Effect of Blended Learning Program on Maternity Nurses′ Performance regarding Prevention of Obstetric Fistula

Marwa Salah Ahmed[1], Manal Abdalla Gaheen[2], Rabaa El-Sayed Shaban[3], Toha Ali El-Sayed Abo-Hatab[4]

[1] Demonstrator of Maternal and Neonatal Health Nursing, Faculty of Nursing, Tanta University, Egypt.
[2] Professor of Maternal and Neonatal Health Nursing, Faculty of Nursing, Tanta University, Egypt.
[3]Assistant professor of Maternal and Neonatal Health Nursing, Faculty of Nursing, Tanta University, Egypt.
[4]Lecturer of Maternal and Neonatal Health Nursing, Faculty of Nursing, Tanta University, Egypt.

Corresponding author: Marwa Salah Ahmed
Email: Marwa.Salah@nursing.tanta.edu.eg

Abstract

Background Obstetric fistula has a major health burden for women that lead to severe morbidities, as well as it is a barrier for achieving the third sustainable developmental goal. **The aim of this study** was to evaluate the effect of blended learning program on maternity nurses′ performance regarding prevention of obstetric fistula. **Design**: A quasi-experimental research design was used. **Subjects and method:** The study was carried out at obstetrics and gynaecological departments of Tanta University Hospital and El-Menshawy General Hospital. All nurses (80) who are working at the previously mentioned study settings were included in the study. **Two tools** were used for data collection. **Tool (I): Maternity nurses' knowledge regarding prevention of obstetric fistula. Tool (II): Observational checklists for maternity nurses' practices** which included four Parts: I- Vaginal examination during labor, II- Perineal supportive techniques during second stage of labor, III- Perineal examination, and V- Episiotomy care. **Results:** It was illustrated that (30% and 22.5% respectively) maternity nurses had a high level of knowledge and satisfactory practice level pre implementation of the blended learning program that increased to (95% and 90% respectively) immediately post program. **Conclusion**: The blended learning program provided to the maternity nurses obviously improved their performance regarding the prevention of obstetric fistula. **Recommendations**: The present study recommends providing continuing evidence-based in-service training programs for maternity nurses to enhance their knowledge and practices regarding the prevention of obstetric fistula.

Keywords: Blended Learning, Nurses′ Performance, Obstetric Fistula.

Introduction

Obstetric fistula is the primary cause of morbidity and mortality among women. It is a severe medical condition that has physical, psychological, social, and cultural issues. Obstetric fistula is an abnormal opening between the vaginal tract and the urinary tract or rectum. There are numerous classifications of obstetric fistula, such as recto-vaginal (RVF), vesico-vaginal (VVF), urethro-vaginal, uretero-vaginal, vesico-uterine, vesico-cervical, and perineo-vaginal fistula **(Chinthakanan, Sirisreetreerux, & Saraluck, 2023; Wall, Ouedraogo, & Ayenachew, 2021**).

Obstetric fistula is associated with different signs and symptoms that include urinary and fecal incontinence, dyspareunia, bad odor, weakness and numbness of the lower extremities muscles caused by nerve damage, recurrent urinary tract or vaginal infections, pain or irritation in the vagina or surrounding areas. Obstetric fistula also has a variety of psychological signs and symptoms such as anxiety, feelings of worthlessness, low self-esteem, changing mood, stigma, social isolation and depression **(Kamel, Ramadan, El Banna, & Ali., 2023; Nwala., et al 2022).** Scientific research studies revealed that there are three causes of obstetric fistula. These include prolonged and obstructed labor, precipitous delivery or obstetric maneuvers and poorly terminated abortion **(Bulndi, Ireson, Adama, & Bayes, 2023).**

Moreover, there are variable risk factors that contributes to the occurrence of obstetric fistula such as early marriage, rural residences, low level of education, malnutrition, anemia, inadequate spacing between pregnancy, lack of antenatal follow up, bearing down and use of instrumental delivery before complete cervical dilation during the first stage of labor, prolonged labor, any factors that increase intra-abdominal pressure, injury during gynecological or obstetric surgeries such as (hysterectomy, and poorly repaired episiotomy), coital trauma and sexual violence **(Woldegebriel et al., 2023; Gedefaw, Wondmieneh, Getie, Bimerew, & Demis, 2021).**

Obstetric fistula expose women to life threatening complications including renal damage due to ascending infection, vaginal stenosis, pelvic inflammatory disease, cervical incompetence and infertility**.** It is also lead to psychological consequences such as humiliation from their smell, which lead to severe socio-cultural stigmatization, worry about developing another fistula in future pregnancies and the inability to fulfill their family responsibilities. Besides that, it may also result in social issues such as adverse impact on sexual intercourse, as well as an increase in the incidence of divorce and separation **(Nduka, Ali, Kabasinguzi, & Abdy, 2023).**

Despite these serious complications the obstetric fistula is a preventable disease that can be prevented during pregnancy, labor and post-partum period. During pregnancy it can be prevented through regular antenatal care, providing healthy nutrition, practicing kegal exercises and

avoiding the factors that increase the intra-abdominal pressure. During labor, the obstetric fistula can be prevented through timely access to obstetric care, empty of the bladder, avoid bearing down and use of instrumental delivery before complete cervical dilation, and avoid prolonged labor **(Alemu, Ukumo, Agago, & Hadaro, 2023).**

In addition to apply supportive techniques during the second stage of labor, avoid fundal pressure and safe caesarean sections for woman in obstructed labor. During the post-partum period, the obstetric fistula can be prevented through assessing the site of episiotomy for REEDA, providing health instructions to avoid chronic cough and constipation, have healthy nutrition, practice kegal exercises, frequently empty the bladder and frequently have perineal care **(Alemu et al., 2023; Hurissa, Koricha, & Dadi, 2022).**

Maternity nurses are at the forefront of healthcare system, and they are instrumental in reducing both fetal and maternal morbidity, and mortality. Furthermore, they had imperative role in the prevention along with management of obstetric fistula and the subsequent reintegration of women into, the society. **(Slinger & Trautvetter, 2020).**

So, there is an urgent need to maintain and improve the maternity nurses' knowledge and practices through providing them with the most up to date evidence-based theoretical and practical nursing education regarding preventive measures of obstetric fistula. This can be achieved through different methods of teaching other than face to face learning, such as blended learning that is an educational approach which integrates online educational resources with classroom-based methods to facilitate interaction. **(Gedefaw et al., 2021; Singh, 2021).**

Blended learning boost proactive learning practices rather than that result from instructions which provide nurses with more opportunities to learn and engage on their own at their preferred place and time (**Ma & Lee, 2021).** Globally, there are no scientific researches that determine the effect of blended learning on nurses' performance regarding prevention of obstetric fistula **(Alemu et al., 2023)**. Therefore, this study will be conducted.

Significance of the study

In 2020, World Health Organization (WHO) reported that the prevalence of obstetric fistula was approximately 50,000 to 100,000 new cases worldwide, while the prevalence of fistula was 30,000–130,000 new cases per year in Africa and 200 per 100,000 cases per year in Egypt **(Asefa, Amenu, & Berhe, 2020).**

The prevention of obstetric fistula is a contributing factor to the inquiry of Sustainable Development Goal 3, which is devoted to the enhancement of maternal health **(Asfaha, Berhe, Siyoum, & Gebremeskel, 2021).** While if it is neglected will lead to different maternal hazards and severe morbidities.

Aim of the study:

Determine the effect of blended learning program on maternity nurses′

performance regarding prevention of obstetric fistula.

Research Hypothesis:

- Knowledge of maternity nurses is expected to be improved after implementation of the blended learning program regarding prevention of obstetric fistula immediately and one month later.
- Practices of maternity nurses are expected to be improved after the implementation of the blended learning program regarding prevention of obstetric fistula immediately and one month later.

Subjects and Method

Research design:

The research was conducted using a quasi-experimental research design.

Setting: The study was conducted at:

- Tanta University Hospital (Main Hospital), which is affiliated to the Ministry of High Education and Scientific Research where the obstetric and gynecological department is comprised of four inpatient units (two obstetric units and two gynecological units each unit is equipped with 12 beds), an ultrasonography room, as well as delivery and operation units.
- El-Menshawy General Hospital affiliated to the Ministry of Health and Population where the obstetric and gynecological department located in the third floor and consisted of three inpatient units (each unit consisted of 6 beds), a vaginal delivery unit and an operation unit.

Subjects: The study included all nurses (80) who are employed at the aforementioned study settings (50 nurses from Tanta University, and 30 nurses from El-Menshawy General Hospital).

Tools of data collection:

To accomplish this research, two tools were developed and used by the researcher.

Tool I: Maternity nurses' knowledge regarding the obstetric fistula:

The researcher developed it after conducting a review of recent related literatures **(Azanu, Dassah, &Agbeno, 2020; Asefa et al., 2020; Balcha, Nigussie, Beyene, & Tesfu, 2020; Heera, Nirmala, Mangala, Gayatri, & Surya, 2019)** and used to evaluate knowledge of the maternity nurses regarding obstetric fistula. It consisted of the subsequent two components:

Part (a): Socio-demographic characteristics of the studied maternity nurses: The basic details of maternity nurses were collected in this part, including their age, marital status, place of residence, level of education, years of experience, attendance of prior obstetric fistula training courses, and the location of those courses.

Part (b): Maternity Nurses' Knowledge regarding the obstetric fistula and its prevention: This part was used to assess the maternity nurses' knowledge regarding the obstetric fistula and its prevention that included questions regarding definition, classification, types, causes, predisposing factors, signs and symptoms, diagnosis and complications of the obstetric fistula. The prevention of the obstetric fistula during ante-natal, labor and post-partum period.

Scoring system for maternity nurses' knowledge was rated as follows:

- Correct and complete answers were given a score of (2).
- Correct and incomplete answers were given a score of (1).
- Incorrect answers or didn't know were given a score of (0).

The total knowledge was scored as follows:

- **High level of knowledge**: 80%-100%.
- **Moderate level of knowledge**: 60% - <80%.
- **Low level of knowledge**: < 60%.

Tool II: Observational checklists of maternity nurses' practices regarding the preventive measures of obstetric fistula:

This tool was adapted by the researcher from **(Ali, El Banna, & Abd Elmordy., 2022; Davidson, London, & Ladewig, 2020)** and used to assess maternity nurses' practices to prevent the occurrence of obstetric fistula. It comprised of 4 procedures including standardized steps or tasks for each one as follows:

Part one: Vaginal examination to assess progress of labor.

Part two: Perineal supportive techniques during second stage of labor.

Part three: Perineal examination.

Part four: Episiotomy Care.

The scoring system of nurses' practices was categorized as follows:

- Done correctly and completely was scored as (2).
- Done correctly and incompletely was scored as (1).
- Done incorrectly or not done at all was scored as (0).

The score of each item of the practiced skills was summed up and converted into percent score as follows:

- **Satisfactory practices** (≥ 80%).
- **Unsatisfactory practices** (< 80%).

Method

The study was implemented according to the following steps:

Administrative approval

To obtain permission to conduct the study, the responsible authorities of the selected locations were provided with an official letter from the Faculty of Nursing Tanta University that clarified the purpose of the study.

Ethical considerations:

- The Faculty of Nursing's Scientific Research Ethical Committee approved the accomplishment of the research with the acceptance code (376-2-2024).
- Every participant was informed about the purpose of the study.
- Every study participant gave their informed consent after being aware of their right to withdraw at any moment and the collected data will only be used for the purpose of this study.
- The researcher was responsible for making sure that the nature of the study would not cause any pain or suffering to the entire sample.
- Confidentiality and privacy were taken into consideration through data collection.

Tools development:

- **Tool I and Tool II** were developed by researchers after reviewing recent and related literature. A jury of five experts in the field of Maternal and Neonatal Health Nursing evaluated the individual

items and the entire instruments to determine whether they were relevant and appropriate to test the intended variables of the study. The face validity of the questionnaire was determined to be 94% based on the opinions of experts. The content validity index for the knowledge questionnaire was 95%, and the content validity index for the checklists of nursing practices regarding prevention of obstetric fistula was 93%. The total content validity index for the questionnaire was 93.65%.

- The reliability of the study tools was tested by Cronbach's Alpha test which indicated high reliability **(0.841 and 0.819 respectively) for knowledge and practices** of maternity nurses regarding prevention of obstetric fistula. The total questionnaire Cronbach's Alpha was 0.848.
- After development of the study tools, a pilot study was carried out on 10% (8) of the maternity nurses to test the clarity and feasibility, simplicity, and applicability of the developed tools before the actual data collection.
- No modifications were made in response to the results of the pilot study, and the instruments were prepared for use. The data from the pilot study were incorporated into the current research sample because the tools remained unchanged.

Data collection:

- Data collection was conducted over a period of six months, from the beginning of June 2024 to the end of November 2024.
- Tool (I) part two and Tool (II) were used three times to assess maternity nurses' knowledge and practices regarding prevention of the obstetric fistula before, immediately and one month post implementation of the blended learning program.
- The researcher was present at the study settings three days per week in the morning and afternoon shifts to collect the data until the predetermined sample size was reached.
- **The blended learning program:** was conducted through the following four phases **(Assessment, planning, implementation and evaluation)**:

Phase I-Assessment phase:

- During this phase, the researcher greeted the maternity nurses, introduced herself, and provided them with a comprehensive overview of the study's purpose, duration, and activities. The maternity nurses' consent to participate in the study was obtained after the researcher determined the most suitable time for each group and provided them with an orientation on how to use the Google Meeting program.
- Data was gathered by the researcher through the distribution of Tool I, part (a) to assess maternity nurses' socio-demographic characteristics, part (b) to assess maternity nurses' knowledge regarding the obstetric fistula and its prevention. The average time taken to fill in the tool was about 20-30 minutes.

- After evaluating (pre-test) the maternity nurses' practices regarding obstetric fistula prevention using Tool II (observational checklists), the researcher distributed an educational booklet in Arabic language with colored illustrations that was divided into two sections (theoretical and practical).

Phase II- Planning phase:

A. Preparation of the blended learning program sessions:

- The blended learning program was consisted of six sessions for each group, three sessions for the theoretical part via the Google Meeting program and three sessions for the practical part (face-to-face).
- The overall sample was assigned into ten groups. Six groups at Tanta University Hospital (four groups with eight nurses and two groups with nine nurses), and four groups at El-Menshawy General Hospital (two groups with eight nurses and two groups with seven nurses).
- Three days per week were planned for the implementation of the program. Each theoretical session was conducted at a suitable time for nurses through the Google Meeting program and lasted between 30 to 45 minutes. The sessions were recorded and sent to those who were unable to attend. On the other hand, the practical sessions were conducted during the morning and afternoon shifts using the previously prepared models.

B. Setting the goals and objectives of the blended learning program:

A. The goal of the blended learning program was to enhance maternity nurses' knowledge and practices regarding the prevention of the obstetric fistula**.**

B. The objectives of the blended learning program were to improve maternity nurses knowledge and practices regarding; identify definition of obstetric fistula, differentiate between different types of obstetric fistula, list causes and predisposing factors of obstetric fistula, determine different signs and symptoms of obstetric fistula, identify the diagnosis and complications of obstetric fistula, demonstrate prevention of the obstetric fistula during ante-natal, labor and post-partum period.

C. Prepare the content of the blended learning program: An educational booklet was developed by the researcher based on nurses′ performance from the assessment phase using recent relevant literature available locally and internationally **(Alemu et al., 2023).** Also, the researcher utilized various types of instructional strategies including lectures, group discussions, simulations, role-playing, demonstrations, and re-demonstrations. Additionally, employed instructional media in the form of videos and supported materials including models of vaginal, vulvar, and episiotomy parts.

Phase III: Implementation phase:

The theoretical sessions: (three theoretical sessions were conducted through Google Meeting).

The first session was initiated by introduction about the blended learning program by the researcher who also provided the nurses with a comprehensive understanding of obstetric fistula, including its definition, classifications, types, major causes, predisposing factors, signs and symptoms, diagnosis, and complications.

The second session included knowledge about the prevention of the obstetric fistula during pregnancy and labor.

The third session included knowledge about the prevention of the obstetrics fistula during the post-partum period.

The practical sessions: (three practical sessions which were conducted face to face). They included demonstration and re-demonstration on vaginal, vulvar and episiotomy parts models.

The fourth session included demonstration by the researcher and re-demonstration by the studied maternity' nurses for proper and needed practical skills regarding **vaginal examination including:**

A. Pre-procedure tasks included four preparations (19 items), which are preparation of the equipment such as clean or sterile gloves, lubricant K-Y gel and sterile pad. Preparation of the (woman, environment, and nurse).

B. Procedure tasks; included 9 items as follow; assist the woman in assuming a dorsal recumbent position, ask the woman to separate or spread her legs without using force, encourage the woman to breathe naturally, prepare the area with an antiseptic solution, and lubricate the index and middle fingers of dominant hand with k-y lubricating jelly, using thumb and fore finger of non-dominant hand to spread the labia. Inspect the general area of introitus. The nurse inserts the dominant hand well-lubricated index and middle fingers gently into the vagina. Then, the hand is turned sideways and move the fingers until touch the cervix to determine the state of the cervix, effacement and dilatation, membranes, presenting part, position, station, and engagement.

C. Post procedure tasks (six items); Redressing the woman, assisting her in achieving a comfortable position, removing the equipment and gloves as well as washing hands, documenting the findings, and providing health education regarding the procedure.

The fifth session included demonstration by the researcher and re-demonstration by the maternity nurses for proper practical skills regarding perineal supportive techniques during the second stage of labor including:

A. Pre-procedure tasks included four preparations (18 items): Preparation of the equipment (Gloves, screen, woman's record & pen). Preparation of the (woman, environment and nurse).

B. Procedure tasks included the following (6 items): Help the woman lie in the lithotomy position, tell her to take deep breaths, place the left hand's fingers on the fetal occiput to keep

the fetal head flexed at the crowning, place the right hand on the perineum just in front of the coccyx, using the U-shaped technique with the thumb and index of the dominant hand on the lateral parts of the perineum, once the anterior shoulder was delivered gently pull upward to help deliver the posterior shoulder, remove the right hand from the posterior perineum and support the fetus's neck using one hand, while the other hand supports the fetus's body once both shoulders have been delivered.

C. **Post procedure tasks:** as mentioned before.

The sixth session featured a demonstration by the researcher and a re-demonstration by the maternity nurses of the necessary practical skills for perineal examination and episiotomy care that involved:

Part one: Perineal examination steps:

A. **Pre-procedure** tasks included (20 items) for:

- Preparation of equipment such as (Gloves, screen, sterile perineal pad, flashlight, woman's record and a pen)
- Preparation of the (woman, environment and nurse).

B. **Procedure steps**; included seven items, which are assist the woman in assuming the Sim's position, lower the perineal pad and the superior buttocks are lifted. Utilize a flashlight, examine the episiotomy or laceration for (REEDA), examine for perineal laceration, and note the number and size of hemorrhoids, additionally, take note of the location and degree of any bruising or edema, as these conditions may be signs of a developing hematoma.

C. **Post procedure tasks**: as mentioned before.

Part two: Episiotomy Care observational checklist:

A. Pre-procedure tasks included:

- Preparation of the equipment such as (Gloves, mackintosh, bed pan, kidney basin, anti-septic solution (betadine), cotton gauze, towels, light source, pin and paper). Preparation of the (woman, environment and nurse)

B. Procedure steps/tasks included the following ten items: Ask the woman to lie in the dorsal recumbent position with her knees slightly bent, legs separated, and foot flat on the bed. Place a large mackintosh under the woman's hips, help the woman sit correctly on the bedpan. Remove the soiled perineal pad from the front to the back and discard it according to the procedure, evaluate the episiotomy and suture for the presence of hematoma or infection and the healing process in accordance with REEDA. Additionally, note the number and size of hemorrhoids if present. Perform perineal care in accordance with the procedure. Clean the episiotomy site with antiseptic solution (betadine) and gauze, apply a gentle pressure technique and avoid fractioning the episiotomy sutures. Instruct the woman to turn to the side opposite of the nurse to remove the bedpan, dry the woman's buttocks and

thighs with cotton, and apply a clean perineal cloth.

C. **Post procedure tasks:** as mentioned before.

Phase IV: Evaluation phase: After implementing the blended learning program, the researcher used the same previous pretest-tools (tool I part (b) and tool II) as post-test-tools to evaluate the effect of blended learning program on maternity nurses' knowledge and practices regarding the prevention of the obstetric fistula immediately and one month post implementation of the blended learning program.

Statistical analysis

SPSS (Statistical Package for Social Science) version 25 (IBM Corporation, Armonk, NY, USA) was used to code, register, tabulate, and analyze the collected data.

Results

Table (1): Reveals that the mean age of the studied maternity nurses was 40.65±10.40 years and 90.0% of them were married, (52.5%) from rural areas and had diploma in nursing technician, (63.7%) had experience of 15 years or more and (90.0%) hadn't any training courses regarding the obstetric fistula.

Figure (1): Clarifies that (30%) of studied maternity nurses had a high level of knowledge regarding obstetric fistula and its prevention pre-program, which is increased to (95%)immediately post with highly statistically significance differences.

Table (2): Notices that the total practices' level of the studied maternity nurses regarding the preventive measures of the obstetric fistula improved immediately and post one month compared to pre-program, where (28.7%, 25.0%, 26.3% and 25.0% respectively) of nurses had satisfactory practice pre-program, compared to the majority of them immediately that slightly decreased one month later with highly statistical significant differences (p=0.0001).

Figure (2): illustrates that (22.5%) of studied maternity nurses has satisfactory practice level pre-program which is increased to (90%) immediately and (82.5%) one month after implementation of the blended learning program.

Table (3): Proves that no significant correlation between total knowledge level and total practice scores of the studied maternity nurses' pre, immediately and post implementation of the blended learning program.

Table (1): Socio-demographic characteristics of the studied maternity' nurses (n=80).

Socio-demographic characteristics(n=80)	N	%
Age/years		
24-30	**19**	**23.7**
>30-40	**17**	**21.3**
>40-58	**44**	**55.0**
Range	**24-58**	
Mean ±SD	**40.65±10.40**	
Marital status		
Single	**3**	**3.7**
Married	**72**	**90.0**
Divorced	**5**	**6.3**
Residence		
Urban	**38**	**47.5**
Rural	**42**	**52.5**
Educational Qualification		
Diploma of Nursing Technician	**42**	**52.5**
Nursing Technical Institute	**33**	**41.2**
Bachelor of Nursing	**5**	**6.3**
Experience years		
<5	**10**	**12.5**
5-10	**11**	**13.8**
>10-15	**8**	**10**
>15	**51**	**63.7**
Attended training courses on obstetric fistula		
No	**72**	**90.0**
Yes	**8**	**10.0**
If yes, Where?		
At hospital	**4**	**50.0**
Ministry of health	**4**	**50.0**

***Statistically significant (P<0.05)**

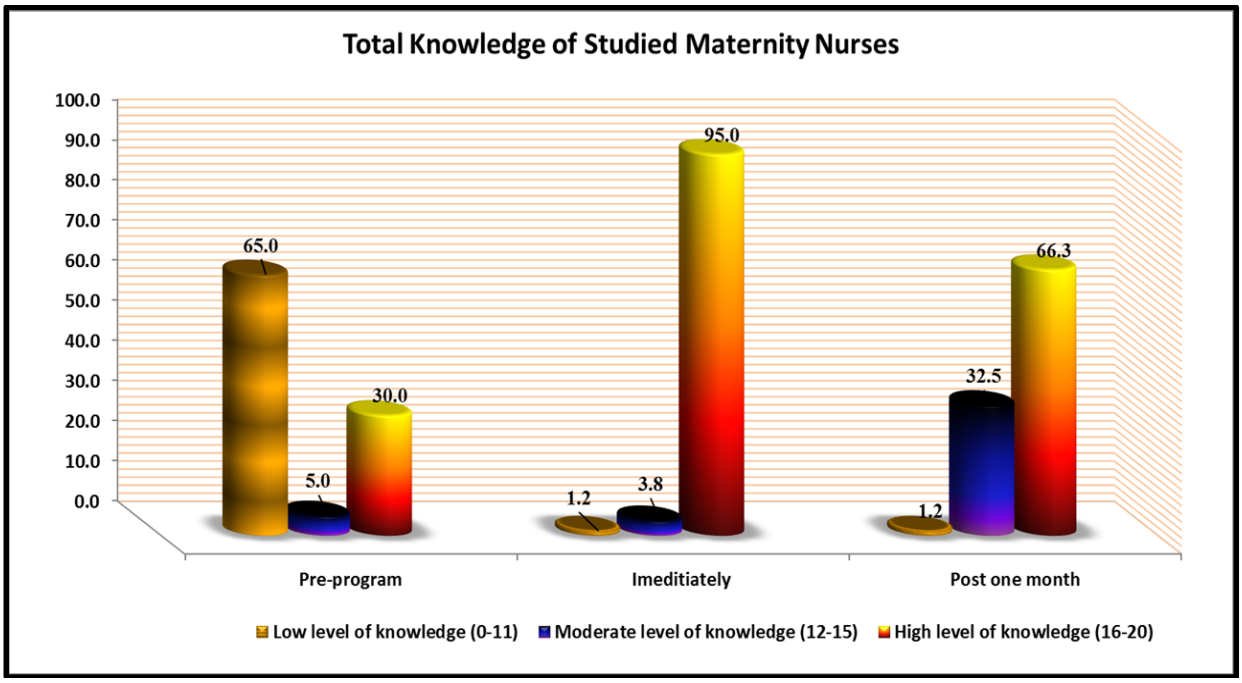

Figure (1): Total knowledge level of the studied maternity' nurses regarding obstetric fistula and its prevention pre, immediately and one month post implementation of the blended learning program (n=80).

Table (2): Total practices level of the studied maternity' nurses regarding the preventive measures (four procedures) of the obstetric fistula pre, immediate and one month post implementation of the blended learning program (n=80).

Total practices scores	Pre		Post				χ^2	p
			Immediately		One month			
	N	%	N	%	N	%		
I-Practices of vaginal examination procedure								
I-Pre-procedure tasks								
Unsatisfactory (0-6)	63	78.7	16	20.0	24	30.0	64.528	0.0001*
Satisfactory (7-8)	17	21.3	64	80.0	56	70.0		
II-Procedure tasks								
Unsatisfactory (0-14)	59	73.7	10	12.5	17	21.2	76.364	0.0001*
Satisfactory (15-18)	21	26.3	70	87.5	63	78.8		
III-Post-procedure tasks								
Unsatisfactory (0-7)	59	73.7	7	8.7	18	22.5	82.527	0.0001*
Satisfactory (8-10)	21	26.3	73	91.3	62	77.5		
Total practice level vaginal examination procedure								
Unsatisfactory (0-28)	**57**	**71.3**	**8**	**10.0**	**15**	**18.7**	**79.013**	**0.0001***
Satisfactory (29-36)	**23**	**28.7**	**72**	**90.0**	**65**	**81.3**		

II-Practices of perineal supportive techniques during second stage of labor procedure								
I-Pre-procedure tasks								
Unsatisfactory (0-6)	63	78.7	23	28.7	28	35.0	47.619	0.0001*
Satisfactory (7-8)	17	21.3	57	71.3	52	65.0		
II-Procedure tasks								
Unsatisfactory (0-9)	62	77.5	7	8.7	15	18.7	97.033	0.0001*
Satisfactory (10-12)	18	22.5	73	91.3	65	81.3		
III-Post-Procedure tasks								
Unsatisfactory (0-7)	59	73.7	8	10.0	19	23.7	78.321	0.0001*
Satisfactory (8-10)	21	26.3	72	90.0	61	76.3		
Total practice level of perineal supportive techniques during second stage of labor procedure								
Unsatisfactory (0-23)	**60**	**75.0**	**8**	**10.0**	**14**	**17.5**	**89.954**	**0.0001***
Satisfactory (24-30)	**20**	**25.0**	**72**	**90.0**	**66**	**82.5**		
III- Practices of perineal examination								
I-Pre-procedure tasks								
Unsatisfactory (0-6)	64	80.0	17	21.2	24	30.0	65.321	0.0001*
Satisfactory (7-8)	16	20.0	63	78.8	56	70.0		
II-Procedure tasks								
Unsatisfactory (0-11)	61	76.2	6	7.5	14	17.5	98.728	0.0001*
Satisfactory (12-14)	19	23.8	74	92.5	66	82.5		
III-Post-Procedure tasks								
Unsatisfactory (0-7)	57	71.3	8	10.0	15	18.7	79.013	0.0001*
Satisfactory (8-10)	23	28.7	72	90.0	65	81.3		
Total practice level of perineal examination procedure								
Unsatisfactory (0-25)	**59**	**73.7**	**9**	**11.2**	**21**	**26.6**	**72.589**	**0.0001***
Satisfactory (26-32)	**21**	**26.3**	**71**	**88.8**	**58**	**73.4**		
IV-Practices of episiotomy care procedure								
I-Pre-procedure tasks								
Unsatisfactory (0-6)	61	76.2	13	16.2	23	28.7	66.579	0.0001*
Satisfactory (7-8)	19	23.8	67	83.8	57	71.3		
II-Procedure tasks								
Unsatisfactory (0-15)	61	76.2	8	10.0	14	17.5	93.083	0.0001*
Satisfactory (16-20)	19	23.8	72	90.0	66	82.5		
III-Post-procedure tasks								
Unsatisfactory (0-7)	60	75.0	8	10.0	15	18.7	87.999	0.0001*
Satisfactory (8-10)	20	25.0	72	90.0	65	81.3		
Total practice level of episiotomy care procedure								
Unsatisfactory (0-30)	**60**	**75.0**	**8**	**10.0**	**15**	**18.7**	**87.999**	**0.0001***
Satisfactory (31-38)	**20**	**25.0**	**72**	**90.0**	**65**	**81.3**		

Total practice scores were classified into; unsatisfactory level (<80% of scores) and satisfactory level (≥80% 0f scores)

***Statistically Significant (P<0.05)**

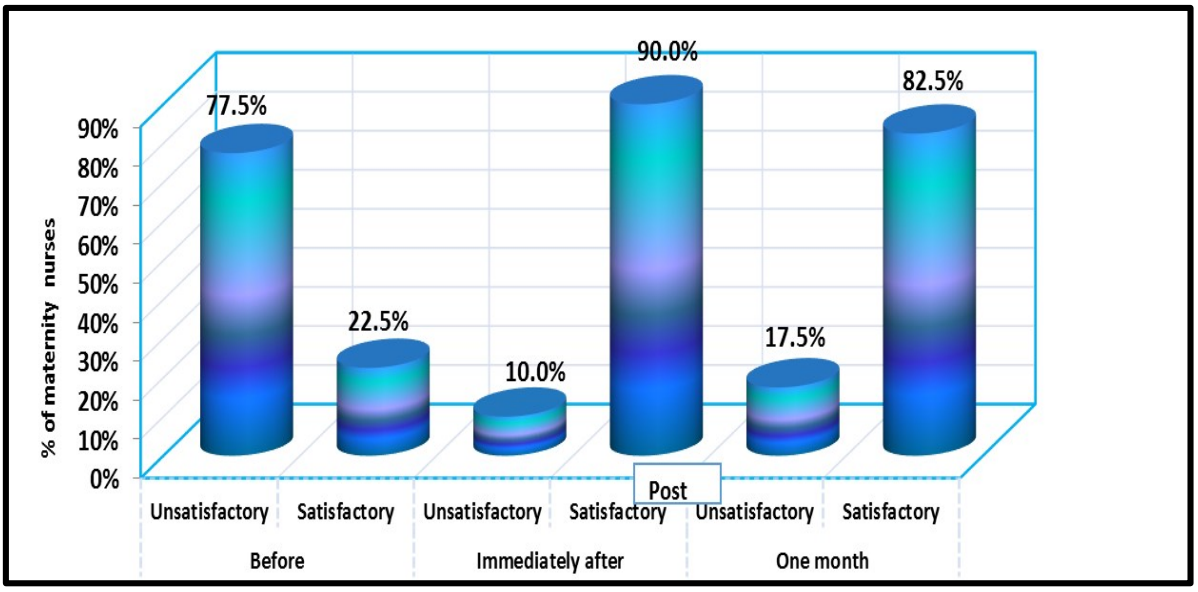

Figure (2): Total practices' scores of the studied maternity' nurses regarding the preventive measures of the obstetric fistula pre, immediate and one month post implementation of the blended learning program(n=80).

Table (3): Correlation between total knowledge and total practices scores of the studied maternity nurses pre, immediately, and one month post implementation of the blended learning program(n=80).

Correlation	The studied maternity nurses (n=80)					
	Pre		Immediate Post		One month Post	
	r	P value	r	P value	r	P value
Total knowledge versus total practices scores	0.100	0.375	0.172	0.128	0.010	0.932

Discussion

Obstetric fistula is a serious health problem which has devastating consequences on the woman's life **Chinthakanan et al., (2023)**.It is a preventable condition whereby maternity nurses had a fundamental role in preventing and decreasing its rate **Woldegebriel et al., (2023).**Accordingly, the current study had peel glows on the effect of blended learning program on maternity nurses' performance regarding prevention of the obstetrics fistula.

The results of the current study demonstrated that nearly three fifths of the studied maternity nurses' age ranged between24-58 years and the majority of them were married, almost one half of them were from rural areas and had diploma in nursing technician. Furthermore, more than three fifths of them had experience of15 years or more and the majority hadn't previous training courses regarding the obstetric fistula.

Maternity nurses' knowledge regarding obstetrics fistula and its prevention becomes one of the fundamental steps for prevention and reduction of maternal morbidity, and mortality **Ali et al., (2022)**.

Pertaining to the total score of knowledge regarding obstetric fistula and its prevention, the current study revealed that approximately one third of the studied maternity nurses had a high level of knowledge preprogram which is significantly improved immediately and one month post program. This finding is strongly similar to **Ali et al., (2022)** who declared that about one third of the studied maternity nurses had good knowledge regarding obstetric fistula preprogram with evident improvement post program. From the researcher's point of view, the similarity between the current study and this study preprogram may be due to the overloaded area of working and insufficient discussion in clinical areas about common gynecological problems. On the other hand, improvement of maternity nurses' knowledge post program implementation can be attributed to the evident effect of the blended learning that facilitated learning at any time, the readiness to learn and the regular attendance of the sessions.

In contrast, the findings of the present study disagreed with **Splendor, Onuigbo, Chikeme, Utazi, & Nnamani (2024)** who observed that there was adequate knowledge regarding obstetrics fistula among the health care providers. According to the researcher's perspective, this difference between the current result and the above study may be due to different hospitals' policies where in the above study the subject had continuous education, training and updating knowledge, while in the present study the nurses had lack of prior knowledge or experience regarding obstetrics fistula.

Concerning the total practices of maternity nurses regarding vaginal examination during labor, there is a remarkable improvement in all categories of the studied maternity nurses' practices post program compared to preprogram, where only

one third of them had satisfactory practice preprogram with prominent improvement post-program. This result goes hand by hand with **El-Kashif, Abd-El hady, Elsaiad, Baker & Thabet (2023).**They identified the effect of evidence-based practice program on internship students' performance at the maternity nursing departments and found that nearly one quarter of the studied maternity' nurses had satisfactory practices toward vaginal examination during labor preprogram with evident improvement post program. From the researcher's stand point of view, the agreement between the current study and the mentioned study preprogram may be due to lack of in-service training programs and lack of clinical guidelines for performing the procedure.

On the other hand, the finding of the present study contradicts with **Downe, Gyte, Dahlen & Singata (2013)** who studied routine vaginal examinations for assessing progress of labour to improve outcomes for women and babies at term. They revealed that maternity nurses had adequate practice concerning vaginal examinations. From the researcher's viewpoint, the difference between the present study and this cited study might be related to the fact that most of the maternity nurses had attended training programs regarding vaginal examination during labor and the presence of highly quality system for supervision and evaluation for nursing practice.

Regarding the studied maternity nurses' total practice level of perineal supportive technique during second stage of labor, the finding of the present study illustrated that one quarter of studied maternity nurses had satisfactory practice level before program implementation. On the other hand, immediately and one months after program there were a highly significant improvement in their practices. This finding matching with **Rodrigues, Silva, Esperança& Escuriet (2024).** They studied "Perineal massage and warm compresses implementation study of a complex intervention in health" and demonstrated that there was a marked change in overall practices of the studied maternity nurses' where nearly one half of them had satisfactory practices preprogram that highly improved post program.

From the researcher's point of view, unsatisfactory performance of the studied' nurses pre-program may result from lack of following the latest evidence based nursing practices where most of maternity nurses hadn't any knowledge about this procedure, while the findings markedly improved immediately after implemention of the program may be because the effect of blended learning that allows opportunity of learning at the suitable time for nurses and allows frequent demonstration and re-demonstration of the procedure.

On the other hand, this result disagreed with **Roper, Thakar, Hurt & Sultan (2023)** who investigated "Diagnosis, management and training in perineal trauma". They showed that nearly two third of studied maternity nurses had satisfactory practices about perineal supportive technique during the second stage of labor. According

to the researcher's outlook, this difference might be related to different hospital policy where this hospital may be follows evidence based clinical guidelines.

Regarding the total practices' level of perineal examination, the findings of the present study revealed that pre-program about one quarter of the studied maternity nurses had satisfactory level of practices that improved immediately and one month post program implementation. This result is in congruence with **Saad, El-Refaey, &Gaheen (2022)** who mentioned that about one quarter of studied maternity' nurses had satisfactory practice level regarding performance of perineal examination preprogram with noticeable improvement post program implementation.

From the researcher's point of view, the consistency between the current study and the mentioned study preprogram may be due to insufficient system of training and evaluation, while their practice profoundly improved post program can be attributed to use of different method of teaching and learning such as online learning that allow frequent seeing the procedure at any times and that decrease after one month due to absence of continuing in-service training and learning.

Related to the total practice level of episiotomy care, the findings of the present study explained that about one quarter of studied maternity nurses had satisfactory level of practice preprogram with evident improvement post program. This result is strongly in agreement with **Said, Elbana & Salama (2022)** who investigated "Effect of educational guidelines on nurses' performance regarding postnatal care of mothers" and clarified that nearly one quarter of the studied maternity nurses demonstrated satisfactory level of practice about episiotomy care preprogram with highly improvement post-program. From the researcher's point of view, the alignment between the current study and the mentioned study regarding unsatisfactory practices pre implementation of the program may be due to lack of adequate training, while the satisfactory practices post program may be due to their readiness to learn and use of videos that allow frequent demonstration of the procedure.

On the other hand, the findings of the present study contradict with **Novelia, Lubis &Sulistiyorini (2021).**They studied the "Relationship between health worker's knowledge and the implementation of episiotomy wound care in the post-partum mother" and revealed that the majority of the studied sample had adequate practice regarding performance of episiotomy care.

Considering the correlation between total knowledge level and total practice scores of the studied maternity nurses' it was obvious that there is no significant correlation between total knowledge level and total practice scores of the studied maternity nurses' pre, immediate and post implementation of the blended learning program. The finding of the present study contradicts with **Metwally et al., (2024)** who illustrated that there was positive

correlation between total knowledge level and practice score. According to the researcher's vantage point, the difference between the current study and these studies may be due the fact that high levels of knowledge don't guarantee effective practices, the nurses may understand the information but cannot implement it.

So, the findings of this study are building up enough research studies to establish evidence about the prevention of obstetric fistula. As nursing is the logical discipline to be the hub of the wheel of integrative services. Hence an opportunity exists for maternity nursing to enhance their knowledge and practices for improving maternal health, quality of their life and ultimately reducing maternal morbidities and mortalities.

Conclusion

- Remarkable improvement was observed in the maternity nurses' level of knowledge and practices regarding obstetric fistula and its prevention during antenatal, labor and post-partum period immediately and one month after implementation of the blended learning program compared to preprogram. So, the aim of the study was achieved and supported the study hypothesis that reflect positive effect on nurses, women' health, as well as the overall nursing profession

Recommendations

Based on the findings of the present study, the following recommendations are suggested:

- Providing continuing in-service evidence-based training programs for maternity nurses to enhance their knowledge and practices regarding the prevention of obstetric fistula.
- Instructional booklets should be available to raise maternity nurses' awareness about preventive measures for obstetric fistula during antenatal, labor and post-partum period.

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