

## Effectiveness of Implementing Evidence Based Practices Guideline on Nurses' Performance Regarding Caring of Aborted Women

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### Abstract

**Background:** Improving the quality of abortion care may lead to reductions of abortion-related morbidities and mortality. **Aim:** this study aimed to evaluate effectiveness of implementing Evidence Based Practices Guideline on nurses' performance regarding caring of aborted women. **Subjects and Methods:** Quasi experimental research design (one group pre-test, post-test) was utilized to fulfill the aim of this study. **Setting:** this study was conducted in obstetrics, labor and gynecological departments at Minia university hospital for maternity and child. **Sample:** convenient sample included 55 nurses. **Tools:** two tools were used: A self-administered Questionnaire and Practical observational checklist. **Results:** The main findings of the study revealed that 72.7% of the studied nurses had poor knowledge regarding abortion and 87.3 % of them had unsatisfactory level of practice regarding caring of aborted women in pretest. Meanwhile after application of evidence based guidelines it was observed that there was a highly significant improvement in their knowledge and their practice regarding abortion care compared to pretest (P-value  $\leq$  0.0001). **Conclusion:** The implementation of an evidence based guidelines was effective and significantly improve nurse's performance regarding caring of aborted women. **Recommendation:** This study recommended that: Strategies for continuous improvement of nurse's knowledge and practice about evidence based abortion care should be developed in obstetrics department such as regular training courses, Special standardized procedures booklets

**Keywords:** Abortion care, Nurses performance, Evidence based abortion care

### Introduction

Evidence-based guidelines for abortion care refers to the underlying principles and essential requirements for providing equitable access to adequate quality of abortion services for the delivery of safe abortion care such as routine review & updates to ensure that they continue to promote women's physical, mental and social well-being to reflect new evidence of best practices .Evidence-based guidelines assist health care providers and policymakers to utilize the best data available to provide safe abortion care and prevent the millions of deaths and disabilities that result from unsafe abortion (Mohammed and Said, 2018).

Unsafe abortion is one of the preventable causes of maternal mortality , world health organization (WHO) defined unsafe abortion as “the termination of an unintended pregnancy either by persons lacking the necessary skills or in an environment lacking the minimum medical standards or both” unsafe abortion is strongly associated with maternal complications such as hemorrhage, sepsis and trauma, and is the fourth leading cause of maternal death (13% of all maternal deaths (Yokoe,2019, POPLINE,2019).

Every day in 2017, approximately 810 women died from preventable causes related to pregnancy and childbirth. 94% of all maternal deaths occur in in low and lower-middle income countries, appropriate care provided by skilled health professionals competent in sexual and reproductive health care, before, during and after childbirth can save the lives of women and newborn babies (WHO, 2019). Between 2015 and 2019, on average, 73.3 million abortions occurred worldwide each year, there were 39 induced abortions per 1000 women aged between 15–49 years and each year between 4.7% – 13.2% of maternal deaths can be attributed to unsafe abortion (WHO, 2020). In developed regions, it is estimated that 30 women die for every 100 000 unsafe abortions. This number

rises to 220 deaths per 100 000 unsafe abortions in developing regions and 520 deaths per 100 000 unsafe abortions in sub-Saharan Africa. The abortion rate declined significantly in developed regions however, no significant change occurred in developing regions (Bearak et al, 2020).

The health risks of abortion depend on whether the procedure is performed safely or unsafely. Where some services are available, limited resources, lack of adequate trained health provider, lack of equipment, inadequate provision of contraceptives, lack of awareness, cultural stigma, and over all poor socio- economic status further limit women's access to quality care. In such environment providers may have little training and experience with methods of termination of pregnancy, which can translate into poor quality information, and counseling. Availability of safe, effective and acceptable abortion care services is one of the most important aspects of women’s reproductive health (Assefa, 2019, Bamniya & Verma, 2018).

Improving maternal health is one of WHO’s key priorities. World health organization (WHO) is working to reduce maternal mortality by providing evidence-based clinical and programmatic guidance, setting global standards. Abortion is safe when provided by a trained practitioner in an environment that meets minimum medical standards to assure this high level of safety WHO developed and later updated guidelines for the provision of safe abortions, which cover each component of comprehensive abortion care in 2015 and updated in 2018 (WHO& UNICEF, 2019).

Nurses play multidisciplinary roles as direct care provider starting from history taking, physical examinations, considering causes of abortion, and finally immediately intervention to utilize best evidence research findings as a base for her/his competent immediate care providing for a

patient with abortion to avoid complications and minimize maternal mortality and morbidity (El-Kashif et al, 2020).

### Significant of the study

Globally, an estimated 55.7 million abortions took place every year between 2010 and 2014. Of these, half were estimated to be unsafe, with 97% of them occurring in developing countries (Ganatra, et al., 2017).

Poor quality of health care services lead to unsafe abortion. Unsafe abortion is a neglected health problem contributing for 8-13 % of maternal death worldwide. The Sustainable Development Goals (SDGs) aimed to reduce global maternal mortality ratio from 216 to 70 per 100, 000 live births by 2030 therefore in order to contribute to this goal, developing countries need to improve health care system to reduce abortion-related maternal deaths (WHO, United Nation, 2017; Gebremedhin et al, 2018).

Mohammed and Said, (2018) evaluate the effect of evidence-based guidelines for maternity nurses to cope with aborted women conducted in obstetrics and gynecological department at Benha University hospital; found that 73.2% of nurses had poor performance level before evidence guideline .Also, Mahmood, et al., (2017) assess nurse's knowledge toward contributing factors that lead to abortion, and finding out the association of nurse's knowledge toward abortion and socio- demographic and reproductive characteristics in hospitals conducted at Kerbala Iraq; reported that 43.8% of nurses had low knowledge toward abortion. Thus, this study aimed to improve the nurses evidence based knowledge and practice regard abortion care.

### Aims of the study:

This study aimed to evaluate Effectiveness of implementing Evidence Based Practices Guideline on nurses' performance regarding caring of aborted women.

### Research hypotheses:

**H1:** Nurses who received evidence based Practices guidelines will have improvement of their performance regarding care of aborted women.

**H2:** There will be significant relation between nurses' knowledge with their practices regarding care of aborted women.

**H3:** There will be significant relation between pre-test knowledge and practice scores of nurses with their selected socio-demographic characteristics.

### Subjects and methods

**Research Design:** Quasi experimental research design (one group pre-test, post-test) was utilized to fulfill the aim of this study.

**Research Setting:** This study was conducted in obstetrics, labor and gynecological departments at Minia university hospital for maternity and child. This setting is considered one of the important medical and specialized hospitals in north Upper Egypt and it provide free health services for women and children during life stages.

**Sample:** All nurses (55 nurses) who work in obstetrics (16 nurses), labor (23nurses) and gynecological (16 nurses) departments at Minia university hospital for maternity and child at the time of data collection was included in the study.

**Exclusion criteria:** Nurses who are in long vocation at the time of data collection (as child care leave, vocation without pay...)

### Tools of Data Collection:

Tools of data collection were developed by the researcher after extensive review of literature and similar studies conducted elsewhere. After that the tool of data collection are revised by 5 panels of obstetrical and gynecological experts in nursing and medical staffs, the data collection tool consisted of two tools:

**Tool I (A self-administered Questionnaire):** It was used to assess and collect data related to three main parts:

**Part (1):** Socio-demographic characteristics of nurses such as: age, educational level, years of experience, previous attendance of training courses and source of their knowledge.

**Part (2):** General knowledge about evidence-based practice in nursing (pre and posttest) , it consists of 4 items as meaning of evidence-based practice, process & steps of evidence based in nursing, and barriers of evidence based in nursing.

**Part (3):** Nurses knowledge about abortion (pre and posttest) it includes (35 items) in the form of multiple choices questions the first section asked about general knowledge about abortion as definition of abortion, causes, contributing factors, dangers signs of abortion, types of abortion, diagnostic test, therapeutic management, post abortion care, complications, home and follow up precautions and preventive measures of abortion, the second section asked specific knowledge about each type of abortion manifestations and management of it.

### Scoring System:

The nurse's answers related to knowledge were scored and calculated. Each correct answer was given one score; and wrong answer or don't know was given zero score. Total knowledge scores were converted into a percent score and classified as (poor knowledge scored < 60%, average knowledge 60%- < 85% and good knowledge scored  $\geq$ 85%.

**Tool II: Practical observational checklist:** Observational checklist (pre; post and follow-up test) was developed by the researcher that adopted from Linnard-Palmer and Coats (2017), WHO, (2018); Murray, et al., (2019) to assess the nurse's practices regarding care of women with abortion as taking history (5 items), assess women general conditions (5 items) , provide emotional support (12 items), infection prevention and control measures in obstetric and gynecological departments (5 items) , infection prevention and control measures in labor (9 items) nursing care for D&C (27 items), pain management (10 items) fundal assessment and uterine massage (19 items) and discharge instructions (9 items).

### Scoring system

Scoring system of Observational checklist, each practice done correctly was took one score, practice done incorrectly or not done was took zero score. The total score < 60% was be considered as unsatisfactory and  $\geq$  60% was be considered as satisfactory practice.

**Supportive material:**

It was designed by the investigator in form of handout (booklet) after revising extensive relevant literature review. It was written in a simple Arabic language and different illustrative picture in order to facilitate understanding its content to enhance the nurse's knowledge regarding abortion and its management which had positive effect on their performance.

**Validity and Reliability:**

To establish validity, the questionnaire was piloted on panel of 5 experts of obstetrics and gynecological staff, and nursing professors who reviewed the instruments for clarity, relevance, comprehensiveness, understanding, applicability and easiness. The tools were tested for internal consistency by using Cronbach's alpha test to check the stability of the internal consistency of the tools.

**Pilot Study:**

It was carried out on 10% of total study sample (6 nurses). It was conducted to evaluate the applicability and clarity of the tools, assessment of feasibility of fieldwork and to detect any possible obstacles that might face the researcher and interfere with data collection. Necessary modifications were done based on pilot study findings such as adding some questions to tools (added three questions to nurses knowledge about abortion) in order to strengthen their contents or for more simplicity and clarity. The pilot sample was included in the main study sample.

**Data collection Procedure:**

The current study was achieved through three phases; assessment phase (pretest), implementation (conducting evidence based guidelines), follow up and evaluation phase (post -test).

**Assessment phase (pre-test)**

After an official permission was obtained from the research ethical committee of faculty of Nursing, participant's nurses was recruited from Minia university hospital for maternity and child. At the beginning of interview the researchers greeted each nurse, explained the purpose, duration, and activities of the study ,they were informed that participation in this study was voluntary and They had the right to withdraw at any time, and taken oral approval of nurses to share in the study.

After obtaining the acceptance from nurses to participate in the current study, the researcher provided an overview and clarification about the assessment tool questions then the self -administered questionnaire (first tool) was distributed to each nurse to assess data related to socio-demographic data, general knowledge about evidence based nursing practices and specific knowledge about abortion, the time taken to fill the questionnaire ranged from 25 to 30 minutes. The researcher assessed the nurse's practices regarding care of women with abortion individually using observational checklists. The researcher visited data collection sites 2 day per/week at two shifts morning and evening.

**Implementation phase (conducting evidence based guidelines)**

After assessing pretest knowledge and practice the nurses divided into small groups each subgroup consists of (3-5) nurses. The evidence-based guideline was applied on 4

sessions; 2 sessions for knowledge (each session lasted from 40-60 minutes) and 2 sessions for practice (each session lasted 1:30- 2 hours) ; two sessions per day to cover all theoretical and practical evidence-based guidelines for each small group and was implemented according to work conditions.

During implementation of evidence based guidelines, the nurses in the study sample received the general knowledge about evidence based guidelines, definition of abortion, types, causes, risk factors, diagnostic tests, components of post abortion care, complications of abortion , preventive measures and care of aborted woman were through used face to face method to achieve the proposed goal and allow the nurses to asking, discussion and reach high level of understanding; the discussion was emphasized on improving nurses' knowledge and 15 minute was assigned at the end of the discussion for question and obtains the feedback to ensure that the nurses got maximum benefits.

Different teaching methods for knowledge were used as lecture, group discussion using PPT on lap top, hand out and pictures to easily understand.

Concerning the practical sessions, the studied nurses had training on how taking history, assess woman general condition, provide emotional support, how to prevent infection, how to manage pain, nursing care for dilatation and curettage and how to apply uterine massage. Different teaching methods for practice were used as demonstration & re-demonstration, and role play by using videos, real equipment doll and pictures. Also, Arabic booklet with pictures was given to each participant. Motivation and reinforcement were by praising and recognition to encourage the nurses to participate in the program.

**Evaluation phase:**

**The investigator was conduct 3 time of evaluation:**

First time of evaluation (pretest) done before implementation of the guideline by using tools I and II to assess knowledge and practice of the nurse regarding care of aborted woman. Second time of evaluation (immediate posttest) done immediately after implementation of the guideline by using tool I (part two and three) to assess knowledge of the nurse. Third time of evaluation (posttest) done after 3 months of the guideline by using tools I and II to evaluate the effect of evidence based guidelines on the nurse's performance regarding care of women with abortion.

The effect of evidence based guidelines was done through comparing between the pretest and posttest that was conducted immediately and after three months of intervention to assess their knowledge and their practice regarding abortion. The data was collected through a period of 11 months from March 2020 to November 2020.

**N.B:** During evaluation the dilatation and curettage checklist applied only for labor nurses and the uterine massage checklist applied only for labor and gynecological nurses.

**Administrative design**

Before the conduction of the pilot study as well as the actual study, an official permission and consent was obtained from the dean of the Faculty of Nursing, as well as the Director of Minia university hospital for maternity and new born. Research proposal was approved from ethical committee in faculty of nursing.

**Ethical consideration:**

An official permission to carry out the study obtained from the nurses that are willing to participate in the study, after explaining the importance nature and purpose of the study, all participants have the right to refuse to participate and or withdraw from the study without any rational any time, privacy was considered during collection of data, no health hazards were present. Participants was assured that all their data are highly confidential, anonymity was also assured

through assigning a number for each nurse instead of names to protect their privacy.

**Statistical analysis**

The collected data was tabulated, computerized, analyzed and summarized by using descriptive statistical tests to test research questions by using SPSS (IBM, 25). The level of significance was accepted at  $P < 0.05$  and was considered highly significant when P-value less than or equal 0.01.

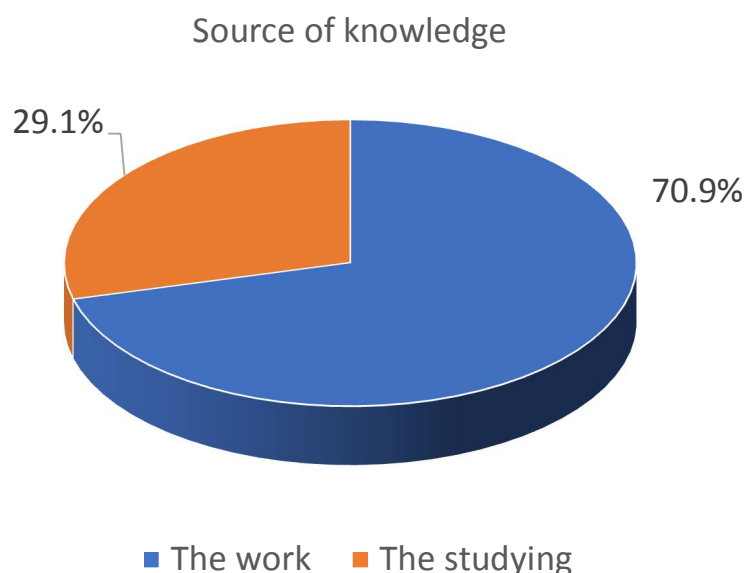
**Results**

This study aimed to evaluate Effectiveness of implementing Evidence Based Practices Guideline on nurses' performance regarding caring of aborted women.

**Table (1): Percentage distribution of socio-demographic characteristics among the studied nurses (n= 55).**

Socio-demographic characteristics	No.	%
<b>Age/ years</b>		
Less than 25	33	60.0
25 - < 35	20	36.4
35 - < 45	2	3.6
Mean ± SD	25.9 ± 4.5	
<b>Educational level</b>		
Diploma nursing	10	18.2
Nursing institute	45	81.8
<b>Years of experience/ year</b>		
Less than 5	33	60.0
5 - < 10	12	21.8
10 - < 15	6	10.9
More than 15	4	7.3
Mean ± SD	6.1 ± 4.5	
<b>Attendance of training courses about the care of abortion</b>		
Yes	7	12.7
No	48	87.3

Table (1): Shows that 60.0% of the studied nurses their age less than 25 years, 81.8% of them had nursing institute certification, 60.0% of them their years of experience less than five years, and 87.3% of them hadn't any training about the care of abortion.



**Figure (1): Distribution of the studied nurses regarding their source of knowledge about care of aborted women (n= 55).**

Figure (1): Demonstrates that 70.9% of them their source of knowledge was from the work experience, and 29.1% of them were from their studying.

**Table (2): Distribution of the study sample regarding their general knowledge about evidence-based practice (n=55)**

Items	Pre		Immediately		Post 3 months		X <sup>2</sup>	P – value
	No.	%	No.	%	No.	%		
<b>Meaning of evidence-based practice</b>								
Don't known	28	50.9	0	.0	0	.0	118.592	.0001**
Poor	27	49.1	7	12.7	10	18.2		
Average	0	.0	5	9.1	20	36.4		
Good	0	.0	43	78.2	25	45.5		
<b>Process of evidence-based practice in nursing</b>								
Don't known	26	47.3	0	.0	0	.0	72.877	.0001**
Poor	16	29.1	5	9.1	10	18.2		
Good	13	23.6	50	90.1	45	81.8		
<b>Steps of evidence-based in nursing</b>								
Don't known	29	52.7	0	.0	0	.0	89.510	.0001**
Poor	16	29.1	7	12.7	8	14.5		
Good	10	18.2	48	87.3	47	85.5		
<b>Barriers of evidence-based in nursing</b>								
Don't known	23	41.8	0	.0	0	.0	88.275	.0001**
Poor	21	38.2	5	9.1	8	14.6		
Average	0	.0	1	1.8	4	7.3		
Good	11	20.0	49	89.1	43	78.2		

\*\*= highly statistical significance differences at .01

**Table (2):** Presents that there were statistically significant differences between pretest and posttest for meaning of evidence-based practice, process of evidence-based practice in nursing, steps of evidence-based in nursing and barriers of evidence-based in nursing P-value < 0.001.

**Table (4): Distribution of the study sample regarding their total knowledge about different abortion types (n=55)**

Types of abortion	Pre						Immediately						Post 3 months						Test of significance	
	Poor		Average		Good		Poor		Average		Good		Poor		Average		Good		X <sup>2</sup>	P-value
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Threatened abortion	27	49.0	3	5.5	25	45.5	4	7.3	1	1.8	50	90.9	7	12.7	4	7.3	44	80.0	35.022	0.0001**
Inevitable abortion	28	50.9	0	.0	27	49.1	1	1.8	0	.0	54	98.2	10	18.2	0	.0	45	81.8	38.077	0.0001**
Incomplete Abortion	40	72.7	10	18.2	5	9.1	1	1.8	1	1.8	53	96.4	3	5.5	8	14.5	44	80.0	111.119	0.0001**
Complete abortion	44	80.0	0	.0	11	20.0	8	14.5	0	.0	47	85.5	9	16.4	0	.0	46	83.6	65.594	0.0001**
Missed abortion	34	61.8	10	18.2	11	20.0	1	1.8	2	3.6	52	94.6	2	3.6	8	14.6	45	81.8	89.057	.0001**
Recurrent spontaneous abortion	30	54.5	20	36.4	5	9.1	1	1.8	6	10.9	48	87.3	5	9.1	3	5.5	47	85.5	96.339	0.0001**
Induced abortion	37	67.3	8	14.5	10	18.2	1	1.8	3	5.5	51	92.7	3	5.5	5	9.0	47	85.5	90.667	0.0001**

Table (4): It shows distribution of the study sample regarding their knowledge about nursing care of different abortion types. It reveals that there were highly statistically significant differences between pretest and posttest three month of evidence based guidelines application (P-value < 0.001 respectively).

**Table (5): Distribution of the study sample regarding their total knowledge level pre, immediately, and post three months of evidence-based guideline application (n=55).**

Total knowledge level	Pre		Immediately		Post 3 months		X <sup>2</sup>	P – value
	No.	%	No.	%	No.	%		
Poor	40	72.7	2	3.6	6	10.9	91.740	0.0001**
Average	10	18.2	4	7.3	8	14.5		
Good	5	9.1	49	89.1	41	74.6		

**Table (5):** Shows that nearly three quarter of the studied nurses (72.7%) had poor level in total knowledge regarding abortion before evidence guidelines application. And the majority of them (89.1%, 74.6%) had good knowledge in immediate and post 3 months after evidence guidelines respectively with highly statistically significant differences which P-value < 0.001.

**Table (6): Distribution of nurses practices regarding caring of aborted women pre and post three months of evidence-based guideline application (n = 55).**

Nurses' practices	Pre				Post 3 months				X <sup>2</sup>	P – value
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory			
	No.	%	No.	%	No.	%	No.	%		
Taking history	1	1.8	54	98.2	44	80.0	11	20.0	69.535	0.0001**
General assessment of women condition	6	10.9	49	90.1	50	90.9	5	9.1	70.423	0.0001**
Emotional support provided	3	5.5	52	94.5	45	81.8	10	18.2	65.202	0.0001**
Infection prevention and control in antenatal and gynecological departments	24	75.0	8	25.0	30	93.8	2	6.2	4.267	0.038*
Infection control at labor word	10	43.5	13	56.5	21	91.3	2	8.7	11.969	0.0005**
Nursing care for D & C	7	30.4	16	69.6	22	95.7	1	4.3	20.994	0.0001**
Nursing care for Pain management	9	16.4	46	83.6	49	89.1	6	10.9	58.356	0.0001**
uterine massage	0	.0	39	100.0	31	79.5	8	20.5	47.690	0.0001**

Discharge instructions	7	12.7	48	87.3	48	87.3	7	12.7	61.124	0.0001**
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\*\*Highly statistical significance differences

Table (6): illustrates that there were statistically significance different between nurses' practices levels about caring with aborted women pre and post three months of evidence-based guideline application which P-value < 0.0001.

**Table (7): Distribution of the study sample regarding their total practice level pre and post three months of evidence-based guideline application (n=55)**

Total Practice level	Pre		Post 3 months		X <sup>2</sup>	P – value
	No.	%	No.	%		
Satisfactory	7	12.7	47	85.5	61.124	0.0001**
Unsatisfactory	48	87.3	8	14.5		

\*\* Highly statistically significant differences

Table (7): It illustrate distribution of the study sample regarding their total practice level pre and post three months of evidence-based guideline application. It showed that there was a significant improvement in total practice regarding abortion care among the studied nurses in post- test as compared to pretest (P-value ≤ 0.0001).

**Table (8): Relation between socio-demographic characteristics of the studied nurses and their total knowledge pre- evidence-based guideline application (n=55).**

Socio-demographic characteristics	Total knowledge level						Test of significance	
	Poor (n= 40)		Average (n= 10)		Good (n= 5)		X <sup>2</sup>	P – value
	No.	%	No.	%	No.	%		
<b>Age/ years</b>								
Less than 25	30	75.0	2	20.0	1	20.0	18.623	0.0009**
25 – < 35	10	25.0	8	80.0	2	40.0		
35 - < 45	0	.0	0	.0	2	40.0		
<b>Educational level</b>								
Diploma nursing	7	17.5	2	20.0	1	20.0	0.046	0.978
Nursing institute	33	82.5	8	80.0	4	80.0		
<b>Years of experience/ year</b>								
Less than 5	31	77.5	2	20.0	0	.0	25.323	0.0003**
5 - < 10	8	20.0	3	30.0	1	20.0		
10 - < 15	1	2.5	4	40.0	1	20.0		
More than 15	0	.0	1	10.0	3	60.0		

\*\* Highly statistically significant differences

Table (8): Shows that there were statistically significant relation between total knowledge levels of studied nurses' pre-evidence-based guideline application and their age and years of experience in which P-value ≤ 0.0009 & 0.0003 respectively.

**Table (9): Relation between total knowledge levels of the studied nurses and their total practice's level post 3 months of evidence-based guideline application (n=55)**

Knowledge level	Total practice level				Test of significance	
	Satisfactory (n = 47)		Unsatisfactory (n = 8)		X <sup>2</sup>	P – value
	No.	%	No.	%		
Poor (6)	1	2.1	5	62.5	28.379	0.0001**
Average (8)	6	12.8	2	25.0		
Good (41)	40	85.1	1	12.5		

\*\* Highly statistically significant differences

The previous table illustrates relation between total knowledge levels of the studied nurses and their total practice's level post 3 months of evidence-based guideline application. It reveals that there were statistically significant relation between nurse's total knowledge and their total practice regarding care of aborted woman post 3months of evidence-based guideline (P-value ≤ 0.0001).

**Discussion**

Evidence-based practice (EBP) increases quality of patient care and reduces healthcare costs. Evidence-Based Practice uses the best scientific evidence and integrates with clinical experience, incorporating patient values and preferences in professional nursing care to give the best clinical decisions (Melnyk et al., 2018).

Regarding the socio-demographic characteristics, the current study showed that less than two-thirds of the studied nurses their age less than 25 years, more than three quarter of them had nursing institute certification, slightly less than two-thirds of them their years of experience less than five years, and the majority of them hadn't any training about the care of abortion., these results supported by Mahmoud et al. (2017), who studied "knowledge of nurses about abortion in the women's hospital and obstetrics in the holy city of Karbala and General AL – Hindia Hospital and reported that nearly

half of the age group to the study sample were within (20-24) year, the majority of them has (1-3) year of experience, and the majority of the study sample wasn't share in training courses, but the same author disagrees with the current study , reporting that nearly three quarter of them had a diploma in nursing. This contrary might due to differences in nursing educational systems across countries.

In the same context, this finding supported by a study conducted by El Sharkawy et al. (2019), who studied "application of iowa model evidence-based practice on maternity nurses regarding postpartum hemorrhage" and reported that most of the studied sample had no previous training courses..

In contrast to the current results Arafat, Mahdy & El-Kashif, (2018), who studied "the effect of evidence-based guidelines on nurses, performance in respect to nosocomial infection at medical-surgical and obstetrician departments at

Benha university" found that more than half of the studied sample their age in between 31:40 years, more than half had less than 10 years of experience and more than half of them had previous training. But the same author agrees with the current study is reporting that more than half had nursing institute certification. In addition, this result comes inconsistent with **Al-Busaidi et al (2019)**, who studied " nurses' knowledge, attitudes, and implementation of evidence-based practice in Oman: a multi-institutional, cross-sectional study" and reported that the mean age was  $32.4 \pm 4.7$  years, nearly three quarter of them hold a diploma in nursing with a mean clinical experience of  $10.9 \pm 4.2$  years. This disagreement may be due to increase in sample size and other departments included other than obstetric department.

In relation to the source of knowledge about the care of aborted women, the present study demonstrated that more than two-thirds of the study sample their source of knowledge was from their work experience. This finding may be related to the fact that work experience helps nurses gain more knowledge through practices.

This result comes in accordance with **Subasinghe, Deb, & Mazza (2021)**, who studied " Primary care providers' knowledge, attitudes and practices of medical abortion: a systematic review" and reported that the majority of the studied sample get their knowledge from their work experience. But the current study differs from **Assefa (2019)**, who studied " Knowledge, attitude and practice of health providers towards safe abortion provision in Addis Ababa health centers" and reported that the majority of nurses improve their knowledge and skills through attendance of educational training. This differences may due to ministry of health in Addis Ababa developed a revised technical and procedural guidelines for safe abortion and prepare training courses to increase knowledge and practice of health care providers on safe abortion care.

Concerning evidence based knowledge of the studied sample in nursing pre & post evidence guideline, the current study revealed that, there was a highly statistically significant difference pre & post evidence guideline regarding their knowledge about meaning, process, steps and barriers of evidence-based which  $P\text{-value} < 0.001$ . This findings revealed the fact that nurse's education and training plays an important role in improvement of knowledge about evidence based practice, so that nursing curriculum should include the best available evidence, and educators should encourage them to adopt a more reflective and critical approach to current practice, thus should work closely with experts in education and research to design strategies to facilitate the adoption of evidence based practice and improve nurses' knowledge and skills also, the nurses' managers should take steps to minimize the barriers to EBP implementation.

The current study findings was confirmed by **Kim, Gu & Chang (2019)** who evaluate effects of an evidence-based practice education program using multifaceted interventions: a quasi-experimental study with undergraduate nursing students, showed that the experimental group had statistically significant higher post-test scores on EBP knowledge ( $p < 0.001$ ) compared to the control group. Also, this result supported by **Sapri et al, (2022)**, who studied effectiveness of educational interventions on evidence-based practice for nurses in clinical settings: a systematic review and meta-analysis, they concluded that educational interventions improved nurses' EBP knowledge and skills. EBP education

interventions should be part of nurses' professional development in clinical settings.

In agreement with the current study, a study done by **Al Qadire (2019)**, to assess "undergraduate student nurses' knowledge of evidence-based practice: a short online survey" the study found that the mean total knowledge regarding evidence-based practices was low. Also, this result comes in line with a study done by **Li et al (2019)** to evaluate evidence-based practice: knowledge, attitudes, implementation, facilitators, and barriers among nurses, the study stated that the studied nurses had low level of knowledge as regard EBP and the findings demonstrate a compelling need for improvement in knowledge of EBP.

In addition, this result come consistent with **Camargo et al, (2018)**, who examine competences and barriers for the evidence-based practice in nursing, they found that nurses had insufficient knowledge related to EBP in nursing and the study highlight the need for educational training to improve their knowledge about EBP, furthermore a study conducted to assess barriers associated with evidence based practice among nurses in low and middle income countries, showed that the studied nurses had lacked knowledge regard EBP and the findings focused on the importance of integrating of EBP into nursing curriculums and offering continuous professional development opportunities for nurses (**Shayan, Kiwanuka & Nakaye, 2019**).

This result come inconsistently with **Paulose et al. (2016)**, who assess "the knowledge of nurses on evidence-based practice in selected setting" and reported that slightly more than half of the nurses have average knowledge on evidence-based practices. This inconsistent may due to that more than half of the studied nurses in this study have completed BSc Nursing, nurses' higher level of education was associated with increase their knowledge towards evidence-based practice.

Regarding the knowledge about different abortion types, the current study illustrated a statistically significant difference between pretest and posttest for threatened abortion, incomplete abortion, and complete abortion, missed abortion, recurrent spontaneous abortion, and induced abortion ( $P\text{-value} < 0.001$ , respectively). Such improvement might be accounted by nurses' interest to lean and acquire knowledge about the study topic as well as the written brochure that was distributed to nurses and used as an ongoing reference, and this was helpful in nurses' acquisition of knowledge.

This result comes in line with **Mohammed & Said (2018)**, who reported a highly statistically significant difference regarding studied nurses' knowledge about evidence-based practice in nursing and abortion pre & post guidelines. Also, this result confirmed by a study done by **Ahmed (2018)**, the study showed that there was a statistically significant difference between pretest and posttest for nurses' knowledge regarding characteristic of missed abortion.

In the same line **Kolodziejczyk & Kuzma (2020)**, studied " knowledge and attitudes towards abortion and euthanasia among health students in Papua New Guinea" and stated that most of the studied sample had a low level of knowledge regarding inevitable abortion. But the current result disagree with **Ozmen, Bolsoy, Çetinkaya, Ulaş, & Özyurt (2018)**, who studied " nursing, midwifery and medical students' attitudes toward induced abortion at Turkey" and

mentioned that most nurses had good knowledge regarding induced abortion.

Concerning nurses' practices regarding caring for aborted women pre and post three months of evidence-based guideline application, the current study illustrated statistically significant differences between nurses' practices levels about caring with aborted women pre and post three months of evidence-based guideline application, in addition the present study showed a significant improvement in total practice regarding abortion care among the studied nurses in the post-test as compared to the pretest ( $P\text{-value} \leq 0.0001$ ). This result was confirmed by **Mohammed & Said (2018)**, reported that before evidence guidelines, nearly three quarter of nurses had poor performance. However, more than three quarter of them had good performance levels after evidence guidelines application with statistically significant differences. Also, the current study was similar to a study done by **Ahmed (2018)**, it was showed that there was a significant improvement in nurses' practice regarding abortion care (care of admission and assessment, psychological care, client encouragement to ask questions, care on discharge and follow up, client rest, give appropriate information) among the studied nurses in the post-test as compared to the pretest in which ( $P = 0.000$ ).

In addition, the current study result was consistent with the result of **Hammood, Kadhim & Washeel, (2020)**, who studied "awareness of nurse midwives' toward post-miscarriage care at Bint Al-Huda Hospital in Al-Nasiriya City", they observed that the post-miscarriage performance of nurses was not well performed as regard emotional assistance, evaluating vaginal bleeding, monitoring vital signs, handling performance, explanation of the patient's procedure, hand washing. It is clear that the nurses in this sample perform well only three out of ten things of the performance needed for women's care after miscarriage as the majority of the studied nurses did not undergo any post-miscarriage educational program. In addition, the current study supported by **Jensen, TempleSmith & Bilardi (2019)**, who studied "health professionals' roles and practices in supporting women experiencing miscarriage: a qualitative study, reported that the majority of the study sample were not instruct the aborted woman about timing of follow up and they had not any training to provide emotional support to aborted women.

The result of the present study was in the same line with **Ibeid and Fahmy (2021)** who assess nurses' knowledge and performance regarding infection control at obstetric and gynecological departments at Menoufia, they concluded that, there were poor nurses' knowledge and performance regarding infection control among studied nurses and the authors recommended that there is an important need to develop training program about infection control for all nurses working in obstetrics and gynecology department to increase knowledge and practice. More over **Hosny and Almasry (2021)** studied the effect of a designing nursing infection control protocol on operating room nurses performance, a comparative study, and their findings revealed that level of nurses' knowledge regarding infection control measures improved after the application of the design nursing protocol.

In the same line, **Qian et al, (2021)**, who studied "Preparing nurses and midwives to provide perinatal bereavement care: A systematic scoping review, they reported that there was significant improvement in clinical skills regard psychological support in abortion care among nurses and midwives after workshop. Also, A study done by **Kalu,**

**Coughlan and Larkin (2018)**, they found that the majority of the midwives did not have adequate levels of confidence to provide emotional support to aborted patient and highlight that improving midwives' bereavement support knowledge and skills is essential for promoting their confidence.

Regarding the relation between socio-demographic characteristics of the studied nurses and their total knowledge of pre-evidence-based guideline application, the present study showed that there was a statistically significant relation between total knowledge levels of studied nurses' pre-evidence-based guideline application and their age and years of experience in which  $P\text{-value} \leq 0.0009$  &  $0.0003$  respectively. This result may be due to the more years of experience, older age and longer period of exposure to discussions on the abortion at work place may enable the nurses to get more knowledge. This result aligns with **Shaughnessy, Donoghue and Leitao (2021)**, who studied termination of pregnancy: staff knowledge and training sexual & reproductive healthcare, reported that age of the studied nurses had a significant contribution to level of knowledge. Moreover, **Mainah, Keraka & Otieno (2019)**, reported a statistically significant difference between the studied nurses' knowledge and their socio-demographic data.

Regarding the relation between socio-demographic characteristics of the studied nurses and their total practice's level pre-evidence-based guideline application, the present study showed a statistically significant relation between total practice's level pre-evidence-based guideline application of the studied nurses and their year of experience in which  $P\text{-value} \leq 0.0002$ . This result may be because nurses with more years of experience reported increased use of the evidence-based practice, and fewer barriers to research and work experience influence the nurses' knowledge and this enhance their performance.

This result aligns with **Abebe, (2021)**, who assess knowledge, attitude and practice of health care workers towards safe abortion and its associated factors at tertiary health facility in Ethiopia, the study confirmed that year of clinical experience was significantly associated with practice of health care workers towards safe abortion. Also, the current study finding agree with **Mohammed & Said (2018)**, who found that statistically significant difference between studied nurses total evidence performance score and their age, level of education, training courses, and years of experience was found.

Regarding the relation between total knowledge levels of the studied nurses and their total practice's level post three months of evidence-based guideline application, the present study revealed that there was a statistically significant relation between nurses' total knowledge and their total practice regarding care of aborted women post 3months of the evidence-based guideline ( $P\text{-value} \leq 0.0001$ ). This result may be related to the nurses who had more knowledge that will impact their practices. **Abate & Mekonnen (2020)** confirmed this result, studied "knowledge, practice, and associated factors of nurses in pre-hospital emergency care at a Tertiary Care Teaching Hospital" and reported that there were significant deference's between nurses knowledge and practices. Moreover, this result was supported by **Mainey et al. (2020)**, who reported that nurses' knowledge affects their performance regarding post abortion care.

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