showed improvement immediately and after one week, where 95% & 87.5% respectively exhibit good total scores. One month later, CBL students showed a decline in their knowledge scores with only 60% achieving a good total score. Statistically significant difference were found before intervention and immediately after ($P= 0.000$). As well as further significant difference were also found between immediately after and one month later ($P=0.0000$). In addition, there were no statistically significant differences between immediately after and after one week ($P = 0.494$), among CBL group.

The same table reveals that, the majority (87.5%) of control group had poor total knowledge scores and none of them had a good total score prior to the traditional intervention. Immediately after the intervention, they exhibited improvement in their knowledge where about three-quarters (72.5) achieving a good total knowledge score. One week after intervention, a sharp decrease was observed in their total knowledge score. Where only 45% of them had good total score of knowledge. A further decrease in their knowledge was observed after one month of providing teaching session where only 27.5% of them had good total score. A statistically significant differences were evident across the three time periods with an initial increase

immediately after teaching (p= 0.000), followed by significant declines after one week and one month (p = 0.033& 0.0000) respectively.

Table (II) :Total score of students' knowledge of placental examination among computer Based Learning and traditional groups

Total score of knowledge	CBL group								Traditional group							
	Before N=40		Immediately N=40		After one week n=40		One month later n=40		Before n=40		Immediately n=40		After one week n=40		One month later n=40	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Good	0	00.0	38	95.0	35	87.5	24	60.0	0	00.0	29	72.5	18	45.0	11	27.5
Fair	4	10.0	2	5.0	5	12.5	15	37.5	5	12.5	8	20	13	32.5	19	47.5
Poor	36	90.0	0	0.0	0	0.00	1	2.5	35	87.5	3	7.5	9	22.5	10	25.0
$\chi^2(P)$	P1 =74.667 (0.000) [*] P2 = 1.409 (0.494) ² P3 = 14.102 (0.000) ³								P1 =56.64 (0.000) ¹ P2 =6.765 (0.033) ² P3 =16.351 (0.000) ³							

$\chi^2(P)$: Chi-Square Test & P for χ^2 Test*: Significant at P ≤ 0.05

P1: Significance between before and immediately after.

P2: Significance between immediately after and after one week.

P3: Significance between immediately after and after one month.

Table (III) shows a Comparison between CBL & traditional groups regarding their knowledge retention after providing teaching session. Students of the CBL group had better knowledge immediately after providing teaching session. They also had better knowledge retention one week and one month later than students of traditional groups. A statistically significant difference between both groups were found immediately after, one week and one month later of providing teaching session. P= (0.020, 0.000 & 0.001) respectively.

Table (III): Comparison between CBL & traditional groups regarding students' knowledge retention after providing teaching session

Total score of knowledge	Before				Immediately				After one week				One month later			
	CBL Group=80		Traditional group=40		CBL Group=40		Traditional group=40		CBL Group=40		Traditional group=40		CBL Group=40		Traditional group=40	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Good	0	00.0	0	00.0	38	95.00	29	72.5	35	87.5	18	45.0	24	60.0	11	27.5
Fair	4	10.0	5	12.5	2	05.00	8	20	5	12.5	13	32.5	15	40.0	19	47.5
Poor	36	90.0	35	87.5	0	0.00	3	7.5	0	00.0	9	22.5	1	2.50	10	25.0
FET/ $\chi^2(P)$	X ² = 0.125 P1 = (0.939)				X ² = 7.809 P2 = (0.020)*				X ² = 18.008 P3 = (0.000)*				X ² = 12.663 P4 = (0.001)*			

X²: Chi-Square Test * Significant at P ≤ 0.05

P1: Significance between traditional and CBL students' knowledge before providing teaching session.

P2: Significance between traditional and CBL students' knowledge immediately after providing teaching session.

P3: Significance between traditional and CBL students' knowledge after one week.

P4: Significance between traditional and CBL students' knowledge after one month.

Table (IV) portrays the total score of students' performance among CBL and traditional groups. As regards CBL group, immediately after providing teaching session, it was found that all of students (100%) had good total score of performance. In addition, the majority (95% & 87.5 %) of them had good total score of performance after one week & one months later respectively.

On the other hands, students of the traditional group showed an improvement in their performance of placenta examination skills. Where, the majority (85%) of them had good total score immediately after providing teaching session. After one week, a slight decline in their performance was observed where 75% of them had good total score. Further decline in students' performance was observed after one month of providing teaching session where 70% had good total score.

These denote that students of CBL had better skill than those of traditional group.

Table (IV) Total score of students' performance of placental examination among CBL and traditional group

Total score of skills	CBL group						Traditional group					
	Immediately N=40		After one week N=40		One month later N=40		Immediately N=40		After one week N=40		One month later N=40	
	No	%	No	%	No	%	No	%	No	%	No	%
Good	40	100.0	38	95.0	35	87.5	34	85	30	75.0	28	70.0
Satisfactory	0	00.00	2	05.0	5	12.50	5	12.5	7	17.5	7	17.5
Poor	0	00.00	0	00.00	0	00.00	1	2.5	3	7.5	5	12.5
χ²(P)	5.267 (0.2609)						3.696 (0.4487)					

X²: Chi-Square Test * Significant at P ≤0.05

Table (V) illustrates that both CBL and traditional groups had improvement in their performance of placental examination procedure after providing teaching session. Where, students of CBL retained more skill than those of traditional group all over the three period of the study. A Statistically significant difference was found between the two groups immediately after, after one week and one month later P (0.039, 0.034 & 0.047), respectively.

This denotes that long retention of skill among students of CBL was better than that in the traditional group.

Table (V) Comparison between traditional and CBL traditional groups regarding students' performance retention after providing teaching session

Total score of skills	Immediately				After one week				One month later			
	CBL Group=40		Traditional group=40		CBL Group=40		Traditional group=40		CBL Group=40		Traditional group=40	
	No	%	No	%	No	%	No	%	No	%	No	%
Good	40	100.0	34	85	38	95.0	30	75.0	35	87.5	28	70.0
Satisfactory	0	00.00	5	12.5	2	05.0	7	17.5	5	12.50	7	17.5
Poor	0	00.00	1	2.5	0	00.00	3	7.5	0	00.00	5	12.5
FET/χ²(P)	6.486 (0.039)*				6.719 (0.034)*				6.111 (0.047)*			

X²: Chi-Square Test * Significant at P ≤0.05

According to table (VI) no significant correlation was found between students' knowledge and their performance regarding placenta examination either immediately after, after one week, one month later following providing teaching session. This indicates that students' knowledge had no effect on their performance regarding placenta examination for both groups.

Table (IV): Correlation between total score percentage of Obstetric Nursing Students Knowledge and Skills concerning placenta examination among both groups

Placenta examination performance	Placenta examination knowledge					
	Immediately after		After one week		One month later	
	R	P	r	P	r	P
CBL group (n=40)	-0.041	0.721	0.010	0.781	0.076	0.651
Traditional group (n=40)	0.116	0.321	0.127	0.509	0.184	0.318

V. Discussion

Nursing education can maintain its dynamic quality as long as it moves toward innovation, development, and use of modern methods of teaching and learning. Achieving this goal requires teachers to use up-to-date methods in their teaching plan. ⁽¹⁷⁾ According to educational psychologists, effective, long-lasting learning entails active engagement of the learner. Therefore, education professionals are currently emphasizing modern, active, learner-centered methods. Several teaching and learning approaches, including Computer-Based Learning, have been derived from this theory. The Computer Based Learning enables learners to reach their educational goals based on their talents and learn how to learn that is one of the educational objectives. ⁽¹⁸⁾ Therefore, this study was carried out to determine the effect of computer based learning on obstetric and gynecological nursing student's knowledge and skills retention regarding placenta examination.

The findings of the present study revealed that the majority of the study group "Computer Based Learning" (90%) and control group "traditional learning" (87.5%) groups had poor total score of knowledge before providing the teaching session regarding placental examination with no statistically significant difference between them. After providing the teaching session, score of students' knowledge increased significantly for both study and control groups. This could reflect the impact of both teaching methods on learning process of such procedure.

The present study finding also showed that CBL group achieved higher scores of knowledge than traditional learning group immediately after providing CBL module. These finding may be attributed to limited effectiveness of traditional approach in clinical nursing education. In such a demonstration method, students assume a purely passive role and their concentration fades off after 15-20 minutes. ⁽¹⁹⁾ On the other hand, CBL is a method, which use computer in learning media, strengthening students' motivation and education process, It also gives opportunities to both students and teacher to learn by their speed and combine active learning with computer technology. Moreover, CBL increases the feeling of self-efficacy, independence and, simulates the actual work situations as well as matched with the ability to repeat the content as many times as needed. ^(19,20)

The present result is consistent with the findings of **Kim j et al (2003)**. ⁽²¹⁾ They had conducted Prospective, randomized double-blinded study to determine whether CD-ROM or printed materials were more effective for teaching cognitive and affective psychomotor skills related to San-Yin-Jiao pressure procedure, in **Korea**. Their results revealed that their experimental group had higher scores in conceptual knowledge and performance skill than printed materials group but not statistically significant. . They added that students' satisfaction with CD-ROM was significantly higher than other group ($P < 0.05$).

The current finding is also relatively consistent with the study of **Schneider P et al (2006)**. ⁽²²⁾ Who had studied the impact of an interactive CD-ROM program on the rate of medication administration errors made by nurses. They had concluded that an interactive CD-ROM enabled nurses to apply the learned information, to identify errors in medication administration and improved adherence to safe medication administration practices. In addition, the present results are consistent with the findings of **Hart P et al (2008)**. ⁽²³⁾ They had conducted a study titled "Effectiveness of a Computer-Based Educational Program on Nurses' Knowledge, Attitude, and Skill Level Related to Evidence-Based Practice" in **USA**. They reported that, after nurses' participation in the computer-based education intervention, their knowledge, attitude, and skill level, as well as beliefs about organizational readiness had increased with a statistically significant difference. Moreover, This result is nearly congruent with the findings of **Gerdprasert et al (2010)**. ⁽²⁴⁾ They had conducted a study titled " the effect of an interactive web-based learning unit to facilitate and improve intrapartum nursing care of nursing students" in **Bangkok, Thailand**. Their results revealed that the students in the experimental group had significant higher scores in conceptual knowledge and performance skill.

Furthermore, the current finding is relatively similar to three studies. First, study of **Minolin Metal (2013)**. ⁽²⁵⁾ in **India**, titled "A comparison of two instructional methods to teach obstetrical palpation for antenatal mothers among B.Sc(N) II year students. Their results indicated that knowledge on obstetrical palpation among students in web based group is effective than the traditional group students. Second the study done by **Alemán et al (2011)**. ⁽²⁶⁾ about effects of competitive computer-assisted learning versus conventional teaching methods on the acquisition and retention of knowledge in medical surgical nursing students, in **Spain**. They revealed that the competitive e-learning method produced significant cognitive gains for the experimental group students in the immediate follow-up test. Third, the study done by **Öztürk et al. (2014)**. ⁽²⁷⁾ in **Turkey** titled effect of web-based education on nursing students' urinary catheterization knowledge and skills. They conclude that Web-based education had positive effects on increased for knowledge when it supplements classroom instruction.

This agreement between the aforementioned findings and the results of current study is probably attributed to the increasing tendency among new generations to use technology not only in study but also in social and other aspects of their lives. In addition, it may be due to the fact that visual stimulation and interaction is a key component in learning, and may play an effective role in nursing education in terms of knowledge acquisition. The students perceived the web-based learning unit to be fun, flexible, and convenient.

On the other hand, The current finding doesn't match with that of **Jeffries P et al. (2003)**.⁽²⁸⁾ Their finding had revealed no significant differences between CAL CD-ROM and traditional in pre or post knowledge test scores. In addition, sameresults is not in the line **Bata-Jones and Avery (2004)**.⁽²⁹⁾ Their findings reported that there were no significant differences between the mean exam scores of students enrolled in the web-based and traditional courses. Other contradicting findings were reported by **Jang et.al (2005)**.⁽³⁰⁾ Their results showed that knowledge about ECG among students in the Web-based group was significantly lower than that of students in the control group. Moreover, this result is not consistent with the results of **Eaton-SpivaL, and Day A (2011)**.⁽³¹⁾ They found that Nurses had a slight improvement in knowledge, skill, and confidence related to diabetes after the computer-based learning intervention, but no statistically significant differences were found. This discrepancy in the results may be explained by the use of different educational methods (CD-ROM and Web-based) in the present study and the contradictory researches used one teaching method only either CD-ROM or Web-based.

Recently, lack of knowledge was indicated as a barrier for adherence to evidence – based practice. Obstetric nursing students rely upon a specialized body of knowledge, skill, and experiences to provide care to women during pregnancy, labor and postpartum period.⁽³²⁾ Regarding knowledge retention, the finding of the present study revealed that both traditional and CBL groups had slight decline in their knowledge retention after one week, and significant decline was also observed one month later. These finding may be due to the fact that students are cognately busy by many other duties and assignment in other clinical rotation in the obstetric course. Moreover, they are enrolled in other courses beside the obstetric nursing course. They are preoccupied with a lot of information that makes it difficult for them to recall all the received information.

The present finding is in consistent with the four studies. First, the study done by **Durkin G(2008)**⁽¹³⁾ in **USA** about the effectiveness of computer-based learning courses among nursing staff. Their results showed that interactive CBL courses showed greater long-term learning retention than traditional courses. Second, the previously mentioned study done by **Alemán Fetal (2011)**.⁽³²⁾ They revealed that the competitive computer-assisted learning method produced significant knowledge retention for the experimental group students in the 10-week follow-up test. Third, the study carried out by **Abdel-Motaleb R.(2012)**⁽²⁵⁾ about the effect of computer based learning (CBL) regarding entotracheal airway suctioning on knowledge and skill retention of third year pediatric nursing students in **Egypt**. Fourth, the study was also carried out in **Egypt** by **Bader E(2015)**⁽³³⁾ about the effect of computer based learning (CBL) regarding nasogastric feeding on knowledge and skill retention of third year pediatric nursing students.

On the contrary, the current finding doesn't match with that of **Bloomfield p et al.(2010)**⁽³⁴⁾ who asserted that neither the CBL group nor the traditional group showed any change in their knowledge scores after two weeks or after eight weeks. The difference between the current study and the previous study may be due to different learning styles of students, where passive and traditional learners were not comfortable with this new teaching method and playing an active role. In addition, some students at first had difficulties with computer and dealing with a new strategy.

Competency in clinical performance enables the nurse to recognize important cues, respond quickly, and adapt interventions to meet specific patient's needs at the right time and efficient way. Every day, and every moment during the day, nurses use their clinical skills in client's care.⁽³⁵⁾

The finding of the current study revealed that student's ability to perform the skills of placenta examination was higher among both groups immediately after providing teaching session. Then, more improvement was observed among CBL group than traditional group. These may be that student in both groups were given the opportunity to re-demonstrate of placental examination procedure after providing teaching session in the obstetric nursing laboratory. Moreover, the availability of procedures, videos, and power point presentation (provided by the researchers), which could provide a demonstration of the procedures, and can be replayed several times to help students observe them before the final performance

The results of the present study agree with the results of **Kaveevivitchai et al(2009)**⁽³⁶⁾. They found that all of their groups of students had gained significantly higher performance skills regardless of whether the groups were subjected to CAL/lecture or CAL/lecture/demonstration. In addition, the present finding is in conformity with the study of **Farrag (2010)**⁽³⁷⁾ who mentioned that there was an improvement in lab achievement scores of nursing students' who were taught following the procedures' maneuver, management of second stage of labor, immediate care of new born, deep tendon reflex, urine analysis for sugar and albumin, funds and lochia examination, as well as perianal care by computerized method compared to the traditional method regarding practical skills. The results were also in agreement with **Bloomfield et al (2010)**⁽³⁴⁾ who concluded that the computer- assisted learning module was an efficient strategy for teaching skill of hand-washing to nursing students.

Contrastingly, the findings of the current study disagreed with **Jeffries Pet al (2003)**⁽²⁸⁾. Their findings had revealed that no significant differences between CAL CD-ROM and traditional skill performance. Also, the current study doesn't correspond with the study of **Udupa and Madhukar(2011)**⁽³⁸⁾ in their study on orthopedic

nursing students stated that there were no statistically significant differences between students instructed by traditional methods and students instructed by computer-assisted learning regarding students' performance. In addition, this result is incongruent with the findings of **Pishgooie A et al. (2012)**.⁽³⁹⁾ who had studied comparison of three instructional methods for drug calculation skill in nursing critical care courses: Lecturing, Problem Solving, and Computer-Assisted Self-Learning. They concluded that all three methods affected learning, but the effect of computer-assisted self-learning was less than others.

Skills retention can describe the stage in acquiring a new motor skill when the student is able to transfer that skill to a different setting. Skills retention varies over time: a given level of skill either improved or being maintained or being deteriorating upon.⁽³⁹⁾ The present study revealed a slight descent in student's performance after one week among traditional students group. Additionally descent was observed in students' performance after one month. This may be due to limited opportunities that are allowed for students to practice placenta examination procedure in hospital as many hospitals collect and discard the placenta immediately after delivery. Similarly, the study findings revealed that skills retention to placenta examination procedure in CBL group show slight decline after one week and further decline was observed one month later. This may be due to the fact that many students tended to use computer for games or chatting rather than using it for learning.

Finally, the results of the present study reveal that both groups showed slight decline in their skill retention. Skill retention among students of CBL group was better than traditional group students after one week as well as one month later. This may be due to that students learn by the traditional method may feel embarrassed to ask the demonstrator for repetition when losing their attention during demonstration. On the other hands, students of CBL group had the opportunity to learn by their own (self-learning). The learning material was available for them all the time (as students had a copy of the modules on CD-ROM, which are available all the time). In addition, the advantages of computer based learning that stimulates the learning environment create a rich environment for active learning and enhance student to build up the performance skill in systematic sequence which strengthen the memory, thereby enhancing skill development and retention. A similar result was also observed by **Kaveevivitchai et al (2009)**⁽³⁶⁾, **Abdel-Motaleb R (2012)**⁽²⁵⁾ and **Bader E(2015)**.⁽³⁴⁾ They reported that the CBL students group achieved gained higher performance score than traditional students group. On the other side, these finding are incongruent with the findings **Bloomfield et al (2010)**⁽¹⁹⁾ which showed equal performance levels in both groups. Therefore, the current study findings denote that CBL is a more effective teaching method in clinical nursing education than the traditional teaching method.

VI. Conclusion and recommendations

Conclusion

Based on the findings of the present study, it can be concluded that computer based learning and traditional teaching method are effective teaching methods. However, students of computer based learning had better knowledge retention than those of the traditional group students regarding placenta examination immediately after, after one week and one month later of providing teaching session. Furthermore, students of computer based learning had more skills retention that the traditional group students regarding placenta examination immediately after, after one week and one month later of providing teaching session.

Based on the previous findings, the following recommendations are suggested;

- Computer based learning should be incorporated in clinical nursing education. Distance learning and on line courses should be applied in clinical education. In addition, Interactive learning environment such as virtualization and simulation should be involved in clinical teaching to facilitate independence and self- directed learning. Establishing more training courses for university professors to develop their skills in electronic design, and Web applications that enable a faculty member to use a variety of integrated strategies, and employ these tools in the educational process.

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