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Application of WHO guidelines regarding prevention and management of postpartum hemorrhage on nurses' competence and self- confidence

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ABSTRACT

Background: Postpartum hemorrhage (PPH) continues to be the leading cause of maternal morbidity and mortality in most countries around the world. **Aim:** The goal of the study was to evaluate application of WHO guidelines regarding prevention and management of postpartum hemorrhage on nurses' competence. **Subjects and method: Research design:** the current study used a quasi-experimental design. **Setting:** The study was carried out in in Obstetrics & Gynecology Specialized hospital affiliated of Comprehensive Health Insurance to Port Said city. **Sample:** A convenience sample of all nurses (150 nurses) in Obstetrics & Gynecology Specialized hospital who working at time of study were included in the study. **Data collection tools:** the initial tool, structured interviewing form, the second tool, Nurses' competency toward prevention of postpartum-hemorrhage, the third tool, Nurses' practice observational checklist and the last tool, Self-confidence measurement Scale. **Results:** The present study showed that all of the studied nurses had poor overall knowledge and negative attitude regarding prevention and management of postpartum hemorrhage pre applying WHO guidelines. Also, the vast majority of the studied nurses reported unsatisfactory practice regarding prevention and management of post-partum hemorrhage. But, there were a marked improvement of the studied nurses' knowledge, attitude and practice post applying WHO guidelines for prevention and management of post-partum hemorrhage. **Conclusion:** The current study found that application of WHO guidelines was effective in achieving the aim of enhancing nurses' competence and their self-confidence regarding prevention and management of post-partum hemorrhage among the studied nurses. **Recommendations:** Implementing of periodical health education programs for intern nurses to enhance competent skills for achieving advanced nursing care regarding prevention and management of primary postpartum hemorrhage.

Key Words: Management – Self-confidence- Nurses' competence – Postpartum hemorrhage- Prevention- WHO guidelines

Introduction

Childbirth is a life-changing event for most women and families all over the world, but it is associated with great risks, disability and even death for some mothers and newborns. Every year, nearly 600 000 women worldwide between the age of (15-45) die due to complications from pregnancy and childbirth. The four major causes of maternal deaths are obstetric hemorrhage, infections, hypertensive disorders and obstructed labor (Cunningham, Leveno, Bloom, Dashe, Hoffman, Casey & Spon, 2018).

Obstetric hemorrhage is the most common and dangerous complication of childbirth. It can be broadly categorized as antepartum hemorrhage and postpartum hemorrhage (PPH). PPH is a potentially life-threatening obstetric emergency associated with both the vaginal birth (2-4%) and the cesarean birth (6-7%) as a consequence of the third stage of labor (Wormer, Jamil & Bryant, 2022).

Postpartum hemorrhage (PPH) is commonly defined as blood loss exceeding 500 mL following vaginal birth and 1000 mL following cesarean. Definitions vary, however, and diagnosis of PPH is subjective and often based on inaccurate estimates of blood loss. Moreover, average blood loss at birth frequently exceeds 500 or 1000 mL. Proposed alternate metrics for defining and diagnosing PPH include change in hematocrit, need for transfusion, rapidity of blood loss, and changes in vital signs, all of which are complicated by the emergent nature of the condition (Bihan, Nowak, Anouilh, Tremouilhac, Merviel, Tromeur & de Moreuil, 2023).

Postpartum hemorrhage is a serious obstetric emergency and one of the top five causes of maternal mortality globally. Each year, about 14 million women experience PPH resulting in about 70,000 maternal deaths globally (World Health Organization, 2022). In developing countries, the estimated mortality rate is 140,000 per year or one maternal death every 4 minutes due to postpartum hemorrhage (Menezes, Cardoso & Pednecar, 2021).

Early detection and management, in a timely manner can be lifesaving. Measuring blood loss (MBL) is more accurate than visual estimation, therefore all blood loss should be measured and recorded following all births. When MBL reaches 500ml (minor PPH), Stage 1 PPH Management should be commenced and help should be

summoned from midwife in charge and first line obstetric and anesthetic staff. Massive Hemorrhage Protocol should be activated, and the consultant obstetrician should be asked to attend (McKinney, James, Murray, Nelson & Ashwill, 2021).

Nurses and midwives, particularly in sub-Saharan hospitals, are the key clinicians in birth care. But, substandard performance of nurses and midwives in managing birth complications has been documented widely as a major cause of maternal and newborn deaths in hospital settings globally (Mohammed, Omran, Elsayed & Salama, 2023).

Clinical teaching is a hallmark of nursing education. It provides an opportunity for nursing students to apply, practice, and develop problem solving, critical thinking, decision-making and communication skills, as well as improves their legal and ethical issue (El-hamid, Mahmoud, Ahmed, Abo-zaid & El-adham, 2021).

Moreover, professional nursing requires knowledge and skills to deal with a number of challenges; well-planned and organized simulation exercises that could help in developing students' critical reflection and clinical competence. The competence gained through simulation helps nursing student to raise confidence and reduce stress levels (Akselbo and Aune, 2023).

Several studies have documented that knowledge and skills of nurses and midwives in low-resources settings are not always at an acceptable level despite their previous education. Hence, improving competency of nurses and midwives could improve maternal and newborn outcomes. One of the approaches to improve competency of nurses and midwives is to conduct regular in-service training courses. Promoting continuous professional development of midwives presents a constant promise of more effective and safe birth care in low-resources settings (Nishimwe, Ibisomi, Nyssen & Conco, 2021).

Because the maternity nurses are ready beside the bedside, they are the first responders to primary postpartum hemorrhage. Nurses must be equipped with the knowledge and procedures essential to recognize patients who have a postpartum hemorrhage to prevent maternal morbidity and death caused by postpartum hemorrhage. Maternity nurses should know how to manage postpartum hemorrhage, including fundal massage method and quantifying blood loss in the case of uterine atony, which is a life-saving intervention (Elbahlowan, El-Salam, Ali & Ashour, 2022).

Significance of the study:

Postpartum hemorrhage is the world's leading cause of maternal mortality, accounting for one-third of all maternal deaths worldwide (Alsaqri, S. 2016). In Egypt, the maternal mortality ratio stood at 45 deaths per 100,000 live births in 2013 according to World Health Organization (WHO, 2014). According to Ministry of Health & Population, September (2014) P.P.H. represents about 19.7% of the direct causes of maternal mortality (Kassebaum, Amelia, Megan, Katya, Caitlyn & et al., 2014). Approximately 88% of these deaths occur within 4 hours of delivery, highlighting the need for timely management during delivery and in the immediate after birth (Prata, Sreenivas, Vahidnia & Potts, 2014).

Nurses are often the first line providers responding to postpartum hemorrhage because they are readily at the bedside. According to the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN), 93% of maternal deaths caused by postpartum hemorrhage could have been prevented with improved clinical response (AWHONN, 2013). While the previous studies on PPH are very low in port-said city, so it is important to carry out this study to improve competencies of nurses regarding management and prevention of postpartum hemorrhage.

Aim of the study:

The present research was aimed to evaluate application of WHO guidelines regarding prevention and management of postpartum hemorrhage on nurses' competence through:

1. Assess nurses' knowledge and practice regarding prevention and management of postpartum hemorrhage in Gynecology & Obstetrics Specialized hospital.
2. Apply WHO guidelines regarding prevention and management of postpartum hemorrhage on nurses' competence and self-confidence in Gynecology & Obstetric Specialized hospital.
3. Evaluate application of WHO guideline regarding prevention and management of postpartum hemorrhage on nurses' competence and self-confidence in Gynecology & Obstetric Specialized hospital.

Research hypothesis:

- ✓ Nurse's competence will be higher after applying WHO guideline regarding prevention and management of postpartum hemorrhage in Gynecological & Obstetric Specialized hospital.
- ✓ Nurse's self-confidence will be higher after applying WHO guideline regarding prevention and management of postpartum hemorrhage in Gynecological & Obstetric Specialized hospital.

Subjects and Method;

To conduct this study, a quasi-experimental design was used for one group (pretest and posttest).

Research setting:

The study was carried out in at Obstetrics & Gynecology Specialized hospital affiliated of Comprehensive Health Insurance to Port Said city

3- Sample:

A convenience sample of all nurses (150 nurses) in Obstetrics & Gynecology Specialized hospital who working at time of study were included in the study.

4- Data collection tools:

Four tools were used to collect data as the followings:

Tool I: structured interviewing form:

It was designed by the researcher after reviewing the related literature national and international and reviewed by supervisors. It was in an Arabic language and include personal characteristics about the study subjects such as: age, marital status, educational level, years of experience, residence and previous training courses about PPH.

Tool II: Nurses' competency toward prevention of postpartum-hemorrhage :-

It was adapted from (Abd Elhakm & Elbana, 2018) in Arabic language and modified by the researcher. Questions asked to evaluate competency of the prevention and management of PPH among participants. Nurse competency Likert-scale contained (Twenty-one) items and answers ranged from 'Demonstrate competency' and 'Doesn't demonstrate competency' ' and was scored 2 to 1 for each statement.

Scoring system

The total score of competency was calculated as:

- Positive : $\geq 75\%$
- Natural : $50\% < 75\%$
- Negative : $< 50\%$

Tool III: Nurses' practice observational checklist:

Performance skills were measured using an objective structured clinical examination (OSCE). The OSCE was an instrument that provides an objective evaluation of nurse's ability to perform clinical skills. A typical OSCE consisted of **15 to 20** stations that assess nurses theoretical and practical level (performance skills). The practical stations consisted of a skills checklist adapted from (Health Service Executive; 2016) guideline on management of postpartum hemorrhage, the practice checklist contained the individual steps or tasks in the sequence required to perform all the skills or activities being taught in a standardized way and include: Active management of the third stage of labor (AMTSL) 3 items, general management of PPH (9 items), Specific management of stages of PPH (4 items).

Scoring system

The maternity nurses' practices were scored as follow: 2 = done the step or task completely. 1 = done the step or task incompletely. 0 = Not done. The total practice score was summed up and categorized as follows: ≥ 60 % Satisfactory and < 60 % Unsatisfactory.

Tool IV: Self-confidence measurement Scale:

It was Adapted from *National League for Nursing*; 2012 .Self-confidence scale consisted of **7-items** that measures how confident nurses feel about the skills they practice. Items are measured on a three-point Likert scale (strongly disagree (0), disagree (1), agree (2). Total score of 0 to 7 was considered as unconfident and total score of 8 to 21 was considered as confident (Pre/post).

B-Operational design:

The recent study's operational design involved a stage of planning, content validity and reliability, a pilot study, and fieldwork.

1-Preparatory phase:

In order to construct the instruments for gathering information, a thorough evaluation of the relevant existing nationwide and globally studies, as well as conceptual comprehension of numerous subject components, was conducted..

2-Content validity of the tool:

Tools of data collection were developed by the researcher and tested for content validity by a panel of five experts in the field of Maternity, Obstetrics and Gynecology nursing, faculties of nursing and medicine (Port-Said and Suez Canal universities). It was conducted to test the tools for appropriateness, comprehensiveness, relevance, and

clearance. Their opinions were elicited regarding the tool format, layout, and consistency. The necessary modifications were done accordingly.

3-Reliability of tool:

The reliability was done by Cronbach's Alpha coefficient test which revealed that each of the three tools consisted of relatively homogenous items as indicated by the moderate to high reliability of each tool. The internal consistency of knowledge was 0.89 and the internal consistency of practice was 0.91. While self-confidence was 0.81.

4-Pilot study:

The pilot study carried out on 10% of total sample (15) to evaluate efficiency, reliability and clarity of tools, no modifications were done then nurses involved in the pilot study were included in the main sample.

5-Field work:

The phases of assessment, planning, implementation, and evaluation were used to complete this fieldwork.

Preparatory phase

After reviewing the relevant literature to the study, the tools were designed, the health educational program based on WHO guidelines and the supportive material (an Arabic booklet) were developed and finally the pilot study was conducted to assess applicability of the study tools after confirming the content validity of the developed tool, the health educational guidelines and material by a panel of experts in maternity nursing and obstetric medicine.

Assessment phase (Pre-test phase)

The researchers introduced her-self and all maternity nurses were interviewed, the purpose of the study was explained by the researcher and an oral consent was taken to participate in the study, Then socio-demographic characteristics and baseline data about nurses' knowledge were collected using tool (I), time needed for nurses to fill this sheet was 25 min. Nurses were asked to perform clinical skills procedures regarding management of postpartum hemorrhage before program implementation using tool (III), time needed to perform steps was 60 minutes for all procedures. Depending on the result of pre-test questionnaire for knowledge and performance, contents of guidelines were prepared and revised by 5 experts in the related field.

After introducing herself and getting their consent to participate in the study, she began interviewing the teenage girls who were blind and filled out the questionnaire sheet and then explained the purpose of the study. The study sample was assured that all collected information was be confidential.

Planning phase

It was selected based on the program objectives & maternity nurses' assessment needs. Study group received both theoretical part and training about nursing management of PPH according to WHO guidelines.

The researcher prepared the health educational program after back to review of literature of (Abd Elhakm & Elbana, 2018) which given for three sequent days. It designed in a simple Arabic language to improve the knowledge and practice of the nurses regarding prevention and management of PPH. In addition, the supportive material which was an Arabic booklet was prepared, the content of the supportive booklet was prepared by the researchers in an Arabic simple understood language.

Implementation Phase:

The study group participants' were divided randomly into ten subgroups; which included 4-6 nurses three times weekly from 9.00.A.M to 3.00 P.M and from 3.00 P.M to 9.00. P.M for the purpose of training course. The program was implemented in 10 weeks, each subgroup cover one week. The training course for each subgroup includes 2 hour theoretical with a 4hour practical. All theoretical sessions were followed by training skills. The program sessions were implemented as follows:

Theoretical and Training sessions:

Session (1): included basic knowledge about PPH as definition, types, causes, signs &symptoms, high- risk group, prevention during antenatal, labor, postpartum period, and complication. Followed by demonstrating nursing assessment for early detection and prevention.

Session (2): included active management of the third stage of labor (followed by training provided to them according to checklist for nurses' performance skills).

Session (3): included nursing management of atonic postpartum

Debriefing:

Immediately, following the training skills researchers conducted debriefing as a reflective activity. This lasted about 30 minutes at the end of debriefing; the team was asked if there were any additional comments

Evaluation Phase

After implementation of training program, the researchers were use the same previous assessment tool (I, III) to evaluate the effect of educational program on nurses' knowledge and performance skills in management and prevention of postpartum hemorrhage (Post-test). Also, nurses 'attitude and self-confidence was evaluated using the nurses 'attitude scale tool (II) and self-confidence Scale (tool IV) which measures how confident nurses feel about the skills they practice when participating in the health educational program.

(III) Administrative Design:

An official permission to carry out the study from the responsible authorities was obtained. Before conducting the study, official letter was submitted from the faculty of nursing, Port Said University to Obstetrics & Gynecology Specialized hospital affiliated of Comprehensive Health Insurance to Port Said city to obtain their approval to carry out the study. At the time of data collection, a verbal agreement was taken from every participant in the study after clear and proper explanation of the study purpose.

Ethical Consideration

The research approval was obtained from scientific research ethical committee in faculty of nursing at Port-Said University before starting the study. Explain the aim of the study to the director of Obstetrics & Gynecology Specialized hospital affiliated of Comprehensive Health Insurance to Port Said city to take their permission to do this study. Oral consent was obtained from the maternity nurses. Explain the aim of the study to each participant to be familiar with the importance of her participation. A brief explanation of the study was given to assure the nurses that the information obtained was confidential and used only the purpose of the study. The process of data collection wasn't disturb the harmony of the work. All data were collected from the studied subjects were processed in a total confidentiality. The maternity nurses were told about their rights to withdraw from the study anytime.

D-Statistical analysis:

The data were collected, organized, coded, computerized and analyzed by using appropriate statistical methods and tests (Mean and standard deviation for quantitative data, X² for qualitative data and correlation tests) were used, data presented in suitable tables and figures using appropriate statistical techniques & tests of significance.

Results:

Table (1) Illustrates distribution of the studied nurses according to their general characteristics, more than one third of the studied nurses (44.0%) were in the age group 25-

<30 year with Mean $\pm$ SD was 27.50 ± 4.31 . Regarding education of the studied nurses, more than half of them (58.0%) had nursing technical institute and only 14.0% of them had diploma degree. More than half of them (62.0%) had less than five years of experience. Near to three quarters of the studied nurses (72.0%) didn't have taken any postpartum hemorrhage prevention courses right.

Table (2) Reveals there was a marked improvement in level of practice the studied nurses regarding all items of management of postpartum hemorrhage post of providing instructional guidelines with a highly statistically significant difference ($P \leq 0.001$) compared to pre applying WHO guidelines. As evidence, less than one fifth and the minority of the studied nurses reported incorrect practice regarding the items of (administration of fluids infusion & Insert fully catheter and empty the bladder) pre- applying WHO guidelines while changed to all of them reported correct practice of these items post applying WHO guidelines respectively.

Table (3) Demonstrates that there was a highly statistical significant differences between most items of the studied nurses' practice regarding prevention and management of PPH pre and post- applying WHO guidelines, whereas ($P \leq 0.001$). As evidence, the high percent of the studied nurses reported unsatisfactory level of practice at (psychological support, preparations, active management of the 3rd Stage of labor, general management of PPH, assess blood loss and nature of bleeding, active management during 4th stage of labor monitoring and nursing measures. Additionally, the majority of the studied nurses (96.0%) reported unsatisfactory level of overall practice regarding prevention and management of PPH pre-applying WHO guidelines compared to all of them (100.0%) reported satisfactory level of overall practice regarding prevention and management of PPH post-applying WHO guidelines.

Table (4) Shows that there was a highly statistical significant differences between most items of the studied nurses' self-confidence pre and post- applying WHO guidelines, whereas ($P \leq 0.001$). As evidence, the minority of the studied nurses (6.0%) disagreed regarding the item of (suturing of vaginal/perineal tears / episiotomy) pre-applying WHO guidelines while changed to the majority of them (98.0%) agreed post-applying WHO guidelines.

Table (5) Portrays that there was a highly statistical significant differences between most items of the studied nurses' competency regarding prevention of PPH pre and post-applying WHO guidelines, whereas ($P \leq 0.001$). As evidence, all of the studied nurses (100.0%) reported that they doesn't demonstrate competency related to the item of "Evaluates

evidence based practices and outcomes" pre-applying WHO guidelines while changed to all of them (100.0%) demonstrate competency regarding it post-applying WHO guidelines.

Table (6) Shows that there was a positive correlation with highly statistical significant differences between the studied nurses' total score level of self-confidence, self-competence and their total score and practice pre and post- test, whereas ($P \leq 0.001$).

Table (1): Distribution of the studied nurses according to general characteristics (n = 150)

General characteristics	No.	%
Age		
<25	42	28.0
25-<30	66	44.0
≥ 30	42	28.0
Min. – Max.	21.0 – 39.0	
Mean $\pm$ SD.	27.50 $\pm$ 4.31	
Median	26.50	
Education		
Diploma of nursing	21	14.0
Nursing technical institute	87	58.0
Bachelor of nursing	42	28.0
Postgraduate	0	0.0
Years of experience		
<5	93	62.0
5-<10	30	20.0
≥ 10	27	18.0
Min. – Max.	1.0 – 15.0	
Mean $\pm$ SD.	5.20 $\pm$ 4.11	
Median	4.0	
Have you taken any postpartum hemorrhage prevention courses right		
Yes	42	28.0
No	108	72.0
If yes : How many training courses	(n = 42)	
G	9	21.4
2	12	28.6
3	21	50.0

SD: Standard deviation

Table (2): Percent distribution of the studied maternity nurses regarding their level of practice about management of PPH pre, and post applying WHO guidelines (n = 150)

Maternity nurses' level of practice about management of PPH	Pre		Post		x2
	No	%	No	%	P-Value
1. Measure vital signs :					
Incorrect or not done.	4	2.6	0	0.00	90.795* <0.001*
Correct and incompetently done.	10	6.6	0	00.0	
Correct competently done.	136	73.3	150	100.0	
2. Assess the blood loss estimation : (Amount, Cause , Sources)					
Incorrect or not done.	124	82.6	1	0.6	98.052* <0.001*
Correct and incompetently done.	20	13.3	0	0.00	
Correct Competently done.	6	4.0	149	99.3	
3. Administration of utero-tonic medication :					
Incorrect or not done.	119	79.3	0	0.00	100.000* <0.001*
Correct and incompetently done.	20	13.3	3	2.0	
Correct Competently done.	11	7.3	147	98.0	
4. administration of fluids infusion :					
Incorrect or not done.	19	12.6	0	0.00	94.929* <0.001*
Correct and incompetently done.	9	6.0	0	0.00	
Correct competently done.	122	81.3	150	100.0	
5. Placenta examination:					
Incorrect or not done.	120	80.0	3	2.0	86.484* <0.001*
Correct and incompetently done.	3	2.0	0	0.00	
Correct competently done.	27	18.0	147	98.0	
6. Uterine massage:					
Incorrect or not done.	120	80.0	1	0.6	69.725* <0.001*
Correct and incompetently done.	20	13.3	1	0.6	
Correct Competently done.	10	6.6	148	98.6	
7. Assess location and consistency of the fundus:					
Incorrect or not done.	34	68.0	0	0.00	79.353* <0.001*
Correct and incompetently done.	16	32.0	3	2.0	
Correct Competently done.	0	0.0	147	98.0	
8- Insert fully catheter and empty thebladder					
Incorrect or not done	5	3.3	0	0.00	49.93 <0.001*
Correct and incompetently done.	25	150.0	0	0.00	
Correct Competently done.	120	80.0	150	100.0	

*: Statistically significant at $p \leq 0.05$

Table (3): Comparison between overall levels of nurses' practice pre and post applying WHO guidelines (n = 150)

Observation of nurses' practice	Pre				Post				p value
	Satisfactor y		Unsatisfactor y		Satisfactory		Unsatisfactor y		
	No.	%	No.	%	No.	%	No.	%	
• Psychological support	4	2.6	146	97.3	148	98.6	2	1.3	<0.001**
• Preparations	27	18.0	123	82.0	150	100.0	0	0.0	
• Immediate care of the new born	96	64.0	54	36.0	150	100.0	0	0.0	
• Active Management of the 3 rd Stage of labor	0	0.0	150	100.0	149	99.3	1	0.6	
• General management of PPH	0	0.0	150	100.0	150	100.0	0	0.0	
• Assess blood loss and nature of bleeding	18	12.0	132	88.0	150	100.0	0	0.0	
• Active management during 4 th stage of labor monitoring	9	6.0	141	94.0	148	98.6	2	1.3	
• Nursing measures	6	4.0	144	96.0	150	100.0	0	0.0	
• Overall practice	6	4.0	144	96.0	150	100.0	0	0.0	

** Highly statistically significant $P \leq 0.001$

Table (4): Comparison between total scores of self-confidence of the studied nurses pre-post applying WHO guidelines (n = 150)

Self-confidence measurement Scale:	Pre								Post								X ² P-Value
	Strongly Disagree		Disagree		Agree		Strongly agree		Strongly disagree		Disagree		Agree		Strongly agree		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
- Administration of utero-tonic drugs	3	2.0	72	48.0	63	42.0	12	8.0	0	0.0	0	0.0	126	84.0	24	16.0	283.50* <0.001*
- Early cord clamping and cutting.	6	4.0	45	30.0	90	60.0	9	6.0	0	0.0	3	2.0	135	90.0	12	8.0	
- Controlled cord traction	54	36.0	66	44.0	21	14.0	9	6.0	0	0.0	0	0.0	75	50.0	75	50.0	
- Uterine massage	3	2.0	9	6.0	99	66.0	39	26.0	0	0.0	18	12.0	75	50.0	57	38.0	
- Examine the placenta.	96	64.0	39	26.0	12	8.0	3	2.0	3	2.0	3	2.0	42	28.0	102	68.0	
- Early breast feeding	3	2.0	24	16.0	81	54.0	42	28.0	0	0.0	0	0.0	63	42.0	87	58.0	
- Early vital signs measuring	3	2.0	9	6.0	102	68.0	36	24.0	0	0.0	3	2.0	54	36.0	93	62.0	
- Measuring blood loss after labor	123	82.0	21	14.0	0	0.0	6	4.0	6	4.0	57	38.0	45	30.0	42	28.0	
- Assess signs and symptoms of PPH.	15	10.0	105	70.0	24	16.0	6	4.0	0	0.0	0	0.0	111	74.0	39	26.0	
- Diagnose uterine atony	9	6.0	30	20.0	108	72.0	3	2.0	0	0.0	0	0.0	141	94.0	9	6.0	
- Diagnose trauma if present	27	18.0	48	32.0	69	46.0	6	4.0	0	0.0	0	0.0	135	90.0	15	10.0	
- Diagnose missed part of placenta inside uterus	3	2.0	36	24.0	105	70.0	6	4.0	0	0.0	0	0.0	132	88.0	18	12.0	
- Recognized disturbance of blood clotting factor	138	92.0	6	4.0	0	0.0	6	4.0	0	0.0	0	0.0	9	6.0	141	94.0	
- Action to take if PPH is diagnosed	6	4.0	69	46.0	69	46.0	6	4.0	0	0.0	0	0.0	135	90.0	15	10.0	
Call the doctor for help if PPH is diagnosed	3	2.0	12	8.0	111	74.0	24	16.0	0	0.0	0	0.0	126	84.0	24	16.0	
Provide information to the woman	126	84.0	12	8.0	6	4.0	6	4.0	0	0.0	0	0.0	57	38.0	93	62.0	
Bimanual compression to the uterus	93	62.0	45	30.0	9	6.0	3	2.0	0	0.0	3	2.0	90	60.0	57	38.0	
Suturing of vaginal/perineal tears / episiotomy	3	2.0	9	6.0	126	84.0	12	8.0	0	0.0	0	0.0	147	98.0	3	2.0	
Manual removal of retained placenta/fragments	21	14.0	93	62.0	30	20.0	6	4.0	0	0.0	3	2.0	129	86.0	18	12.0	

* Statistically significant $P \leq 0.001$

Table (5): Distribution of the studied nurses according to competency to ward for prevention of post-partum hemorrhage Pre and post applying WHO guidelines (n = 150)

Nurses competency to ward for prevention of PPH	Pre				Post				X ² P-value
	Doesn't Demonstrate competency		Demonstrate competency		Doesn't Demonstrate competency		Demonstrate competency		
	No.	%	No.	%	No.	%	No.	%	
- Obtain pertinent data	126	84.0	24	16.0	24	16.0	126	84.0	643.50* <0.001*
- Perform follow up assessment as needed	60	40.0	90	60.0	15	10.0	135	90.0	
- Assesse the environment in an orderly manner	129	86.0	21	14.0	75	50.0	75	50.0	
- Communicate effectively with professional team	51	34.0	99	66.0	75	50.0	75	50.0	
- Communicate effectively with patient	138	92.0	12	8.0	108	72.0	42	28.0	
- Document clearly, concisely and accurately	147	98.0	3	2.0	87	58.0	63	42.0	
- Responds to abnormal findings appropriately	48	32.0	102	68.0	96	64.0	54	36.0	
- Promotes professionalism	150	100.0	0	0.0	105	70.0	45	30.0	
- Interprets vital signs	126	84.0	24	16.0	39	26.0	111	74.0	
- Interprets lab results	42	28.0	108	72.0	9	6.0	141	94.0	
- Interprets subjective data	81	54.0	69	46.0	15	10.0	135	90.0	
- Prioritizes appropriately perform evidence based practices	147	98.0	3	2.0	18	12.0	132	88.0	
- Evaluates evidence based practices and outcomes	150	100.0	0	0.0	0	0.0	150	100.0	
- Reflects on clinical experience	81	54.0	69	46.0	15	10.0	135	90.0	
Delegates appropriately	147	98.0	3	2.0	24	16.0	126	84.0	
Use patient identifies	144	96.0	6	4.0	93	62.0	57	38.0	
Utilizes standardized practices and precautions	141	94.0	9	6.0	60	40.0	90	60.0	
Administer medications safety	147	98.0	3	2.0	3	2.0	147	98.0	
Manage technology and equipment	120	80.0	30	20.0	21	14.0	129	86.0	
Performs procedures correctly	147	98.0	3	2.0	93	162.0	57	38.0	
Reflects on potential hazards and errors	147	98.0	3	2.0	60	40.0	90	60.0	

Table (6): Correlation between total score level of practice, self-confidence and self-competency regarding management of post-partum hemorrhage, (n = 150)

Correlations	The study maternity nurses applying WHO related to management of post-partum hemorrhage (N=150)			
	X ²	P	X ²	P
• Practice Vs. Self-confidence	283.50*	<0.001**	28.198*	<0.001*
• Practice Vs. self-competency	283.50*	<0.001**	643.50*	<0.001*

Discussion

Postpartum hemorrhage (PPH) continues to be the leading cause of maternal morbidity and mortality in most countries around the world. Despite multiple collaborative efforts at all levels, there is still a lack of implementation or adherence to the recommendations for management of PPH when faced with this obstetric emergency. In part, this delay in implementation lies in the lack of information from current evidence and a lack of unification of the multiple guidelines for diagnosis and strategies to control bleeding (Escobar, Nassar, Theron, Barnea, Nicholson, Ramasauskaite et al., 2022).

Health workers at all levels of care (particularly in LMICs) need to have access to appropriate medications and training in PPH prevention and management procedures. Nurses with improved knowledge and skills have a higher level of self-confidence, thus improving their ability to provide safe and effective quality care to postpartum patients. The increased self-confidence, knowledge and skills have the potential to reduce PPH related complications and mortality (Begum, Beyeza, Burke, Evans, Hanson, Lalonde & FIGO PPH Technical Working Group, 2022). So, this study was conducted to evaluate application of WHO guidelines regarding prevention and management of postpartum hemorrhage on nurses' competence and self-confidence.

According to practice of the studied nurses regarding prevention and management of post-partum hemorrhage pre-post applying WHO guidelines, the

present study revealed that there was a marked improvement in level of practice the studied nurses regarding all items of management of postpartum hemorrhage post of providing instructional guidelines with a highly statistically significant difference compared to pre applying WHO guidelines. As evidence, less than one fifth and the minority of the studied nurses reported incorrect practice regarding the items of (administration of fluids infusion& Insert fully catheter and empty the bladder) pre-applying WHO guidelines while changed to all of them reported correct practice of these items post applying WHO guidelines respectively.

These results indicate that the guidelines was successful in improving nurse's knowledge that is subsequently improve their level of practice. This could related to the structure and the content of the program which combined both scientific knowledge about PPH, its meaning, prevention and treatment.

These results are similar to Khadim, Yaqoob, Parveen & Khan (2022) who found that there was an enhancement in the studied nurses' practice of regarding most aspects of postpartum hemorrhage post of applying clinical intervention compared to pre applying clinical intervention. On the same line, Esan, Ayenioye, Ajayi & Sokan-Adeaga (2023) stated that preventive measures were improved after education provided to midwives.

Additionally, the present study illustrated that there was a statistical significant differences between most items of the studied nurses' practice regarding prevention and management of PPH pre and post- applying WHO guidelines. As evidence, the high percent of the studied nurses reported unsatisfactory level of practice at (psychological support, preparations, active management of the 3rd Stage of labor, general management of PPH, assess blood loss and nature of bleeding, active management during 4th stage of labor monitoring and nursing measures.

From the researchers' point of view, It could be due to lack of available facilities and guidance about the correct method for care that make the nurses un abled to perform their nursing care in correct manner. So, their level of practice was low pre-applying WHO guidelines and improved post-applying WHO guidelines.

These findings in the same direction with Farahat, Ali & Abd El-Aty (2021) who mentioned that in the pre-test, more than two thirds of the studied nurses had an unsatisfactory level of knowledge and practices regarding active management of third

stage of labor and PPH management, but in the post-test and follow-up tests, the highest percentage of the nurses had a satisfactory level of knowledge and practices.

Additionally, these results are supported with Waghmare, Upendra, Kaur, Barde & Joshi, (2019) who reported that the majority of the nurses in the trial performed poorly when it came to the placenta and placental examination prior to participating in the protocol. However, after applying the program, nurses' performance in terms of placental assessment improved significantly.

Concerning overall levels of nurses' practice pre and post applying WHO guidelines, the findings of the current study clarified that there was a marked improvement in overall practice of the studied nurses regarding prevention and management of post-partum hemorrhage post applying WHO guidelines with a highly statistically significant difference compared to pre applying WHO guidelines. As evidence, the vast majority of the studied nurses reported unsatisfactory practice regarding prevention and management of post-partum hemorrhage, while changed to all of them reported satisfactory practice post applying WHO guidelines.

From the researcher point view, these findings may be due to after the providence of WHO guidelines which were properly prepared in a simple Arabic language and after providence of the supportive material which was the educational booklet that made in a simple method and validated by a panel of experts in the maternity nursing and obstetric medicine, which had the great effect on enhancement of the participants' knowledge regarding prevention and management of postpartum hemorrhage that subsequently improve practice level.

These results agree with Egenberg, Reta, Sørensen, Ugglas, Nilsen & Evans (2023) who indicated that there were an improvement in the total practice scores of the participants regarding PPH after provision of the educational sessions according to WHO steps. with highly statistically significant differences.

In addition to another study done by Khadim et al., (2022) who found a statistically significant satisfactory improvement in practice scores in various aspects of PPH following applying guidelines according to WHO steps.

According to the studied nurses' self-confidence pre-post applying WHO guidelines, the findings of the current study illustrated that there was a statistical

significant differences between most items of the studied nurses' self-confidence pre and post- applying WHO guidelines. As evidence, the minority of the studied nurses disagreed regarding the item of (suturing of vaginal/perineal tears / episiotomy) pre-applying WHO guidelines while changed to the majority of them agreed post-applying WHO guidelines.

These study findings may be attributed to that post applying WHO guidelines the level of perception and knowledge of nurses was improved that subsequently enhance their level of self-confidence. These results are in harmony with the study done by Abd Elhakm et al., (2018) who stated that there were a highly statistically significant difference between studied nurses' self-confidence at the pre and post intervention phases.

In relation to the studied nurses according to competency toward prevention of post-partum hemorrhage pre and post applying WHO guidelines, the present findings clarified that there was a highly statistically significant differences between most items of the studied nurses' competency regarding prevention of PPH pre and post- applying WHO guidelines. As evidence, all of the studied nurses reported doesn't demonstrate competency related to the item of "Evaluates evidence based practices and outcomes" pre-applying WHO guidelines while changed to all of them demonstrate competency regarding it post-applying WHO guidelines.

From the researchers' point of view, this result may because of the studied nurses do not seek to improve their level of knowledge and their weak points in this subject. This may be due to the lack of time due to work pressure, which made them need to improve their level of knowledge for correct application, as happened in this study. Their commitment to health steps improved after increasing their information..

These results are supported with a study performed by Desoky & Salim (2021) who concluded that at the time of the intervention, there were statistically significant differences between the competence level of the nurses toward postpartum hemorrhage prevention and management prior training for PPH prevention which about two thirds of them had low level of competence regarding PPH prevention and management pre-training compared to more than three quarters of them had good level of competence post-training.

Concerning Correlation between total score level of practice, self-confidence and self-competency regarding management of post-partum hemorrhage, the present study illustrated there was a positive correlation with highly statistical significant differences between the studied nurses' total score level of self-confidence, self-competency and their total score level of knowledge pre and post- test.

From the researchers' point of view, this result may be due to self-confidence is influenced by internal personal traits of self as self-confidence and competence can control the ability and readiness of obtaining information and improving knowledge. This result is in the same direction with a study performed by Mohammed et al., (2023) who concluded that there was significant relation between the studied nurses' self-confidence, competence and practice improvement in some items. On the contrast, Abd Elhakm et al., (2018) found that there was no significant relation between the studied nurses' level of practice and their self-confidence.

Conclusion:

Applying WHO guidelines was effective in achieving the aim of enhancing nurses' competence and their self-confidence regarding prevention and management of post-partum hemorrhage among the studied nurses.

Recommendations

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

- 1- Implementing of periodical health education programs for intern nurses to enhance competent skills for achieving advanced nursing care regarding prevention and management of primary postpartum hemorrhage.
- 2- Training programs should be included in nursing curriculum to help professional nurses acquire the essential knowledge, performance skills, and clinical judgment for early detection, and an effective nursing response for managing PPH.
- 3- Integration of training program into the clinical training component of the maternal nursing curriculum based on competent level.
- 4- Provide pre-service and in-service training programs using simulation for newly appointed nurses to improve the competency level.

- 5- Further research is crucial to conduct a similar study on larger sample size in different settings for generalization of the findings.

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