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Maternity Nurses Performance Regarding Late Ante Partum Hemorrhage: An Educational Intervention

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Abstract:
Background: *Ante partum hemorrhage is one of the most serious obstetric emergencies and is a leading cause of maternal and perinatal mortality and morbidity. It affects 2-5% of pregnancies. Improving maternity nurse performance is extremely important and will be crucial in controlling blood loss and reducing the risk of maternal morbidity or even death.* ***Aim*** *of the study was to evaluate effect of an educational intervention on maternity nurses' performance regarding management of late ante partum hemorrhage.* ***Design:*** *A quasi-experimental design was utilized to fulfill the aim of the study.* ***Sample:*** *A convenient sample of a total 64 maternity nurses were included in the present study.* ***Setting:*** *The present study was conducted in obstetrics and gynecology departments at Benha University Hospital.* ***Data*** *were collected through: A structured Interviewing Schedule, knowledge assessment sheet, and an observational checklist.* ***Results*** *indicated that there were highly statistically significant differences (P<.001) pre and post educational intervention regarding total knowledge and practices mean scores of the studied nurses. There were negative statistically significant correlations (P≤.01) between studied nurses, total knowledge, total practices scores and their age and years of experience.* ***The present study concluded*** *that educational intervention had a positive effect on improving knowledge and practices of maternity nurses towards management of late ante hemorrhage.* ***Recommendation****: Frequent and schedule In-services training program should be applied for nurses at the hospital regarding management of late ante hemorrhage in order to improve nurses' knowledge and practices which will be reflected on improving the quality of health care.*

Keywords: *Maternity nurse, performance, Late ante partum hemorrhage, educational intervention.*

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I. Introduction

Around the world, approximately 830 women die daily as a results of pregnancy or childbirth-related complications. Almost all ninety-nine percent of these maternal deaths occur in developing countries. One of the targets under Sustainable Development Goal III is: "to reduce the global maternal mortality ratio to less than 70 per 100000 births between 2016 and 2030". **[1]** The findings of the World Health Organization meta analysis show that the foremost important direct causes of maternal deaths are, namely: hemorrhage (27%), abortion, and sepsis (14%) and hypertension (11%). Beside the indirect causes triggered through the interaction between preexisting medical conditions and pregnancy**.[2]**

Hemorrhage during the antepartum period is a life-threatening emergency for mother and/or fetus. Late antepartum hemorrhage associated with an increased risk of postpartum hemorrhage, anemia, shock, low birth weight, intrauterine fetal death, and birth asphyxia. It contributes to 15-20% of maternal mortality in the world **[3].** Late antepartum hemorrhage defined as bleeding from the genital tract from the time of viability of pregnancy for extra uterine survival to the delivery of the baby**[4]**. APH complicates 0.5–5% of pregnancies and it constitutes one of the reasons for emergency hospital visits among pregnant women **[5].**

The major causes of APH are placenta previa and abruption placenta; however, the exact cause of bleeding in some cases may be undetermined. In a small proportion where placenta previa and abruption have been excluded, the cause may be related to local lesions of the cervix and vagina, e.g., cervicitis, cervical erosion, genital tumors, vulvar varicosities and heavy show and occasionally fetal in origin e.g., ruptured vasa previa and velamentous insertion of the cord**.[6]**

Placenta previa is one of the most serious complications during pregnancy and is associated with numerous adverse maternal and fetal-neonatal complications. Many of these are direct consequences of maternal antepartum and intrapartum hemorrhage **[7].** Placenta abruption is defined as bleeding at the decidual-placental border leading to placental separation prior to delivery of the fetus. Placenta abruption is a complication in 0.5–1% of all pregnancies. It is associated with such immediate adverse maternal outcomes as

severe obstetric hemorrhage, emergency hysterectomy, disseminated intravascular coagulation, renal failure, and even maternal death **[8]**.

In a comparison of maternal risk factors of late antepartum hemorrhage **[6]** concluded that abruption is more likely to be related to conditions occurring during pregnancy (preeclampsia, abdominal trauma, intrauterine infections, pre labor rupture of membranes, polyhydramnios, elevated maternal serum alpha-fetoprotein, smoking, and substance abuse). The precise cause of abruption is unknown; however, hypertension is the most consistent predisposing factor**.** Placenta previa related to conditions existing prior to the pregnancy (uterine scar, manual removal of placenta, curettage, advanced maternal age, multiparty, and previous placenta previa)**[9].**

According to **[10]** found that there is a strong relationship between late APH and later development of intra partum bleeding necessitating cesarean delivery. Some women necessitate preterm cesarean section and hysterectomy for life-threatening APH, whereas others undergo elective cesarean section at term without hemorrhagic complications. It is linked need for blood transfusion, maternal intensive care unit admission, hysterectomy, septicemia, thrombophlebitis, and even maternal death **[11&12].**

Nurses play a vital role in antenatal care, clinical assessment, critical thinking, decision making, appropriate preparation and good emergency obstetric care and resource allocation must be quick and appropriate to increase the likelihood of positive outcome of late ante partum hemorrhage for mother, fetus and neonate as well as reducing mortality and morbidity. The immediate management of late ante partum hemorrhage start with the women admission to the hospital, the nurse begins with an assessment of the bleeding, take necessary history such as gravidity, parity, EDD, general status, bleeding (quantity, precipitating event, and associated pain), assess the vital signs and fetal status, abdominal examination to assess fundal level. Laboratory studies include CBC, determination of blood type and Rh factor, coagulation profile, possible type and cross match for 2 packed red blood cells if needed**[13].**

1.2 Significance of the study

Ante partum hemorrhage (APH) is one of the most serious obstetric emergencies and is a leading cause of maternal and perinatal mortality and morbidity. It affects 2-5% of pregnancies. **[14].** Globally, it is the primary cause of nearly one quarter of all maternal deaths. In developing countries including Egypt, ante partum hemorrhage is the common leading direct cause of maternal mortality. Specifically, it was the attributable cause of 21.3% of all direct maternal deaths in Egypt 2013 **[15&16].** Because of the significant morbidity and mortality associated with APH. Maternity nurses are the frontline health care providers multifaceted with responsibilities to improve women health, decrease morbidity and saving the mother's life. This can be achieved through improving knowledge, technical skills, besides clinical decision making and judgment. Therefore, it is vital to participate the maternity nurses in educational intervention. This approach prove for preparing nurses to respond competently in emergency situations through prompt management of late APH.

1.3 Aim of the Study

This study was undertaken to evaluate the effect of an educational intervention on maternity nurses' performance (knowledge and practices) regarding management of late APH.

This aim was achieved through the following objectives:

- Assessing knowledge and practices of maternity nurses regarding management of late APH before intervention .
- Designing and implementingan educational intervention according to maternity nurses' needs.
- Evaluating the effectof educational intervention on maternity nurses' performance regarding management of late APH .

1.4 Hypothesis:

Maternity nurses who received an educational intervention would have improved knowledge and practices regarding late APH than before intervention.

II. Subjects And Method

2.1 Research Design: A quasi- experimental study design was used (pre/post- test design), single group was studied to fulfill the aim of the present study.

2.2 Setting: The study was carried in obstetrics and gynecological departments at Benha University Hospital.

2.3 Sample: All nurses working in the above mentioned settings at the time of the data collection and agreed to participate in the study were included. The total number was (64) maternity nurses,

1.4 Tools of data collection:
two tools were used for collecting data.

2.4.1 Tool I: A structured Interviewing Schedule: It was designed by the researchers after reviewing related literature. It was written in Arabic language in the form of closed and open-ended questions. It encompassed two major parts:
Part I: included socio-demographic data of the studied sample such as age, qualification, years of experience in obstetrics and gynecology department and attendance of training courses about management of late APH.

Part II: Assessment of maternity nurses' knowledge regarding late APH: This part was used before and after implementation of the educational intervention program (pre/post-test format), it included thirty six multiple choice questions which divided into four sections ;

Section (1) knowledge about definition and incidence of late ante partum, it consisted of (6) items (definition and incidence of late ante partum hemorrhage, definition and incidence of placenta praevia , definition and incidence of abruptio placenta)

Section (2) knowledge about etiology, Predisposing factors & types of late ante partum: it consisted of (9) items(etiology, Predisposing factors & types of late ante partum, etiology, Predisposing factors & types of placenta previa, etiology, Predisposing factors & types of abruptio placenta).

Section (3) knowledge about clinical manifestation & complications of late ante partum : it consisted of (6) items(clinical manifestation & complications of late ante partum, clinical manifestation & complications of placenta previa, clinical manifestation & complications of abruptio placenta).

Section (4) knowledge about diagnosis & management of late ante partum : it consisted of (15) items(diagnosis & management of late ante partum, diagnosis & management of placenta previa, diagnosis & management of abruptio placenta)

Scoring system of knowledge:
Each questions was assigned a score of (one) given when the answer was completely correct , a score (zero) was given when the answer was incorrect. The total score of each section was calculated by summation of the scores of its items. The total score for the knowledge of a participant was calculated by the addition of the total score of all sections. The mean and standard deviation was calculated. As well as maternity nurse, total knowledge score was classified as the following: Satisfactory ≥ 80 % of total knowledge score ranged from (29-36 marks). Unsatisfactory < 80% of total knowledge score ranged from (1-28 marks).

2.4.2 Tool II- An observation checklist:-
It was concerned with assessing the maternity nurses practices regarding management late ante partum hemorrhage. It divided into (6) procedures which consisted of (68 steps). It include initial assessment when women arrived in the hospital and emergency measures (27steps) such as(estimate amount of blood loss, vaginaldigital examination is contraindicated, quick attention to the presentingvital signs looking for hypotension, tachycardia, confusion, or breathlessness, assess presence of uterine contractions, observe fetal movement check fetal heart rate and place woman on lateral position etc…), patient/caregiver teaching (instructions and explanations) (11 steps) as explain the causes of bleeding, management of bleeding, rationale for bed rest, need for blood transfusion at any time, explain warning signs, explain signs of shock etc…), preparation for investigations and operations (6 steps)as (Explain about the type and the purpose of investigation, take informed consent from the woman before operations, inform the woman about the progress of bleeding etc…) psychological support and keeping privacy(5 steps) as(Respect woman's privacy during administration of medical examination or nursing care, give relatives adequate information about the case and its progress, encourage the woman to verbalize anxiety and concerns about her baby etc….) nurses administration of physical care and medication(10 steps) as (take adequate information about medical history during hospital admission, measure vital signs on time, give medication in a right manner etc…) and infection control and prevention (standard precautions) (9 steps) as(Take care of personal hygiene and clothes hygiene, exchange frequently room ventilation, change bed linens frequently etc…). This checklist was adopted from **[17].**
The scoring system for practices:
The scoring system for practices ranged from 2 to 0 as follows, each item was scored as (2) if done correctly, (1) score if done incorrectly and (0) if not done. Then summing up the scores of the items in each procedure and

the overall scores gave practice score. The mean and standard deviation was calculated. As well as nurse, total practice score was classified as the following :

- Competent practice ≥80 % of total practice score (108 -136 marks).
- Incompetent practice < 80 % of total practice score (1-107 marks).

2.5 Tools validity and reliability:

Tools were reviewed by a panel of five experts in the field of obstetric and woman's health nursing to ascertain their content validity. Tools were modified according to the jury results and judgment. Reliability was done by Cronbach's Alpha coefficient test which revealed that each of the two tools consisted of relatively homogenous items as indicated by the moderate to high reliability (internal consistency) of each tool (knowledge = 0.791 and practices = 0.872).

2.6 Ethical considerations:

The present study was conducted under the approval of the Faculty of Nursing Ethical Committee, Benha University. An official permission was obtained from the directors of the pre mentioned settings. Each nurse was informed about the purpose of the study, those who agreed to complete in this study were asked to sign a consent form before starting the data collection. Confidentiality was ensured throughout the study process, and the nurses were assured that all data were used only for research purpose and their benefit. Each nurse was informed that participation is voluntary and they are free to withdraw from the study at any stage.

2.7 Pilot study

The pilot study was carried out on 10% from the total number of study sample (7) nurses to test the clarity, objectivity, feasibility, and applicability of the study tools as well as to estimate the time needed to fill in the questionnaire. Required modifications were done. Nurses involved in the pilot were excluded from the main study sample.

2.8 Field work:

After approval to conduct this study, official letters were used from the Dean of the Faculty of Nursing to the directors of the previously mentioned settings. The study was carried out through four phases: assessment, planning, implementation, and evaluation. These phases were carried out from beginning of September 2017 to the end of April 2018, covering along a period of eight months. The previously mentioned settings were visited by the researcher in the two shifts (morning - afternoon), two days/week alternatively.

Assessment phase: Upon securing official permissions to conduct the study, the researcher interviewed the maternity nurses, greeted each nurse, explained the purpose and procedures of the study, and asked for participation. Upon consent to participate, the nurse was interviewed to assess socio-demographic data, knowledge regarding late APH, as well as nurses' practices toward management of late APH. The data obtained during this phase constituted the baseline for further comparisons to evaluate the effect of the educational intervention. Average time for the completion of interviewing schedule 25-30 minutes. The number of assessed nurses/week ranged from 2-4 nurses. The time needed to fill in the checklist depends upon the time of each procedure and was filled in by the researcher during nurse's practices inside the department in the morning and afternoon shifts.

Planning phase: Based on the needs identified in the assessment phase from the maternity nurses, and in view of the related literature, the educational intervention was developed by the researcher in the form of printed Arabic booklet to satisfy the studied nurses' deficit knowledge and practices regarding management of late APH. Power Point presentation about late APH was prepared in simple Arabic language to suit the nurses' level of understanding. The general objective of the educational intervention was to improve maternity nurses' knowledge and practices regarding management of late APH.

Specific objectives: By completion of the educational intervention, each nurse will be able to:

- Define late Ante partum Hemorrhage
- Identify the incidence of late APH
- Enumerate causes of late APH
- Define placenta praevia
- List out the causes & risk factors of placenta praevia
- Explain the type of placenta praevia
- Describe the clinical manifestation of placenta praevia
- Discuss diagnosis of Placenta praevia

- Mention about the management of placenta praevia
- List out the complications of placenta previa
- Define abruptio placenta
- Discuss the incidence of abruptio placenta
- Explain the type of Abruptio placenta
- Enumerate causes of abruptio placenta
- Describe the clinical manifestation of abruptio placenta
- Discuss diagnosis of abruptio placenta
- Explain about the management of abruptio placenta
- Enlist complications of abruptio placenta

Implementation phase: Implementation of the educational intervention took (19) weeks period. The researcher visited the previously mentioned settings in the two shifts (morning - afternoon), two days/week alternatively. The educational intervention involved (6) scheduled sessions; 3 sessions for theoretical content and 3 for practical content and were implemented according to working circumstances, nurses' physical and mental readiness. These sessions were repeated to each subgroup of (4-5) nurses. The duration of each session lasted from half an hour to one hour including periods of discussion according to their achievement, progress and feedback. At the beginning of the first session an orientation to the educational intervention and its aims took place. Feedback was given in the beginning of each session about the previous one. Different teaching strategies were used such as lectures, group discussions, critical thinking and problem solving, concept mapping and demonstrations /re-demonstrations. Suitable teaching media were used, included an educational booklet that was distributed to all nurses in the first day of the educational intervention as well as audio-visual aids (data show presentation)

Evaluation phase: Immediately after implementation of the educational intervention, the post test for nurses' knowledge and practices was done by the same formats of the pre-test to assess the impact of the implemented educational intervention.

Limitation of the study:
Sometimes, the sessions were protracted due to workload, noise and other individuals' interruption that required more time than the devoted as well as more effort.

Statistical design:

Data analysis was performed using Statistical Package for Social Sciences (SPSS), version 20.0. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentage). Test of significance (chi-square and paired t test) were applied to test the study hypothesis. Correlation coefficient was calculated between knowledge, and practices scores as well as between knowledge, practice scores and sociodemographic data. A statistically significant difference was considered at p-value ≤.05, and a highly statistically significant difference was considered at p-value ≤ .001, while the p-value >.05 indicates non-significant results.

III. Results

Table (1) Represents socio-demographic characteristics of the studied nurses. It was clear that (39.1 %) of the nurses were aged from 30-<40 years, with a mean age (34.64□6.04) years. Furthermore, the majority (92.2%) of them were working as staff nurses. Regarding nurses' educational qualification, three quarter (75.0%) of them had secondary nursing education. As regards years of experience, three quarter (75.0%) of nurses had more than10 years of experience in the maternity ward, with a mean (15.77□5.38 years). Only (12.5%) of nurses attended training programs about APH.

Table (2) Represents that, there were highly statistically significant differences (P<.001) before and after implementation of the educational intervention in relation to nurses' knowledge regarding late APH.

Table (3): Indicates that, there was a highly statistically significant differences between mean scores of knowledge related to late APH between the pre and post educational intervention (p<0.001).
Fig. (1): Illustrates that, the majority (82.81 %) of the studied nurses had unsatisfactory knowledge before educational intervention. However, after intervention the almost (93.75%) of them had satisfactory knowledge.

Table (4): Displays that, there were highly statistically significant differences (P<.001) before and after educational intervention in relation to nurses' practices about initial assessment & emergency measures,

patient/caregiver teaching (instructions and explanations), Preparation for investigations and operations, nurses administration of physical care and medication and infection control and prevention (standard precautions).

Fig. (2): Illustrates that, only (9.40%) of the studied nurses had competent practices before educational intervention. However, after intervention changed to be (93.80%) after intervention.

Table (5) reflects that, there were negative, highly statistically significant correlations ($P \leq .01$) between nurses' total knowledge, total practices scores and their age, as well as between nurses' total knowledge, total practice scores and their years of experience before and after the educational intervention. On the other hand, there was a positive, highly statistically significant correlation ($P \leq .01$) between nurses' total knowledge, total practices scores and their educational level.

Table (6): shows the correlation between studied nurses' knowledge and practice scores pre and post educational intervention, it was observed that there was a highly positive association between their knowledge and practices scores pre and post educational intervention.

Table (1): Distribution of the studied nurses in relation to their Socio-demographic characteristics. (n= 64)

Variable		No	%
Age/ year			
-	20-<30	12	18.8
-	30-<40	25	39.1
-	40-<50	20	31.3
-	50+	7	10.8
Mean SD		34.64 6.0	
Educational qualification			
- Secondary nursing education		48	75.0
- Technical nursing education		12	18.8
-Bachelor of nursing		4	6.2
Job position			
-Head nurse		5	7.8
-Staff nurse		59	92.2
Years of experience			
-	Less than 5 years	6	9.4
-	5 - <10	10	15.6
-	10+	48	75.0
Mean SD		15.77 5.38	
Attendance of training program about late APH			
-Yes		8	12.5
-No		56	87.5

Table (2): Distribution of the studied nurses in relation to their knowledge regarding late APH before and after educational intervention (n= 64).

** Highly statistically significant difference at $P \leq .001$

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Knowledge about	Pre-intervention				Post-intervention				Chi square test	P value
	Incorrect		Correct		Incorrect		Correct			
	NO	%	NO	%	NO	%	NO	%		
Definition & incidence	45	70.3	19	29.7	8	12.5	56	87.5	35.24	<0.001**
Etiology, Predisposing factors & types	53	82.8	11	17.2	12	18.8	52	81.3	8.47	<0.001**
Clinical manifestation and complications	41	64.1	23	35.9	10	15.6	54	84.4	18.82	<0.001**
Diagnosis and management	49	76.6	15	23.4	15	23.4	49	76.6	38.04	<0.001**

Table (3): Mean knowledge scores of the studied nurses before and after educational intervention (n= 64)

Knowledge items	Maximum score	Pre-intervention Mean ±SD	Post-intervention Mean ±SD	Paired t test	P value
Definition & incidence of APH , placenta praevia & placenta abrubtio	6	3.25± 0.755	5.328 ±0 .473	-19.75	<0.001**
Etiology, Predisposing factors & types of APH , placenta praevia & placenta abrubtio	9	4.281±1.629	7.671± 0.473	-31.32	<0.001**
Clinical manifestation and complication of APH , placenta praevia & placenta abrubtio	6	3.484 ±1.617	5.609 ± 0.491	-22.18	<0.001**

Diagnosis and management of APH , placenta praevia & placenta abrubtio	15	8.750±1.1818	13.015 ±1.161	-16.91	<0.001**
Total	36	19.765±1.444	31.625±1.442	-39.81	<0.001**

** Highly statistically significant difference at P ≤ .001

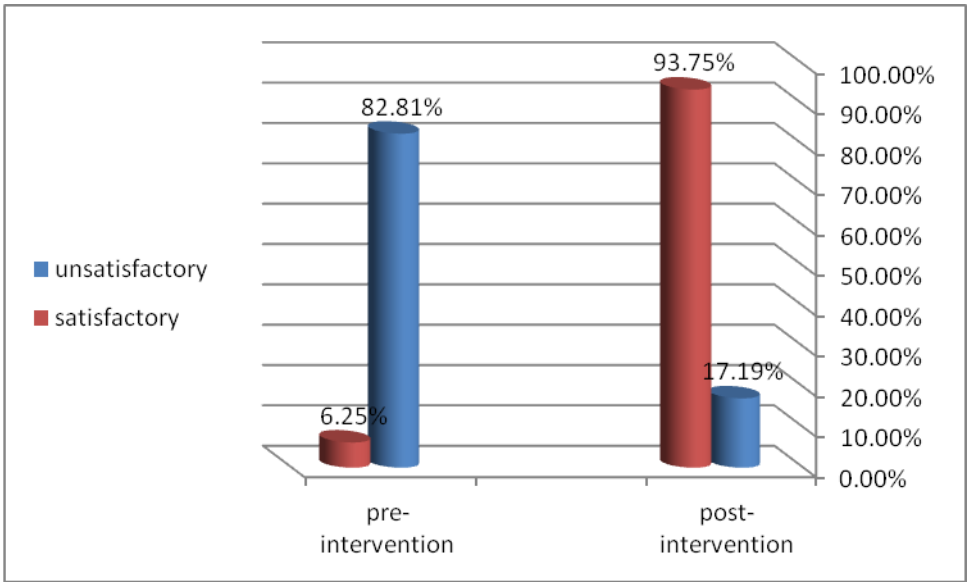

Fig. (1): Percentage distribution of the studied nurses according to their total knowledge scores before and after educational intervention (n= 64)

Practice items	Maximum score	Pre-intervention Mean ±SD	Post-intervention Mean ±SD	Paired t test	P value
Initial assessment & emergency measures	54	27.437± 5.206	49.687±2.315	-30.81	<.001**
Patient/caregiver teaching (instructions and explanations)	22	11.937± 2.329	20.812±1.331	-25.80	<.001**
Preparation for investigations and operations	12	6.109±1.544	11.312±1.081	-21.96	<.001**
Psychological support and keeping privacy	10	7.250± 1.603	9.546± 0.7111	-11.77	<.001**
Nurses administration of physical care and medication	20	12.546± 1.859	19.093± 1.422	-26.09	<.001**
Infection control and prevention - standard precautions	18	11.250± 1.490	17.140±1.401	-26.30	<.001**
Total practices score	136	76.53± 9.491	127.59± 7.548	-34.96	<.001**

Table (4): Mean practices scores of the studied nurses before and after educational intervention (n= 64)
** Highly statistically significant difference at P ≤ .001

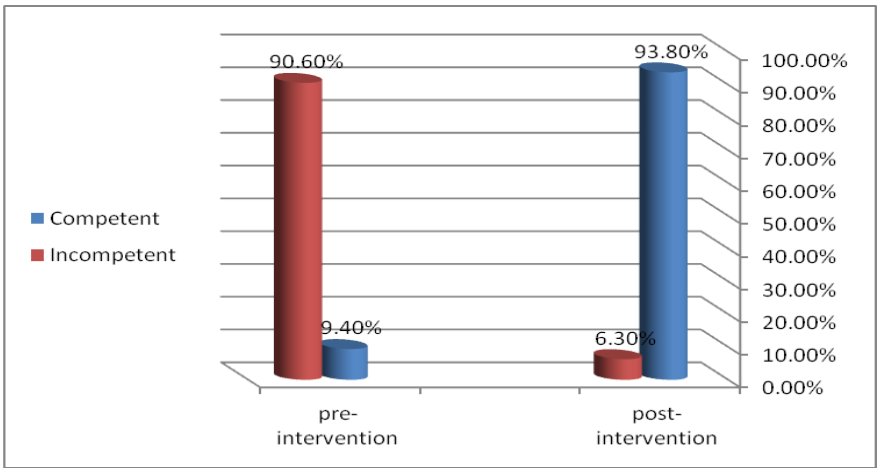

Fig. (2): Percentage distribution of the studied nurses according to their total practices scores before and after educational intervention (n= 64)

Table (5): Correlation coefficient between studied nurses' total knowledge and practices scores and their socio demographic characteristics before and after educational intervention (n = 64)

Variables		Age		Years of Experience		Educational level	
		r	P	r	P	r	P
Knowledge	Pre-intervention	-0.588	<.01**	-0.610	<.01**	0.476	<.01**
	Post-intervention	-0.584	<.01**	-0.634	<.01**	0.565	<.01**
Practice	Pre-intervention	-0.506	<.01**	-0.623	<.01**	0.366	<.01**
	Post-intervention	-0.577	<.01**	-0.587	<.01**	0.470	<.01**

**. Correlation is significant at the 0.01 level (2-tailed)

Table (6): Correlation coefficient between studied nurses' total knowledge and practices scores before and after educational intervention (n= 64)

Variables	Knowledge pre-intervention		Knowledge-post intervention	
	r	P value	r	P value
Practice pre-intervention	.658**	.000	-	-
Practice post-intervention	-	-	.946**	.000

**. Correlation is significant at the 0.01 level (2-tailed).

IV. Discussion

Obstetric hemorrhage remains one of the major causes of maternal death in developing countries and is the cause of up to 50% of the estimated 500 000 maternal deaths that occur globally each year ***Say et al., (2014)***[18] **,** and it is one of the primary obstetric causes of perinatal morbidity and mortality ***Gardosi et al., (2013).*** [19] Ante partum hemorrhage (APH) is one of the most frequent emergencies in obstetrics ***Sheikh & Khokhar, (2015)***[14]. Several evidence recommends a strong need for educational intervention in this area. ***Ruth &Kennedy (2011)*** [20] noted an increase in positive patient outcomes during treatment of late APH after staff nurses attended in-service training on the appropriate documentation and quantification of blood loss during pregnancy. Similarly, a recent study by ***Motanya (2015)***[21] demonstrated a need for educational programs for staff nurses and the need for hospitals to develop standards for professional practice related to decreasing APH. The present study was conducted to evaluate the effect of educational intervention on maternity nurses' performance (knowledge and practice) regarding management of late APH. The present study supported the stated hypothesis that educational intervention improved the maternity nurses' knowledge and practice regarding management of late APH.

Concerning maternity nurses' total knowledge about late APH, the present study findings revealed that the majority of the studied nurses had unsatisfactory knowledge before the implementation of the educational intervention. The decrease of the percentage of the nurses' knowledge before educational intervention may be due to that most of the studied nurses were secondary nursing education, working since more than 10 years ago, as well as the inadequate participation in training programs related to the research topic, where most of the nurses did not attend any training program about late APH. These findings are in agreement with ***Jayanthi, (2018)***[22] who had studied "the effect of structured teaching program on ante partum hemorrhage among staff nurses". He pointed out that, majority of the staff nurses had inadequate knowledge and only one third had moderate knowledge regarding causes and intervention of APH in the pretest. After administration of the

structured teaching program the minority of the subjects had moderate knowledge and the majority had adequate knowledge regarding causes and intervention of APH in the post test.

The present study findings showed highly significant improvement in the nurses' knowledge regarding all items related to late APH after the educational intervention as compared to before the intervention. The findings of the present study agree with at least four other researches. First, ***Ranjana,(2016)*** [13] who had studied "the effectiveness of structure teaching program on knowledge regarding causes and intervention of APH among staff nurses" He pointed out that there were significant difference between pre test and post test level of knowledge of staff nurses regarding the causes and intervention of APH. *Second*, ***Heikham & Raddi (2015)*** [23] they had studied "the effectiveness of planned teaching program on knowledge regarding management of selected obstetric emergencies among the final year GNM students of selected school of nursing" The results revealed that in pre test, majority of the subjects had average knowledge, less than one quarter had poor knowledge and only (14%) had good knowledge regarding management of selected obstetric emergencies. *Third*, ***Hamza, (2015)*** [24] who had studied" the assessment of nurses Knowledge for nursing care of women have placenta previa, in antenatal ward at Rib at University hospital" He recommended that should be have intensive effort to improve the knowledge and awareness within graduated nurse about how to provide care, close monitoring to women with placenta previa, this could be through: lectures, workshops, seminars and training course.

Fourth ***Kavitha, et al. (2014)*** [25] they had assessed level of knowledge of staff nurses on emergency obstetric management at orotta national referral maternity hospital and showed the knowledge score regarding ante partum hemorrhage management among staff nurses, majority of the staff had moderately adequate knowledge and (18.3%) of the staff had inadequate knowledge and only (3.3) had adequate knowledge regarding hemorrhage management pre intervention . Hence there is significant difference between pre test and post test level of knowledge of staff nurses regarding management ante partum hemorrhage

This improvement of knowledge post intervention in the present study may be attributed to the ability of the maternity nurses to gain knowledge easily and they are interested to refresh and update their knowledge about APH as well as the distribution of the written booklet to nurses to be used as an ongoing reference, was helpful in nurses' acquisition of knowledge.

Regarding mean practices scores of the staff nurse, the findings of present study revealed that there were highly statistically significant differences (P<.001) between pre and post intervention in relation to nurses' practices about, initial assessment & emergency measures, patient/caregiver teaching (instructions and explanations), Preparation for investigations and operations, nurses administration of physical care and medication and infection control and prevention and total practices scores

These results are in accordance with ***Harshash, (2017)*** [26] who had studied "the effect of maternity nurses' practices of women with late ante partum hemorrhage" she recommended that should be maintaining good performance of maternity nurses regarding ante partum hemorrhage through: develop a clear protocol for the management of massive hemorrhage, which should be regularly updated and rehearsed. Educational program, regular seminars and work shop should be presented monthly to maternity nurses by head nurses and doctors. The researcher's point of view in the current study that the majority of staff nurse participants gained more knowledge about management of late APH in posttest. The knowledge about management of late APH increased significantly. The session show significant remarkable effect of the result. Also educational intervention has a great effect not only on the maternity nurses' knowledge but also on their performance in nursing care where, the staff nurse gain real-world experience.

Regarding the relationship between nurses' total knowledge and practices scores and their socio-demographic characteristics, the findings of the present study revealed that, there were negative, statistically significant correlations between nurses' total knowledge and practices scores and their ages and years of experience through all the study periods. This means that nurses' level of knowledge and practices is better with decreased ages and years of experience. This might be due to that the older nurses delegated nursing activities to the younger nurses and have a small number of assigned patients beside some administrative roles, in addition to the fact that young age nurses have the ability to remember and retrieve information easily than older nurses. This result is compatible with ***Ranjana, (2016); Mohammed and El-Sayed (2015) and El-Bahy et al. (2013)*** [13,27,28] The *first*, had studied "the effectiveness of structure teaching program on knowledge regarding causes and intervention of APH among staff nurses. He found statistically significant association between the total knowledge scores of the staff nurses and demographic variables such as age and experience in maternity ward at the probability level of p<0.05. The *second*, had studied" the effect of an educational intervention regarding cord blood collection and stem cells on knowledge and attitude of maternity nurses". They found negative statistically significant correlations between nurses total knowledge scores and their ages and years of experience at different times of assessment. The *third*, had studied the "effect of an educational program for maternity nurses about pregnancy induced hypertension on their knowledge in Port Said hospitals", they showed a statistically significant association between nurses' knowledge about pregnancy induced

hypertension at the follow-up phase and their age and years of experience.

On the other hand these findings disagree with ***Ramadan, et al. (2018)***[29] they had studied ''effect of an educational intervention on maternity nurses' performance regarding non-invasive fetal wellbeing measure". They showed that no statistically significant difference among studied participants total knowledge and practices score and their age and years of experience ($p>0.05$).

Moreover, the current study showed a positive, statistically significant correlation ($P\leq .01$) between nurses' total knowledge and practices scores and their educational level. In the same line, the previously mentioned, ***Mohammed and El-Sayed (2015)***[27] study, pointed out that there was a statistically significant correlation between the studied nurses' total knowledge score and their educational level. As well ***Ramadan, et al. (2018)***[29] found a highly statistical significant correlation between the studied participants total knowledge and practices score and their educational qualification. ($p<0.001$).

As regards the relationship between nurses' total knowledge and practices scores regarding APH throughout the educational intervention, there was a positive highly statistically significant correlation ($P\leq.01$). This strong correlation between nurses' knowledge and practices is highly expectable; whereas, the effective management of late APH is often hindered by lack of knowledge in addition to the basic knowledge about late APH is essential for effective nursing practices. This result was supported by ***Kaur et al. (2016)***[30] who had studied "knowledge and practices regarding antenatal assessment among obstetric nurses", they found highly significant association between obstetric nurses' knowledge and their practices regarding antenatal assessment. This finding is also in agreement with the previously mentioned ***Ramadan, et al. (2018)***[29] study, they had found a high positive correlation between total knowledge and practices score of studied nurses at pre and post intervention phase.

The researcher view that the staff nurse must be aware and have knowledge about management of late APH because it is a corner stone in management of high risk pregnancy. Moreover, the result of the present study demonstrated that the staff nurse had better knowledge on posttest and there were highly statistical significant difference between pretest and posttest. This could be attributed to the fact that any training course increase nurses knowledge in turn changes their practices.

V. Conclusion

Based on the results of the present study, it can be concluded that, there was a statistically significant improvement in nurses' knowledge and practices mean scores after the educational intervention. The educational intervention had a positive effect on improving knowledge and practice of maternity nurses towards management of late ante hemorrhage Moreover, the above mentioned results proved and reinforced the study hypothesis.

Recommendations

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

- Frequent and schedule In-services training program should be applied for nurses at the hospital regarding management of late APH in order to improve nurses' knowledge and practices which will be reflected on improving the quality of health care.
- Encourage nurses to attend continuing education in the form of workshops, conferences and review update nursing care related to management of late APH.
- Providing maternity nurses in obstetrics and gynecology departments with an instructional booklet regarding management of late APH to enhance their knowledge and practices.
- The nursing curriculum of basic nursing should include the knowledge about causes and intervention of late APH and should be revised and updated according to recent researches regarding management late APH .

Further research:

- Replication of the study on a larger sample and in different geographical areas in Egypt is recommended for generalization of findings.

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