

Effect of Health Educational Program on Maternity Nurses' Performance Regarding Obstetric Fistula and its Prevention

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Abstract

Background: Obstetric fistula is a major public health issue among thousands of women within a developing country and has the most devastating effects on physical, social, and economic levels. Also, obstetric fistula is a preventable condition that healthcare workers play a key role in its prevention. **Aim:** The present research was aimed to evaluate the effect of health educational program on maternity nurses' performance regarding obstetric fistula and its prevention. **Design:** A quasi-experimental research design was utilized. **Settings:** The research was conducted at Obstetrics and Gynaecology department and emergency department affiliated to Benha University Hospital. **Sample:** A convenient sample of 80 maternity nurses was recruited. **Tools:** Four tools were used for data collection; a structured self-administered questionnaire, maternity nurses' knowledge assessment sheet, modified Likert scale for maternity nurses' attitudes and checklists about fistula care skills to assess nurses' practices during caring women with obstetric fistula. **Results:** Illustrated that, there was a highly statistically significant improvement in relation to maternity nurses' knowledge, attitudes and practices regarding obstetric fistula and its prevention at post-intervention phase compared to pre-intervention phase ($P \leq 0.001$). As well, there was a highly positive statistically significant correlation between total knowledge, total attitudes and total practices scores at pre-and post-intervention phase ($p \leq 0.001$). **Conclusion:** Was concluded that research hypothesis was supported and maternity nurses exhibited improved performance (knowledge, attitudes and practices) regarding obstetric fistula and its prevention after implementation of educational program. **Recommendations:** Increase awareness of obstetric fistula and its prevention among health care teams. Training of health care workers to facilitate early screening for identification and referral of women with obstetric fistula.

Keywords: Health education, Maternity nurses, Obstetric fistula, Performance, Prevention

Introduction

Obstetric fistula (OF) is a life-altered birth associated damage that creates an unnatural connection between the bladder and vagina most commonly (vesico-vaginal fistula) or less commonly between the rectum and the vagina (rectovaginal fistula), that arise because the end result of obstetric trauma, typically from obstructed or prolonged labor leading to constantly leakage of feces or urine from the vagina (Swain et al., 2020). Also, Obstetric fistula is one of the most public health concerns for women in developing nations and apparent indications of maternal morbidity and is considered a public health concern for women

and communities in developing countries, notably in Africa and Southeast Asia (Yismaw, et al., 2019).

According to the World Health Organization (WHO), approximately 130,000 new cases of obstetric fistula occur each year, based on the assumption that fistula is likely to occur in 2% of the 6.5 million cases of obstructed labor that occurs in poor countries. Of these, around 33,000 women are detected in Sub-Saharan Africa, and 1.62 women per 1000 reproductive age are affected in Ethiopia (Balcha et al., 2020). According to the problem analysis report, Ethiopia has between 36,000 and 39,000 women living with obstetric

fistula, with between 3,300 to 3,750 new cases of obstetric fistula being discovered each year (Asefa et al., 2020).

Obstructed labor is the causative factor of obstetric fistula, which can be caused by a constricted pelvis, foetus mal-presentations, or a big foetus. During prolonged and obstructed labor, bladder, rectal and vaginal damage occurs due to compression of the maternal tissue by the fetus during repetitive uterine contractions that hinder blood flow, leading to ischemia and tissue damage that cause uncontrolled and continuous leakage of urine (Raassen, et al., 2017).

Risk factors of the obstetric fistula are common in settings that lack adequate emergency obstetrics care, healthcare workers, and skilled birth attendants in maternity services (Deribe, et al., 2020). Further, Poverty remains a crucial factor which affects gender discrimination, women' status in society, women's nutrition, and the level of education. The woman is taken into account to be powerless and voiceless therefore, decisions concerning life are made by men. These factors which arise due to poverty compound the danger to developing a fistula or knowledge to hunt for treatment even after having fistula (Morhason, et al., 2020). Other commonly reported risk factors for obstetrical fistula include, harmful cultural practices like female genital mutilation, early marriage of females, home-based childbirth and misconceptions about childbirth (Deribe, et al., 2020).

Obstetric fistula is taken into account to be the foremost devastating morbidity that affects women after childbirth. Women with obstetric fistula often have horrific or difficult associated conditions that stem either from the fistula itself or from the obstructed and prolonged labor which caused it. The most common complications are incontinence, either faecal, urinary or both. The continuous leakage of faeces and urine can also cause damage to the thighs and vulva. Many series cases of obstetric fistula show high rates of separation and divorce, abstaining from sexual relations, amenorrhea, loss of fertility and depression (Animut, et al., 2020).

Obstetric fistula continues to be a source of concern and fear in developing countries. There is a great need to assess the level of knowledge, practices and attitudes about this disease condition that can be a positive step in reducing obstetric fistula (Zoë, et al., 2017). To achieve sustainable development by 2030, obstetric fistula must be eliminated. As a result, raising awareness about obstetric fistula among trained birth attendants and women can help to reduce morbidity, mortality, and social stigma (Dessalegn, et al., 2021).

Nurses are on the front lines of health care in East Africa, particularly in the care of women and newborns, and they play a critical role in lowering both infant and maternal morbidity and mortality. Nurses are also important members of the health team in the treatment of fistulas and the subsequent reintegration of women back into society and can take critical steps to prevent the condition. Additionally, the high incidence of iatrogenic fistula in relation to sub-optimal care, mismanagement and poor attitudes of health care workers documented in several studies indicate the need for health care workers to have adequate knowledge, good attitude and practices (Oluwasomidoyin and Olatunji, 2018).

Justification of the research:

On a global scale, obstetric fistula remains a significant obstetrical problem in low-resource countries and found to be one of the most visible indicators of maternal morbidity (Swain, et al., 2020). Obstetric fistula is a significant and often neglected problem in East, Central, and Southern Africa. Globally, around two million women living with untreated fistulas, this number may be an underestimate, because data about the conditions are often limited. One study has estimated that at least 33,450 new cases of obstetric fistula occur every year in rural Sub-Saharan in Africa. There are between 50,000 to 100,000 new cases of fistula develop worldwide. Of these, around 33,000 women live in Sub-Saharan Africa, and affects about 1.57 per 1,000 women in Sub-Saharan Africa

and 1.62 women per 1000 reproductive age in Ethiopia (Wondu, et al., 2020).

Moreover, no available published or unpublished research work that investigates the effect of educational program on nurses regarding obstetric fistula in Benha University was found. So, this research aimed to evaluate the effect of health educational program on maternity nurses' performance regarding obstetric fistula and its prevention.

Aim of the research:

The research was aimed to evaluate the effect of health educational program on maternity nurses' performance regarding obstetric fistula and its prevention.

This aim was achieved through the following objectives:

- Assessing the level of nurses' knowledge, attitudes and practices regarding obstetric fistula and its prevention.
- Designing and implementing a health educational program regarding obstetric fistula and its prevention.
- Evaluating the effectiveness of the health educational program on nurses' knowledge, attitudes and practices regarding obstetric fistula and its prevention.

Research hypothesis:

The researchers hypothesized that; there will be an improvement of maternity nurses' knowledge, attitudes and practices regarding obstetric fistula and its prevention after applying the health educational program than before.

Operational definitions:

- An educational program: It refers to the planned verbal and written instruction consisting of objectives strategies, visual aid designed to provide maternity nurses with essential knowledge, positive attitude and

health practices regarding obstetric fistula and its prevention.

- Nurses' performance: It refers to the knowledge, attitude and practices of the maternity nurses related to obstetric fistula and its prevention.

- Obstetric fistula: It refers to an abnormal opening between two parts of the body. Usually develops among the vagina and bladder or more rarely among the vagina and the rectum.

Subjects and Method:

Research design:

A quasi-experimental research design (One-Group, Pre-test / Post-test design) was utilized to fulfill the aim of this research which specifies that an observation (called a pre-test) was assessed before intervention is introduced to individuals (or other units), the intervention subsequently introduced, and finally a second observation (called a post-test) was applied in different times. The difference between the pre-test and post-test observations is used to estimate the size of the effect of the intervention (Millsap and Olivares, 2009).

Setting:

The research was conducted at Obstetrics and Gynaecology Department and Emergency Department affiliated to Benha University Hospital. It is a major hospital in Benha city and attracts clients from Al Qualubya Governorate and other Neighboring Governorates. This setting provides obstetrics and gynecology healthcare services that include antenatal care, counseling, care for high risk pregnancy, delivery care and follow up services.

Sampling:

Sample type: A convenient sample

Sample size: All nurses (80 nurses) who were working at department of Obstetrics

and Gynaecology and emergency department affiliated to Benha University Hospital.

Tools of data collection:

Four main tools were used for data collection:-

Tool I: A structured Self-administered Questionnaire:

It was designed by the researchers after reviewing related literatures (Heera, et al., 2019 and Azanu, et al., 2020) and included demographic characteristics of studied nurses such as (age, marital status, residence, educational qualification, years of experience, attend training courses and site of training and willing to attained training program regarding obstetric fistula).

Tool II: Maternity Nurses' Knowledge Assessment Sheet:

It was designed by the researchers after reviewing related literatures (Heera, et al., 2019; Balcha et al., 2020 and Asefa, et al., 2020). It included (52 items) designed to measure maternity nurses' knowledge regarding obstetric fistula and its prevention. Each item has two options, with (yes and no answer). The sections included for developing the tools were; definition of obstetric fistula (2 items), common types of fistula (2 items), causes of fistula (2 items), predisposing factors (8 items), signs and symptoms (4 items), diagnosis (4 items), prevention of obstetric fistula (8 items), surgical repair for obstetric fistula (3 items), preoperative management of obstetric fistula (4 items), postoperative management of obstetric fistula (7 items) and discharge advice of fistula (8 items).

Scoring system of knowledge:

The participant who checked an item (yes) was given (1), while the one who checked an item (no) was given (0). Assuming the same weight for all questions, the participants answers had been compared with the standard answers and then evaluated. The percentage of correct answers for each study participants was

calculated as (number of correct answers ÷ total questions×100).

Total knowledge scored as following categorized into

- Satisfactory knowledge when the total score was $\geq 75\%$.

- Unsatisfactory knowledge when the total score was $< 75\%$.

Tool III: Modified Likert Scale for Maternity Nurses' Attitude:

It was adapted from Dahal and Shakya, (2020) then translated by the researchers into Arabic language and included (14 items questionnaire) to assess nurses' attitudes toward obstetric fistula and its prevention and consisted of (obstetric fistula preventable and treatable disease, fistula is social problem, fistula is the disease of poverty, fistula is God's plan, fistula can occur in any time during pregnancy, prolonged labor is one of the cause of fistula , sexual violence is one of the cause of fistula , malnourished woman are prone to develop obstetric fistula, home delivery is risk factor of an obstetric fistula recurrence, antenatal checkup reduce obstetric fistula, deliver with the help of a health worker reduces the chances of developing fistula, delay marriage and birth spacing can prevent obstetric fistula, seeking obstetrics care early enough reduces the chances of developing fistula and campaigns against fistula should be public).

Scoring system:

The items were judged according to a three-point continuum of the Likert scale from agree (2), neutral (1), and disagree (zero). Summing up the scores of the items then the overall score gave total attitude score. Nurses' total attitude score was graded as;

- Positive attitudes when the total score was $\geq 75\%$.

- Negative attitudes when the total score was $< 75\%$.

Tool IV: Checklists about Fistula Care Skills:

This tool Adopted from **ECSA-HC and Fistula Care Org., (2012)** to assess nurses' practices during caring women with obstetric fistula and comprise 7 procedures: Use of the partograph (22 items), Urinary catheterization (28 items), Physical assessment (23 items), Perform a dye test (9 items), preoperative care (Initial preoperative care 5 items, Two days before surgery 7 items, Day/Night before surgery 7 items and Day of surgery 9 items), Postoperative care (Immediate in recovery room 15 items and Within first 24 hours postoperatively 9 items), Discharge and Follow-Up (15 items).

Observational checklist's scoring system:-

Each item of the procedure was assigned a score (1) if done and a score (0) if not done. The total score was calculated by addition of the total score of all procedures. The total score was classified into

- Adequate practice when the total score was $\geq 75\%$

- Inadequate practice when the total score was $< 75\%$.

Administrative approval:

This research was conducted under the approval of the Scientific Research Ethical Committee at Faculty of Nursing, Benha University. Also, an official permission was obtained from the directors of the pre-mentioned setting to conduct the study after explaining its purpose.

Validity and reliability of the tools:

The Content validity of the tools was reviewed by a panel of five experts (two from Obstetrics and Gynecological Medicine and

three from Obstetrics Gynecological Nursing) and little changes in sentence wording were required. The reliability of the tools was done to check its internal consistency. The Cronbach's alpha coefficient for the tool II (Maternity Nurses' knowledge Assessment Sheet) was 0.85, for the tool III (Modified Likert Scale for Maternity Nurses' Attitude) was 0.74, and for the tool IV (Checklists about Fistula Care Skills) ranged from 0.73 to 0.86.

Ethical Considerations:

The research approval was obtained from Scientific Research Ethical Committee, Faculty of Nursing at Benha University before starting the research. An official permission from the selected study settings was obtained for the fulfillment of the research. At the beginning of the interview and during the research periods, each nurse was informed of the purpose of the research and its benefits. Before data collection began written consent was obtained from each nurse. The nurses were assured that the data will remain confidential and will only be used for research purposes. The right of the nurses to autonomy and integrity was guaranteed. The nurses were also granted an unconditional right of withdrawal from the research at any time.

Pilot study:

The pilot study was carried out on ten percent of the total sample (8 nurses) to test the clarity and applicability of the research tools as well as estimate the time needed to fill in the tools. Nurses in the pilot study were included in the main sample.

Procedures:

After receiving the official approval from the Director of Benha University Hospital, the research was carried out in the following phases; assessment, planning, implementation, and evaluation phase. The research was conducted for twelve months, from the starting of January, 2021 to the end of December, 2021. Implementation of the research was carried out at obstetrics and gynecology department and

emergency department of Benha University Hospital. The researchers began the research by visiting Benha University Hospital two days a week, from 9 a.m. to 2 p.m. Sometimes the researchers went during the afternoon or night shift, the time was determined according to the appropriate time for the nurses participating in the research.

Assessment Phase:

During this phase, the researchers welcomed the nurses, introduced themselves, explained the purpose of the research and gave the nurses all the information about the research (purpose, duration, and activities) and their consent to participate in the research was obtained. Data were gathered by the researchers through the distribution of the structured self-administered questionnaire (Tool I) to collect nurses' demographic characteristics, knowledge assessment sheet (Tool II pre-posttest) to assess nurses' knowledge regarding obstetric fistula, Modified Likert Scale (Tool III pre-posttest) to assess nurses' attitudes regarding obstetric fistula. The average time it took to fill in the questionnaire was about (20-30 minutes). Then the researchers used the observational fistula care skills checklists (Tool IV pre-posttest) to assess nurses' practices regarding obstetric fistula.

Planning phase:

According to the results of the pretest assessment of nurses' knowledge, attitudes and practices related to obstetric fistula and its prevention and the review of relevant literatures, the researchers established the educational booklet in an Arabic language which provided with colored pictures and comprises two parts (theoretical and practical). The sessions' number and its content were determined. The researchers used a variety of teaching methods such as lectures, group discussion, demonstration, and re-demonstration. The researchers also used the instructional media as video and supported materials as partograph sheet, vaginal part of simulator, vulval part of simulator, Foley catheter, Bladder syringe, 60cc with big nozzle, Syringe 5 to 10 cc, urinary bags, vaginal

speculum, Methylene blue or gentian violet, Probe, Water-soluble lubricant, Kidney basin, Gauze and Sponge-holding forceps.

Implementation phase:

The health education program was implemented in the aforementioned setting. The nurses were divided into (10) groups according to the work circumstances and the mental and physical readiness of the nurses. Each group included (8 nurses). The total sessions for each group were 7 sessions; divided into 3 theoretical sessions and the duration of each session was between 45 and 60 minutes followed by 4 practical sessions and the duration of each session was between 60 and 90 minutes included times of discussion according to nurses' achievement, progress and feedback.

The theoretical sessions:- (Three theoretical sessions), First session: At the beginning of the first session the researchers gave the nurses the educational booklet and introduced an orientation including the general and specific objectives by using Arabic language to match all level of education. Then the researchers started by the introduction of the theoretical part of the health educational program and provided nurses with general knowledge about obstetric fistula, major causes, predisposing factors, signs and symptoms, diagnosis and prevention of obstetric fistula. Second session: the researchers provided nurses with knowledge about surgical repair, preoperative and postoperative management of fistula. Third session: knowledge about discharge advice of fistula was given to nurses. Each session began by a feedback about the last session and introduction of the objectives of the new session. At the end of each session the researchers gave nurses the opportunity to ask questions and provided period for discussion.

The practical sessions: (Four practical sessions), First session: implied the implementation of the practical part of the health educational program and included certain procedures as urinary catheterization and how to fill the partograph sheet. Second

session: the researcher performs the procedures of Physical assessment and a dye test. Third session: included demonstration of preoperative care. Fourth session: included demonstration of postoperative care, discharge and Follow-Up. Each session started by feedback and re-demonstration of the last session and introduction of the objectives of the new session. At the end of each session the researchers informed the nurses about the objectives of the next session.

Evaluation phase:

After implementing the health educational program, the researcher used the same previous pretest-tools (tool II, III and IV) as posttest-tools to evaluate the effect of health educational program on maternity nurse's performance (knowledge, attitude and practices) regarding obstetric fistula and its prevention.

Statistical Analysis:

Data entry and statistical analysis were done using the Statistical Package for Social Science (SPSS version 22.0). Descriptive statistics included frequencies and percentages, means and standard deviations. Inferential statistics as (Chi-square test, paired-samples T Test) and Pearson correlation coefficient were used. For all of the statistical tests done, p -value > 0.05 indicated no statistical significant difference, p -value ≤ 0.05 indicated a statistical significant difference, and p -value $P \leq 0.001$ indicated a highly statistically significant difference.

Results:

Table (1) clarifies demographic characteristics of the studied nurses. It reveals that, more than two fifth (42.5%) of studied nurses were in age group 25-35 years with a mean age of 37.97 ± 10.46 years. More than three quarters (76.3%) of the studied nurses were married. Less than three quarters (71.3% and 70.0%) of the studied nurses were from rural areas and had technical nursing education respectively. Less than half of the studied nurses (45.0%) had more than ten years of

experiences. Furthermore, more than four fifths of the studied nurses (81.3%) not attended training courses related to obstetric fistula, only less than one fifth (18.7%) from them attained training program and less than two thirds (60.0%) of them were trained at hospital. **Table (2)** clears that, there was a highly statistically significant difference between the results of post-intervention compared to pre-intervention in favor of post-intervention regarding all items of studied nurses' knowledge about obstetric fistula (definition of obstetric fistula, common types, causes, predisposing factors, signs and symptoms and diagnosis) with $p \leq 0.001$. As the majority of studied nurses (91.2%, 92.5%, 88.7%, 95.0%, 92.5% and 93.8%) stated that, obstetric fistula is an abnormal opening between urinary tract and genital tract, Vesico-vaginal fistula is the common types of obstetric fistula, fistula in developing countries is related obstetrical causes, prolonged obstructed labor is the risk factors of obstetric fistula, dripping of urine post vagina as signs and symptoms of obstetric fistula and Dye test is the diagnosis of obstetric fistula respectively at post intervention compared to (35.0%, 40.0%, 32.5%, 63.7%, 60.0%, 62.5%) of them at pre intervention respectively.

Table (3) shows that, there was a highly statistically significant difference between the results of post-intervention compared to pre-intervention in favor of post-intervention regarding the studied nurses' knowledge about the prevention of obstetric fistula with $p \leq 0.001$. As majority of nurses (95.0%, 92.5%, 93.8% and 90.0%) illustrated that obstetric fistula can be prevented by screening high risk cases followed by focused antenatal care, then plotting partograph, Continuous bladder drainage in obstructed labor. and early identification of obstructed labor at post intervention respectively compared to less than three quarters (71.2% and 68.8%) and less than two thirds (63.8% and 61.2%) of the studied nurses at pre intervention respectively.

Table (4) illustrates that, there was a highly statistically significant difference between the results of post-intervention compared to pre-intervention in favor of post-

intervention regarding all items of studied nurses' knowledge (surgical repair, preoperative and postoperative management) with $p \leq 0.001$. As the majority (93.7%, 88.7%) of the studied nurses knew that local repair should again be attempted after 3 months followed by catheterization at post intervention compared to (45.0% and 32.5%) at pre intervention respectively. Regarding preoperative management, most of the studied nurses (95.0%) showed that, bowel care is the best preoperative management at post intervention compared to three quarters (75.0%) at pre intervention. As regards, postoperative management (97.5%, 96.2%, 91.3%, and 87.5%) of the studied nurses at post intervention stated that, administration of anti-biotic then follow infection prevention practices, observe for catheter block, and NPO till 2nd post-operative day are the best postoperative management of obstetric fistula compared to (80.0%, 75.0%, 45.0%, and 61.2%) at pre intervention respectively.

Table (5) shows that, there was a highly statistically significant difference between the results of post-intervention compared to pre-intervention in favor of post-intervention regarding the studied nurses' knowledge about the discharge advice of fistula with $p \leq 0.001$. As majority (93.7%, 95.0% and 92.5%) of the studied nurses stated that, avoiding constipation, family planning methods for birth spacing, and antenatal care and hospital delivery respectively are discharge advice of obstetric fistula at post intervention compared to (71.3%, 75.0% and 70.0%) at pre intervention respectively.

Table (6) illustrates that, there was a highly statistically significant difference between the results of post-intervention compared to pre-intervention in favor of post-intervention regarding all items of studied nurses' knowledge regarding obstetric fistula with $p \leq 0.001$. As the majority of the studied sample (90.0%, 91.2%, 87.5%, 85.0%, 86.2%, 88.8%, 87.5%, 86.2%, 87.5%, 90.0% and 85.0%) had satisfactory knowledge regarding all knowledge items of at post intervention respectively compared to (33.8%, 38.8%, 33.8%, 42.5%, 26.2%, 33.8%, 47.5%, 28.8%,

40.0%, 42.5% and 31.2%) at pre intervention respectively.

Figure (1) displays that, less than two thirds (61.3%) of studied nurses had unsatisfactory knowledge score at pre-intervention while at post-intervention phases more than four fifth (85.0%) of studied nurses had satisfactory total knowledge score.

Table (7) illustrates that, there was a highly statistically significant difference between the results of post-intervention compared to pre-intervention in favor of post-intervention regarding all items of studied samples' attitudes regarding obstetric fistula with $p \leq 0.001$. As the majority (86.2%, 88.8%, and 91.2%) of the studied nurses agreed that, deliver with the help of a health worker reduces the chances of developing fistula, seeking obstetric care early enough reduces the chances of developing fistula, and campaigns against fistula should be public at post intervention respectively compared to (37.5% 47.5% and 61.2) at pre intervention respectively.

Figure (2) displays that, only less than one quarter (23.8%) of studied nurses had total positive attitudes score at pre-intervention while more than three quarters (78.8%) of them had total positive attitudes post-intervention phases.

Table (8) illustrates that, there was a highly statistically significant difference between the results of post-intervention compared to pre-intervention in favor of post-intervention regarding all items of studied nurses' practices about obstetric fistula with $p \leq 0.001$. The mean practices score post intervention were 22.50 ± 3.47 in term of preoperative care, 25.25 ± 2.25 in urinary catheterization, 20.17 ± 1.53 in Plotting partograph, 20.42 ± 2.29 in Physical assessment, 7.55 ± 0.96 in a dye test, 20.30 ± 2.73 in postoperative care and 13.03 ± 1.06 in discharge and Follow-Up at post intervention compared to 16.80 ± 3.55 , 17.32 ± 2.29 , 20.47 ± 2.32 , 16.76 ± 2.37 , 4.95 ± 1.22 , 16.22 ± 1.77 and 10.51 ± 1.25 at pre intervention respectively.

Figure (3) displays that, less than one third (28.7%) of studied sample had total adequate practices score at pre-intervention which became more than four fifths (81.3%) of them at post-intervention phases.

Table (9) clarifies that, there was a highly positive statistically significant correlation between total knowledge, total attitude and total practices scores at pre-and post-intervention phase ($p \leq 0.001$).

Table (1): Distribution of the studied nurses according to their demographic characteristics (n=80).

Demographic characteristics	No	%
Age (in years)		
< 25	14	17.5
25-35	34	42.5
> 35	32	40
Mean \pmSD	37.97 \pm 10.46	
Marital Status		
Single	10	12.5
Married	61	76.3
Divorced	6	7.5
Widow	3	3.7
Residence		
Rural	57	71.3
Urban	23	28.7
Educational qualification		
Secondary nursing education	19	23.7
Technical nursing education	56	70.0
Bachelor of nursing	5	6.3
Years of experience (in years)		
<5 years	20	25.0
5-10 years	24	30.0
>10 years	36	45.0
Mean \pmSD	17.07 \pm 12.62	
Attend training courses related to obstetric fistula		
Yes	15	18.7
No	65	81.3
Site of training (n=15)		
Outside the hospital	6	40.0
At hospital	9	60.0

Table (2): Distribution of studied nurses' knowledge regarding obstetric fistula at pre and post- intervention phases (n=80).

Knowledge items	Pre-intervention				Post-intervention				X ²	P-value
	Yes		No		Yes		No			
	No	%	No	%	No	%	No	%		
Definition of obstetric fistula										
An abnormal opening between urinary tract and genital tract	28	35.0	52	65.0	73	91.2	7	8.8	54.3	0.000**
Abnormal communication of the urinary tract with the genital tract and/or the rectum resulting in continuous leakage of urine and/or faeces	25	31.3	55	68.7	72	90.0	8	10.0	57.8	0.000**
Common types of obstetric fistula										
Vesico-vaginal fistula	32	40.0	48	60.0	74	92.5	6	7.5	49.3	0.000**
Recto vaginal fistula	30	37.5	50	62.5	72	90.0	8	10.0	47.7	0.000**
Causes of fistula in developing countries										
Gynecological	29	36.3	51	63.7	70	87.5	10	12.5	44.5	0.000**
Obstetrical	26	32.5	54	67.5	71	88.7	9	11.3	53.0	0.000**
Predisposing factors of obstetric fistula										
Prolonged obstructed labor	51	63.7	29	36.3	76	95.0	4	5.0	23.8	0.000**
Instrumental vaginal delivery	45	56.3	35	43.7	72	90.0	8	10.0	23.1	0.000**
Repeated abdominal operation	22	27.5	58	72.5	69	86.3	11	13.7	56.2	0.000**
Episiotomy breakdown	34	42.5	46	57.5	70	87.5	10	12.5	35.6	0.000**
Incomplete healing or unrepaired complete perineal tear	36	45.0	44	55.0	75	93.7	5	6.3	44.7	0.000**
Female genital cutting or mutilation	18	22.5	62	77.5	68	85.0	12	15.0	62.8	0.000**
Early marriage	36	45.0	44	55.0	73	91.3	7	8.7	39.4	0.000**
Sexual violence	42	52.5	38	47.5	74	92.5	6	7.5	32.1	0.000**
Signs and symptoms of obstetric fistula										
Dripping of urine per vagina	48	60.0	32	40.0	74	92.5	6	7.5	23.3	0.000**
Leakage of urine after delivery	34	42.5	46	57.5	75	93.8	5	6.2	48.3	0.000**
Involuntary escape of flatus /or feces into the vagina	32	40.0	48	60.0	71	88.7	9	11.3	41.4	0.000**
Presence of pruritus/excoriation of vulva	28	35.0	52	65.0	68	85.0	12	15.0	41.6	0.000**
Diagnosis of obstetric fistula										
Obtaining history	20	25.0	60	75.0	70	87.5	10	12.5	63.4	0.000**
Speculum examination	41	51.3	39	48.7	74	92.5	6	7.5	33.6	0.000**
Metal catheter passage test	14	17.5	66	82.5	71	88.7	9	11.3	81.5	0.000**
Dye test	50	62.5	30	37.5	75	93.8	5	6.2	22.8	0.000**

** A Highly Statistical Significant $p \leq 0.001$.

Table (3): Distribution of studied nurses' knowledge regarding prevention of obstetric fistula at pre and post- intervention phases (n=80).

Knowledge items	Pre-intervention				Post-intervention				X ²	P-value
	Yes		No		Yes		No			
	No	%	No	%	No	%	No	%		
Screening high risk cases.	57	71.2	23	28.8	76	95.0	4	5.0	16.0	0.000**
Focussed antenatal care.	55	68.8	25	31.2	74	92.5	6	7.5	14.4	0.000**
Plotting partograph.	51	63.8	29	36.2	75	93.8	5	6.2	21.5	0.000**
Early identification of obstructed labor.	45	56.3	35	43.7	73	91.3	7	8.7	25.3	0.000**
Continuous bladder drainage in obstructed labor.	49	61.2	31	38.8	72	90.0	8	10.0	17.9	0.000**
Knew timely cesarean section	41	51.2	39	48.8	74	92.5	6	7.5	33.6	0.000**
Early repair of complete perineal tear.	28	35.0	52	65.0	70	87.5	10	12.5	46.4	0.000**
Consciousness about possible rectum injury in gynecologic surgery.	32	40.0	48	60.0	71	88.8	9	11.2	41.4	0.000**

**A Highly Statistical Significant $p \leq 0.001$.

Table (4): Distribution of studied nurses' knowledge regarding surgical repair, preoperative and postoperative management of fistula at pre and post- intervention phases (n=80).

Knowledge items	Pre-intervention				Post-intervention				X ²	P-value
	Yes		No		Yes		No			
	No	%	No	%	No	%	No	%		
Surgical repair										
Local repair should again be attempted after 3 months	36	45.0	44	55.0	75	93.7	5	6.3	44.7	0.000**
Nutritious diet is sufficient to heal the remaining portion	22	27.5	58	72.5	69	86.3	11	13.7	56.2	0.000**
Catheterization heals the unrepaired part gradually.	26	32.5	54	67.5	71	88.7	9	11.3	53.0	0.000**
Preoperative management										
Continuous catheterization for 4-8 weeks for spontaneous closure	41	51.3	39	48.7	73	91.3	7	8.7	31.2	0.000**
Administer rectal washout with warm, soapy water, repeating until return water is clear (Bowel care).	60	75.0	20	25.0	76	95.0	4	5.0	12.5	0.000**
Encourage client to drink at least 3 L of fluids daily.	59	73.8	21	26.2	76	95.0	4	5.0	13.7	0.000**
Repair of obstetric fistula 3 months post-delivery	20	25.0	60	75.0	70	87.5	10	12.5	63.4	0.000**
Postoperative management										
Observe for catheter block	36	45.0	44	55.0	73	91.3	7	8.7	39.4	0.000**
Administration of anti-biotic	64	80.0	16	20.0	78	97.5	2	2.5	12.2	0.000**
Encourage fluid intake 3-5 liter	35	43.7	45	56.3	70	87.5	10	12.5	33.9	0.000**
Advise patient to pass urine frequently (1 hourly) following removal of catheter	32	40.0	48	60.0	70	87.5	10	12.5	39.0	0.000**
NPO till 2nd post-operative day	49	61.2	31	38.8	70	87.5	10	12.5	14.4	0.000**
Non-residual diet from 3rd day onwards and full diet from 6th day onward	28	35.0	52	65.0	68	85.0	12	15.0	41.6	0.000**
Follow infection prevention practices	60	75.0	20	25.0	77	96.2	3	3.8	14.6	0.000**

**A Highly Statistical Significant $p \leq 0.001$

Table (5): Distribution of studied nurses' knowledge regarding discharge advice of fistula at pre and post- intervention phases (n=80)

Knowledge items	Pre-intervention				Post-intervention				X ²	P-value
	Yes No	%	No No	%	Yes No	%	No No	%		
Abstinence three months from sexual intercourse	26	32.5	54	67.5	71	88.7	9	11.3	53.0	0.000**
Delay pregnancy for at least one year after surgery	39	48.7	41	51.3	72	90.0	8	10.0	32.0	0.000**
To pass urine more frequently	51	63.7	29	36.3	74	92.5	6	7.5	21.5	0.000**
Constipation avoid	57	71.3	23	28.7	75	93.7	5	6.3	12.1	0.000**
High protein diet and hygiene maintenance	49	61.3	31	38.7	71	88.7	9	11.3	16.1	0.000**
Family planning methods for birth spacing	60	75.0	20	25.0	76	95.0	4	5.0	12.5	0.000**
Antenatal care and hospital delivery	56	70.0	24	30.0	74	92.5	6	7.5	13.2	0.000**
Elective cesarean section for successful repair	35	43.7	45	56.3	70	87.5	10	12.5	33.9	0.000**

**A Highly Statistical Significant $p \leq 0.001$.

Table (6): Distribution of studied nurses' total knowledge regarding obstetric fistula at pre and post- intervention phases (n=80)

Knowledge items	Pre- intervention		Post- intervention		X ²	P value
	Satisfactory No (%)	Unsatisfactory No (%)	Satisfactory No (%)	Unsatisfactory No (%)		
Definition of obstetric fistula	27 (33.8)	53 (66.2)	72 (90.0)	8 (10.0)	53.6	0.000**
Common types of obstetric fistula	31 (38.8)	49 (61.2)	73 (91.2)	4 (8.8)	48.4	0.000**
Causes of fistula in developing countries	27 (33.8)	53 (66.2)	70 (87.5)	10 (12.5)	48.5	0.000**
Predisposing factors of obstetric fistula	34 (42.5)	46 (57.5)	68 (85.0)	12 (15.0)	31.2	0.000**
Signs and symptoms of obstetric fistula	21 (26.2)	59 (73.8)	69 (86.2)	11 (13.8)	58.5	0.000**
Diagnosis of obstetric fistula	27 (33.8)	53 (66.2)	71 (88.8)	9 (11.2)	50.9	0.000**
Prevention of obstetric fistula	38 (47.5)	42 (52.5)	70 (87.5)	10 (12.5)	29.1	0.000**
Surgical repair	23 (28.8)	57 (71.2)	69 (86.2)	11 (13.8)	54.1	0.000**
Preoperative management	32 (40.0)	48 (60.0)	70 (87.5)	10 (12.5)	39.0	0.000**
Postoperative management	34 (42.5)	46 (57.5)	72 (90.0)	8 (10.0)	40.3	0.000**
Discharge advice of fistula	25 (31.2)	55 (68.8)	68 (85.0)	12 (15.0)	47.4	0.000**

**A Highly Statistical Significant $p \leq 0.001$.

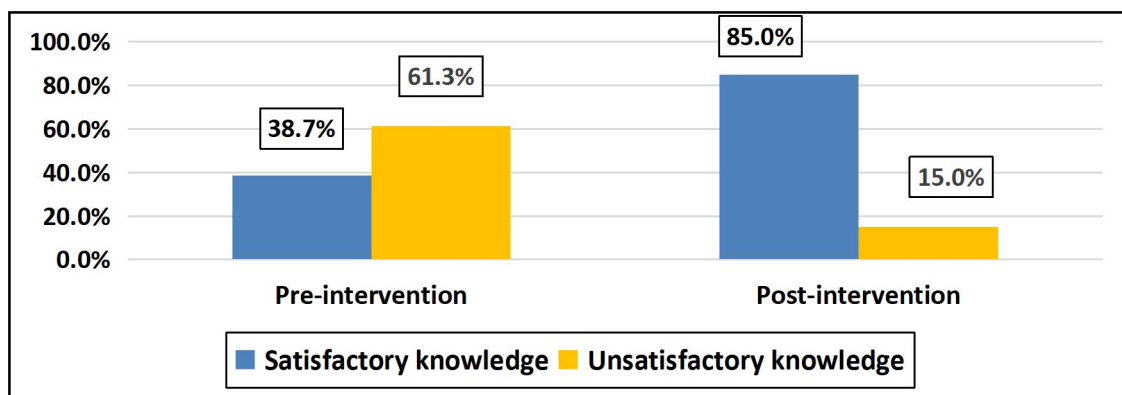
**Figure (1): Percentage distribution of studied nurses' total knowledge score about obstetric fistula at pre and post- intervention phases (n=80).**

Table (7): Distribution of studied nurses' attitudes regarding obstetric fistula at pre and post-intervention phases (n=80).

Attitudes items	Pre-intervention			Post-intervention			X ²	P-value
	Agree	Uncer tain	Disagre e	Agree	Uncer tain	Disagre e		
	No %	No %	No %	No %	No %	No %		
Obstetric fistula is preventable and treatable disease	23 28.7	24 30.0	33 41.3	70 87.5	4 5.0	6 7.5	56.7	0.000**
Obstetric fistula is social problem	22 27.5	26 32.5	32 40.0	65 81.3	8 10.0	7 8.7	46.8	0.000**
Obstetric fistula is the disease of poverty	13 16.3	19 23.7	48 60.0	68 85.0	4 5.0	8 10.0	75.7	0.000**
An obstetric fistula is God's plan	10 12.5	18 22.5	52 65.0	57 71.2	9 11.3	14 17.5	57.8	0.000**
Obstetric fistula can occur at any time during pregnancy.	11 13.7	20 25	49 61.3	62 77.5	7 8.8	11 13.7	65.9	0.000**
Prolonged labor is one of the cause of obstetric fistula	17 21.3	23 28.7	40 50.0	59 73.8	11 13.7	10 2.5	45.4	0.000**
Sexual violence is one of the cause of obstetric fistula	12 15.0	21 26.3	47 58.7	55 68.7	9 11.3	16 20.0	47.6	0.000**
Malnourished woman are prone to develop obstetric fistula	20 25.0	11 13.7	49 61.3	56 70.0	9 11.3	15 18.7	35.3	0.000**
Home delivery is risk factor of an obstetric fistula recurrence	11 13.7	49 61.3	20 25	53 66.2	10 12.5	17 21.3	52.0	0.000**
Antenatal checkup reduce obstetric fistula	19 23.7	24 30.0	37 46.3	55 68.8	16 20.0	9 11.2	36.1	0.000**
Deliver with the help of a health worker reduces the chances of developing fistula	30 37.5	13 16.2	37 46.3	69 86.2	4 5.0	7 8.8	40.5	0.000**
Delay marriage and birth spacing can prevent obstetric fistula	24 30.0	23 28.7	33 41.3	61 76.3	8 10.0	11 13.7	34.3	0.000**
Seeking obstetrics care early enough reduces the chances of developing fistula	38 47.5	11 13.8	31 38.8	71 88.8	5 6.2	4 5.0	33.0	0.000**
Campaigns against fistula should be public	49 61.2	13 16.2	18 22.5	73 91.2	3 3.8	4 5.0	19.8	0.000**

**A Highly Statistical Significant $p \leq 0.001$.

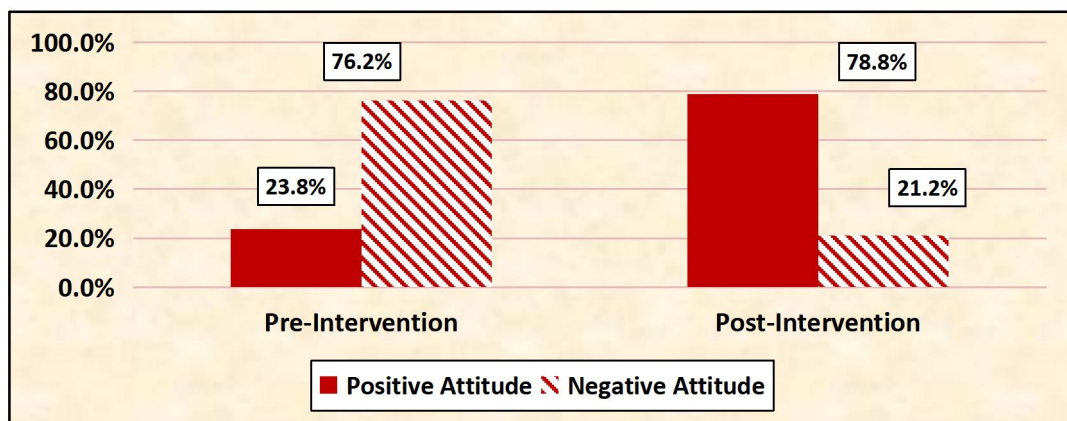


Figure (2): Percentage distribution of studied nurses' total attitude score about obstetric fistula at pre and post- intervention phases (n=80).

Table (8): Mean and standard deviation of studied nurses' practices regarding obstetric fistula at pre and post intervention phases (n = 80).

Practices' Items	Pre-intervention	Post-intervention	T	p-value
	Mean ± SD	Mean ± SD		
The Partograph	17.32 ± 2.29	20.17 ± 1.53	13.7	0.000**
Urinary Catheterization	20.47 ± 2.32	25.25 ± 2.25	35.2	0.000**
Physical Assessment	16.76 ± 2.37	20.42 ± 2.29	21.4	0.000**
Perform a dye test	4.95 ± 1.22	7.55 ± 0.96	47.1	0.000**
Preoperative Care				
- Initial preoperative care	2.76 ± 0.67	3.98 ± 0.62	26.0	0.000**
- Two days before surgery	3.98 ± 0.77	5.37 ± 0.97	25.3	0.000**
- Day/Night before surgery	4.07 ± 0.92	5.40 ± 0.94	25.1	0.000**
- Day of surgery	5.97 ± 1.32	7.73 ± 1.07	34.5	0.000**
Total Preoperative Care	16.80 ± 3.55	22.50 ± 3.47	47.0	0.000**
Postoperative Care				
- Immediate in recovery room	10.21 ± 0.88	12.47 ± 1.84	16.5	0.000**
- Within first 24 hours postoperatively	6.01 ± 0.97	7.82 ± 0.96	33.7	0.000**
Total Postoperative Care	16.22 ± 1.77	20.30 ± 2.73	28.6	0.000**
Discharge and Follow-Up	10.51 ± 1.25	13.03 ± 1.06	44.9	0.000**
Total Practices Score	103.05 ± 13.31	129.23 ± 13.85	73.4	0.000**

**A Highly Statistical Significant $p \leq 0.001$

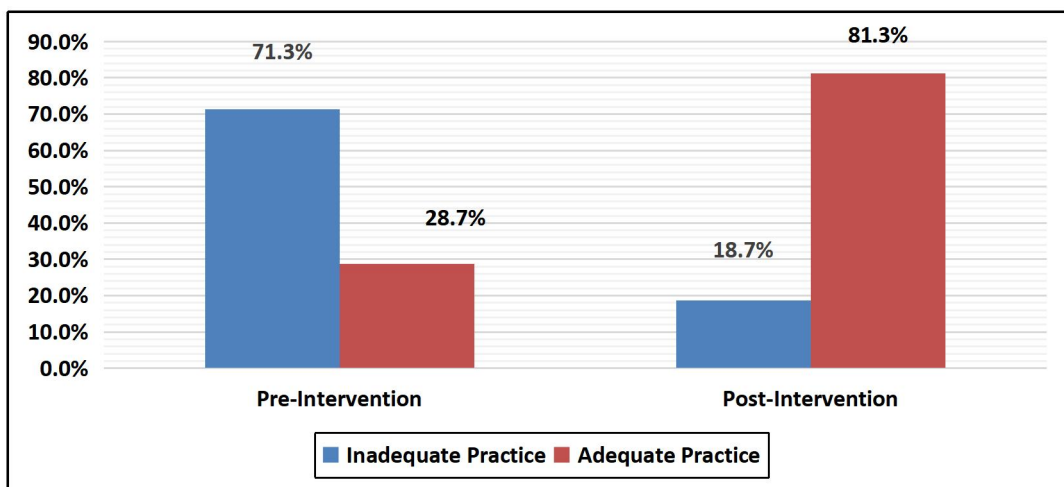


Figure (3): Percentage distribution of studied nurses' total practices score about obstetric fistula at pre and post- intervention phases (n=80).

Table (9): Correlation coefficient between total knowledge, attitude and practices scores among studied nurses at pre and post- intervention phases (n=80).

Total knowledge, attitude and practices		Pre-intervention		Post-intervention	
		Total attitude	Total practices	Total attitude	Total practices
Total knowledge	r	0.64	0.63	0.82	0.38
	p-value	0.000**	0.001**	0.000**	0.000**
Total attitude	r		0.35		0.47
	p-value		0.001**		0.000**

**A Highly Statistical Significant $p \leq 0.001$.

Discussion:

Obstetrics fistula is a complication that arises from prolonged or obstructed labor without prompt medical and nursing care which causes tissue necrosis resulting in a hole between the vagina and bladder or rectum, or both. It is a public health issue for women and communities within developing countries, particularly in Africa and Southeast Asia. Obstetrics fistula which signifies a health system that has failed to provide accessible, timely, and appropriate intrapartum care, improving health care workers' knowledge, practices and attitudes regarding obstetric fistula could help in its prevention (Animut et al., 2020).

The aim present research was to evaluate the effect of health educational program on maternity nurses' knowledge, practice and attitudes (performance) regarding obstetric fistula and its prevention. The research proved that there was a significant improvement of nurses' performance (knowledge, attitudes and practices) regarding obstetric fistula and its prevention after applying the health educational program. So, the research hypothesis was accepted (there will be an improvement of maternity nurses' knowledge, attitudes and practices regarding obstetric fistula and its prevention after applying the health educational program than before).

Regarding demographic characteristics, the research findings showed that, more than two fifths of nurses aged 25-35 years old with a

mean age of 37.97 ± 10.46 years. More than three quarters of the nurses were married. Less than three quarters of the studied nurses were from rural areas and had technical nursing education respectively. Less than half of the studied nurses had more than ten years of experiences. Furthermore, more than four fifths of the nurses didn't attend training courses related to obstetric fistula, only less than one fifth from them attained training program and less than two thirds of them were trained at hospital.

These results are in same line with **Abakar, (2019)** who studied "Assessment of Nurses, Knowledge Regarding Patients with Obstetric Fistula in Omdurman Maternity Hospital, Khartoum, Sudan". The results reported that, more than half of study population (52%) had technical diploma of nursing, most of nurses were in age group between 26-30 years old and (66.0%) of nurses not attained any training program related to obstetric fistula. Also, **Oluwasomidoyin and Olatunji, (2018)** who conducted a study of "Healthcare Workers Knowledge and Attitude towards Prevention of Obstetric Fistula" and found that, the majority of the health workers were between 25-44 years old and (73.1%) of them were married and had more than 10 years of experience.

Concerning total knowledge score of the studied nurses regarding obstetric fistula and its prevention, the research results stated that, less than two thirds of studied nurses had unsatisfactory knowledge score at pre-intervention. This lack of knowledge about obstetric fistula and its prevention may be due to that more than two thirds of the studied nurses had technical education level and did not receive the needed information about obstetric fistula and most of them not attained any program regarding obstetric fistula.

This result agreed with **Abakar, (2019)** who showed that, more than half of studied nurses had inadequate knowledge regarding obstetric fistula. As well as, the results are supported by **Asefa, et al., (2020)** who conducted "A study to assess awareness of Obstetric Fistula and its associated factors

among reproductive-age group women in Bench Sheko Zone, Southwest, Ethiopia". The result indicated that, more than half of the studied sample had poor awareness of obstetrics fistula. Moreover, **Dahal and Shakya, (2020)** who studied "Awareness and attitude regarding obstetric fistula among married women" stated that, less than two thirds of studied sample had poor awareness of obstetrics fistula.

On other hand, this result disagreed with **Wisdom, et al., (2017)** who studied "Knowledge of obstetric fistula among prenatal clinic attendees and midwives in Mfantseman municipality, Ghana" and stated that, all nurses had good knowledge of obstetric fistula and its preventive measures; however, up to 73.3% had some misconceptions about it. This indicating a gap between knowledge and perception. This requires regular refreshing courses about obstetric fistula should be organized for midwives and nurses to update knowledge and help dispel some of misconceptions. Moreover, **Heera, et al., (2019)** who assess "Knowledge on Genitourinary Fistula among Nurses in a Tertiary Hospital of Eastern Nepal" found that, majority of the nurses working at Koirala Institute of Health Sciences had moderate knowledge on obstetric fistula. The finding also, contrasted with **Azanu, et al., (2020)** who studied "Knowledge of obstetric fistula among prenatal clinic attendees and midwives in Mfantseman municipality, Ghana". The results showed that, from participants who had heard of obstetric fistula, 62.8% had good knowledge.

The findings of the current research showed that, more than four fifth of studied nurses had satisfactory total knowledge score at post intervention compared to more than one third of them at pre intervention. This result may be due to that the health educational program and the learning sessions the affect the knowledge of studied nurses positively. Also, the topic of the study is considered vital and very important to nurse's work in these critical units so, nurses were very interested in and gratified during the learning sessions. Moreover, nurses had handout which was followed in care with women to minimize the

complications that may affect the woman and newborn. This result is supported by **Betty and Martin, (2020)** who studied "Impact of health education on knowledge and behaviours toward obstetric fistula among women of reproductive age in Uganda" concluded that, improving access to quality health education will contribute to the elimination of obstetric fistula. Also, **Zerihun, et al., (2020)** who studied "Awareness of Obstetric Fistula and its Associated Factors among Reproductive-age Group Women in Bench Sheko Zone, Southwest, Ethiopia" represented that, the intervention group has a significant difference when compared with the counterpart ($p < 0.001$) on knowledge of obstetric fistula. Studied sample who have good knowledge about obstetric fistula were 69.7% and 30.4% from the intervention and comparison group respectively ($p < 0.001$). Therefore, community based intervention can increase knowledge and encourage the use of essential obstetric services.

The current research results revealed that, there was a highly statistically significant difference between the results of post-intervention compared to pre-intervention in favor of post-intervention regarding all items of nurses' knowledge (definition of obstetric fistula, major causes of fistula, predisposing factors, signs and symptoms, diagnosis of obstetric fistula, prevention of obstetric fistula, surgical repair, preoperative and postoperative management of fistula and discharge advice of fistula). This improvement on nurses' knowledge might be due to active participation and good communication with the researchers who helped them to acquire knowledge. Besides, the educational booklet plays a very important role in helping nurses to acquire knowledge about obstetric fistula. This indicated positive impacting of the health educational program on knowledge of nurses regarding fistula.

The results of the current research clarified that, about half of the studied nurses had unsatisfactory knowledge regarding definition, causes and predisposing factors of fistula and more than one quarter of the nurses had satisfactory knowledge about signs and symptoms of obstetric fistula and one third of

them had satisfactory knowledge regarding diagnosis of obstetric fistula at pre-intervention that improved to the most of nurses had satisfactory knowledge at after intervention. These findings agreed with **Mohammed, et al., (2017)** who evaluated "Awareness of vesicovaginal fistula among health workers in some health facilities of Zamfara state" the results showed that, only 15% had adequate knowledge on predisposing factors of obstructed fistula. Also, these results were in same line with **Mselle, (2019)** who studied "Healthcare access and quality of birth care: narratives of women living with obstetric fistula in rural Tanzania" and stated that, 20% participants having adequate knowledge on signs and symptoms of obstetric fistula and 28% had adequate knowledge on diagnosis of genitourinary fistula.

The results of the current research illustrated that, there was a highly statistically significant difference between the results of post-intervention compared to pre-intervention in favor of post-intervention regarding the studied nurses' knowledge about the prevention of obstetric fistula, as more than half of the studied nurses had in satisfactory knowledge about prevention of obstetric fistula at pre-intervention that improved to the majority of them had satisfactory knowledge at post intervention and improvement in all knowledge items regarding obstetric fistula preventive measures as (Screening high risk cases followed by antenatal care, plotting partograph and early identification of obstructed labor and continuous bladder drainage (catheterization) in obstructed labor) than before educational program.

These results have been strengthened and enhanced by **Oluwasomidoyin and Olatunji, (2018)** who reported that, there was deficiency in the health care workers' knowledge of obstetric fistula prevention evident by more than half of the health care workers having poor knowledge of obstetric fistula prevention. Also, these findings agreed with **Imran, et al., (2019)** who studied "Knowledge of front-line health workers on the role of urethral catheterization for primary prevention of obstetric fistula in Ibadan,

Nigeria" and stated that, the majority of health workers had poor knowledge of catheterization in obstetric fistula prevention and recommended that there is need for training and re-training of health workers in primary health care centers on the vital role of bladder catheterization following prolonged/obstructed labor to reduce the burden of obstetric fistula.

The results of the current research illustrated that, more than two thirds of the studied nurses had unsatisfactory knowledge regarding discharge advice of fistula at pre-intervention that improved to the most of nurses had satisfactory knowledge after intervention. These results matched with **Heera et al., (2019)** whose results showed that, 80.0% of the studied sample had inadequate knowledge on discharge advice. As well, **Ali, (2017)** who assessed "Nurses' Knowledge Regarding Patients with Obstetric Fistula in Omdurman Maternity Hospital, Khartoum, Sudan" reported that, the majority of study population was not aware about the advice on discharge after repair.

Concerning nurses' attitudes regarding obstetric fistula and its prevention, the present study concluded that, there was a highly statistically significant difference between the results of post-intervention compared to pre-intervention in favor of post-intervention regarding all items of studied nurses' attitudes regarding obstetric fistula with $p \leq 0.001$. The results of the current research illustrated that, more than one third of the studied nurses agreed that, deliver with the help of a health worker reduces the chances of developing fistula at pre intervention phase compared to the majority of them at post intervention phase. These results are matched with **Basheer and Pumpaibool, (2015)** who conducted a study "Knowledge, attitude and maternal health care utilization among married women of reproductive age towards Vesico vaginal fistula in Kebbi state, Nigeria". The findings cleared that, more than one third 34.5% agreed that delivery assisted by health worker can minimize the occurrence of Vesico vaginal fistula.

As well as, the current research findings clarified that, less than half of the studied nurses agreed that, seeking obstetric care early enough reduces the chances of developing fistula and less than two thirds agreed that campaigns against fistula should be public at pre intervention compared to the majority of them at post intervention phase. The results are similar to **Catherine, (2016)** who assess "Knowledge, Attitude and Practice of Women Regarding Prevention of Obstetric Fistula at Kabale Regional Referral Hospital" reported that, 43.3% of the respondents agreed that, seeking obstetric care early enough reduces the chances of developing fistula and 65.5% of the respondents agreed that campaigns against fistula should be public.

Regarding total attitude score, the current research results showed that, less than one third of studied nurses had positive attitudes regarding obstetric fistula and its prevention at pre intervention which improved to more than three quarters of them had positive attitudes at post intervention. This returned to effect of educational program that improved nurses' attitudes regarding obstetric fistula and its prevention as positive attitude of health workers were vital to obstetric fistula prevention. Great advantage of positive attitude could translate to proper interaction and handling of women in labor. This positive attitude could have a positive effect on obstetrics services especially intrapartum care.

The results of the current research were in agreement with **Maeri, (2019)** who assess "Awareness on vesico-vaginal fistula among women of reproductive age in Kawangware Slums, Nairobi City County, Kenya". The results showed that, one third (33.0%) of respondents had positive attitude towards vesicovaginal fistula. On the other hand, the findings are disagreed with **Oluwasomidoyin and Olatunji, (2018)** who showed higher proportion (60.8%) of the nurses and midwives had positive attitude towards obstetric fistula and its prevention and there was no statistically significant relevancy between health facilities of practice and attitude towards obstetric fistula prevention.

Concerning nurses' total practices score about obstetric fistula, the current research findings showed that, less than one third of the nurses had adequate level of practice about obstetric fistula at pre intervention which improved to more than four fifths of them had adequate level of practice regarding obstetric fistula at post-intervention phase. Moreover, the mean difference score for overall studied nurses' practices (the partograph, urinary catheterization, physical assessment, perform a dye test, preoperative care, postoperative care, discharge and follow-up) in the post-intervention were higher than the scores in the pre-intervention phase. This may be due to effect of educational program that focus on improving nurses' practices regarding obstetric fistula and its prevention. As well as, nurses at post-intervention phase acquired correct knowledge which in turn affects their practices positively.

These results agreed with **Mustafa, et al., (2020)** who stated that, nearly three quarters of the studied nurses had good level of practice regarding partograph at post practice scores. Also, these findings came in same line with **AbdElfattah, et al., (2019)** who examined "Effect of Simulation on Students' Achievement in Normal Labor Modules" the results represented that, there was a highly statistically difference regarding practical skills including perineal care, abdominal examination, vaginal examination, handling, assessment of fundus, placental examination of both phase of assessment. Additionally these results proved by **AbdElmordy, et al., (2019)** who studied "Effect of an Instructional Package on Nurses' Performance Regarding Obstetrical Emergencies" the findings illustrated that, (86.1%) of nurses have competent practice regarding urinary catheterization to prevent obstructed labor immediately after implementation of the instructional package. Finally, **Sodere, et al., (2017)** who studied "Knowledge, Attitude and Practice of Obstetric Danger Signs during Pregnancy in Debre Berhan, Ethiopia" showed that, there was general poor knowledge and attitude as well as practices of the sample regarding practices on prevention of obstetric fistula and concluded that the overall participants' knowledge and

attitude and practices still needs intervention to maximize knowledge and lean-to them with positive attitude and competent practice.

Concerning correlation between total knowledge, practices and attitude scores of studied nurses, the current research results proved that, there was a highly statistically positive correlation between total knowledge, total practices and attitudes scores at pre-and post-intervention. This ensures that nurses at post-intervention phase acquired correct knowledge which in turn affect attitude and practices positively. This result agreed with **AbdElmordy, et al., (2019)** showed that, there was a positive statistically correlation between total knowledge and total practice scores before, immediately after and at follow up phases of instructional package implementation ($p \leq 0.001$). Also, **AbdElfattah, et al., (2019)** showed that, there was a positive statistically correlation between total knowledge and total practice scores before, immediately after and at follow up phases of instructional package implementation ($p \leq 0.001$).

Finally exchange for knowledge and skills has been evidenced in efforts to prevent obstetric fistula in east Africa, health workers including nurses have embarked on special training on fistula care and prevention. These in turn education and training birth attendants and nurses on simple skills in helping women to safely deliver babies and realizing those at risk of complicated labour and refer them to timely skilled medical attention. Also, nurses trained to detect fistula and refer it to the centres where treatment and care are offered. Also, retraining healthcare workers is aimed at broadening clinical practice and takes a more holistic approach to care. This has also empowered nurses and midwives in the fight against early marriages, other harmful traditional prices and promoting fistula preventive interventions in communities (**Maeri, 2019**).

Limitation of the study:

- Unfortunately, by searching literature, there were no researches on educational program on nurse's knowledge, attitude and

practice regarding obstetric fistula. Hence, the results were compared with those of other studies conducted on other population.

- Limited sample size restricts the generalization of finding. The knowledge on different characteristics on genitourinary fistula and real practice gap can't be sort out.

Conclusions:

Based on the results of current research, it was concluded that, research hypotheses were accepted and maternity nurses exhibited improved knowledge, attitudes and practices regarding obstetric fistula and its prevention after application of educational intervention. Also, there were a highly statistically positive significant correlation between nurses' knowledge, attitudes and practices regarding obstetric fistula and its prevention.

Recommendation

based on research findings it was recommended following:

- Increase awareness of the causes and prevention of obstetric fistula through community core teams.

- Training of health care workers to facilitate early screening, identification and referral of women with obstetric fistula.

- Continuing up to date in- service training program about obstetric fistula should be designed for nurses.

- Periodic assessment and evaluation for nurses' knowledge to keep them up dating and knowledgeable which will help to improve their performance through application of knowledge in to practice.

Further researches:

- Improve reproductive health and maternity care services aimed at preventing and recognizing cases of obstetrics fistula.

Financial Support:

Not applicable.

Conflict of Interests:

Authors announced that there is no any conflict of interest.

Acknowledgements:

The authors would like to thank all the samples of nurses for their valuable participation and kind cooperation to facilitate this study. Also, thank all jury expertise for their guidance and thanks for setting director that allow researchers to conduct this research.

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