

Developing Competences for Maternity Nurses during Labor regarding Prevention of Primary Postpartum Hemorrhage

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Abstract

Background: Postpartum hemorrhage (PPH) prevention is the main stay and corner stone to achieve the millennium developmental goal 5 (MDG5). Maternity nurses play a crucial role in maternal morbidity reduction resulting from PPH and competency of maternity nurses directly affects quality of treatment and health outcomes. **Aim:** was to develop competences for maternity nurses during labor regarding prevention of primary postpartum hemorrhage. **Design:** A quasi- experimental design was used. **Setting:** The research was carried out in maternity hospital at Zagazig university hospitals, Sharkia Governorate, Egypt. **Subjects:** purposive sample included fifty nurses provided direct nursing care for women during labor and postpartum period. **Tools:** Three tools were used; a structured interviewing questionnaire, competency performance checklist for maternity nurses' practice regarding prevention of primary postpartum hemorrhage, maternity nurses attitude scale regarding prevention of primary postpartum hemorrhage. **Results:** The results of this study showed that there was an improvement in nurse's knowledge, practice and attitudes toward prevention of primary postpartum hemorrhage after implementation of competency nursing intervention. Also, there were positive correlation between nurses' knowledge score and their attitude scores, practice scores and age. **Conclusion:** there was highly statistically significant improvement in nurses' knowledge and practice level during labor to prevent primary PPH after implementation of competency nursing intervention compared to pre intervention. **Recommendations:** Offer training programs or workshops for developing the nurses' competency regarding primary postpartum hemorrhage prevention to develop their best practice.

Keywords: Developing competencies-maternity nurses- primary postpartum hemorrhage

Introduction

Postpartum hemorrhage (PPH) is a leading cause of mortality and maternal morbidity worldwide (Edwards, 2018). PPH is described as loss of blood above 500 ml, assessed up to the first 24 hours postpartum and secondary PPH is defined as blood loss after 24 hours postpartum. Blood losses of up to 500 ml among healthy women have not negative effects, but uncontrolled blood losses of over 500 ml could be fatal (Souza et al., 2013). Primary PPH occurs within 24 hours of childbirth, contributing to maternal morbidity and mortality, while secondary postpartum hemorrhage refers to bleeding from 24 hours to 6 weeks after giving birth. In general, blood loss is classified as PPH if one or more of the following occurs: uterine tone loss (atony); placental tissue retention or blood clot retention; genital tract laceration; or coagulopathy (Edwards, 2018).

Postpartum hemorrhage affects 1 to 5 percent of all deliveries globally. Maternal Mortality due to postpartum hemorrhage in 2015 is about 23 cases every 100.000 deliveries in the undeveloping countries versus 12 cases death due to postpartum hemorrhage in the developed countries (Sayl, et al 2015). Kassebaum, et al., (2014) and Mahmoud& Omar, (2018) reported that, Postpartum hemorrhage in Egypt is responsible for about 19.7% of maternal death

Low uterine contraction after childbirth, retained placenta, uterine tears or inadequate blood coagulation are the common predisposing risk factors for PPH. It occurs more commonly in the anemic women, multiparity, obese or old aged women (> 40 years), with macrosomia. Clinicians and health care providers should try to identify risk factors antenatally and during labor in order

to deliver high risk women at the highest level of care (**weeks, 2015**).

Active management of the third stage of labour is the cornerstone for the prevention of PPH and is associated with a substantial reduction in the occurrence of PPH compared with expectant (physiological) management (**WHO, 2012**).

The successful management of the third labor stage includes procedures to help the removal of the placenta and the uterine contraction with the goal of avoiding or minimizing blood loss. The interventions include use of uterotonic, cord traction control and uterine massage. Other interventions pertaining to postpartum hemorrhage prevention are being studied, such as skin-to - skin contact, breastfeeding, early cord tightening. Maternity nurses therefore need to define and evaluate best clinical methods that are used to avoid and control PPH (**Leduc et al., 2015**).

A maternity nurse is a nurse who takes care of expectant mothers before, during and after their childbirth. Most maternity nurses will concentrate on helping women during childbirth – staying on the side of the patient to provide support for mother and her newborn, and encouraging, coaching, education and support. Others may care for women who are experiencing complications before birth or provide postpartum care (**Stephenson et al., 2015**).

Nurses are often the first responses to emerging events because they are readily on the bedsides of the patients. They must identify the clinical symptoms of postpartum hemorrhage and know how to react appropriately in situations like this (**Anonson et al., 2014**).

Competencies can be identified as the knowledge , skills , ability and judgment required for safe and ethics of nursing practice; competencies are not tasks but behavioral actions that require the registered nurse to use a depth and breadth of knowledge, skills and judgment that enable them to practice safely and adapt competently to changes in the environment of healthcare. The nurse is said to be competent when she has competence across all areas of competence applicable to the nurse, according to a

standard identified appropriate for the level of the nurse to be assessed (**Walker et al., 2010**).

Achieving maternity competence standards is of importance to ensure safe maternity care. The latest statistics published by the annual report of the World Health Organization (WHO) show that maternal mortality worldwide has declined by 56% since 2010. However, a total of 7000 women still dying every year in Africa because of some preventable causes before, during, and after the time of giving birth. In North Africa, 2000 women die every year and 80% of these women did not suffer serious pregnancy or delivery problems. It was remarkable that the WHO annual report highlighted that nurses 'professional skills were often held responsible for these deaths because 66% of nurses who handled these cases were not aware of maternity competency standards and 54% of those nurses did not practice these competency standards in real life situations (**Ibrahim and Elshafie, 2016**).

Significance of the study:

PPH is one of the obstetric crises that may be prevented with the proper training, yet it is still the greatest cause of maternal death worldwide. To avoid this situation and accomplish Millennium Development Goal number five, improving maternal health, PPH prevention and treatment are essential. If the nurses have the knowledge and abilities to avoid PPH and treat it when it does arise, this can be accomplished. Although nurses' attendance at births is necessary for delivering safe maternity care, their skills and competencies are more significant than their presence (**Floyed et al., 2013**).

A better clinical response might have avoided 93% of maternal fatalities brought on by postpartum hemorrhage, according to the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) (AWHONN, 2013). So this research was undertaken to investigate developing competencies of maternity nurses during childbirth on preventing postpartum hemorrhage.

Theoretical Definition:

Competency in nursing entails knowledge and abilities that help nurses accomplish their objectives for the patient. Additionally, competence is providing treatment that keeps the patient safe (O'Shea and Whelan, 2007).

Operational Definition

Competency is the knowledge, skills, and attitude of maternity nurses required for adequate nursing practice during labor and immediate postpartum period aimed at preventing primary postpartum hemorrhage.

Primary Postpartum Hemorrhage: This kind of bleeding happens within 24 hours after giving birth and increases the risk of morbidity and death for new mothers.

Aim of the present study

The aim of this study was to develop competences for maternity nurses during labor regarding prevention of primary postpartum hemorrhage.

The more specific objectives aimed to enhance knowledge regarding prevention of primary postpartum hemorrhage, develop competent practice regarding prevention of primary postpartum hemorrhage, as well as evaluate attitude regarding prevention of primary postpartum hemorrhage.

Hypothesis:

H1-The maternity nurses who are subjected to competency nursing intervention will have satisfactory knowledge regarding prevention of primary postpartum hemorrhage after the intervention than before.

H2-The maternity nurses who are subjected to competency nursing intervention will have competent practice regarding prevention of primary postpartum hemorrhage after the intervention than before.

H3-The maternity nurses who are subjected to competency nursing intervention will have positive attitude regarding prevention of primary postpartum hemorrhage after the intervention than before.

Subjects and methods

Study design: A quasi-experimental design (pre- post intervention) was used in the present study

Study setting:

The present study was conducted in the Maternity hospital at Zagazig University Hospitals, which consists of five floors; emergency ward in the first floor; antenatal and postnatal ward in the second floor; high risk pregnancy ward in the third floor; labor ward in the four floor and operation ward in the five floor. This setting attracts women from all over Sharkia Governorate, but principally from Zagazig city and all nearby areas. It provides low cost health service for women with obstetrics problems compared with other private centers and clinics.

Sample:

1- Purposive sample included 50 maternity nurses provide direct nursing care for women during labor and immediate post-partum period in the above mentioned setting with different experience years and age as well as, different qualifications.

From result of pilot study; sample size: was calculated; Mean \pm Sd score of knowledge pre intervention was (6.5 \pm 3.62) and Mean \pm Sd of knowledge post intervention was (8.62 \pm 3.87). Confidence level is 95% with power of study 80%. Sample size calculated using Open Epi, is 50 nurses.

Tools:

The data collection tools for this study were

Tool I: A structured interviewing questionnaire:

It consisted of two parts:

First part: it was included information about socio-demographic characteristics of nurses such as ages, qualifications, years of experience in maternity department and attendance of training courses about prevention of primary postpartum hemorrhage.

Second part: The Knowledge questionnaire sheet for assessment nurses' knowledge regarding prevention of postpartum hemorrhage .

It was developed by the researchers from nursing review (Orshan, 2008 and Pillitteri, 2010), also from previous experience with the nurses in clinical setting include 13 questions about postpartum hemorrhage definition, risk factors, prevention and nursing and medical management of PPH. Multiple choice questions to determine the nurses' "Knowledge about postpartum hemorrhage".

Scoring system of knowledge:

Questions were scored as follows: score 2 for correct answer and score 1 for wrong or no answer. Summation of all questions including knowledge. The total score of each aspect $\geq 75\%$ indicates satisfactory, $< 75\%$ indicates unsatisfactory.

Tool II: Competency performance checklist (Observational Checklist):

A competency performance checklist adopted from (Daniels et al., 2010) and included competency nursing management during labor and immediate postpartum period and modified by the researcher. It was performed through overt observations of nurses during caring of women from the starting of labor and performed two times pre and post applying the competency nursing intervention program. It involves the following items: preparation task, administration of uterotonic drug, uterine massage, placenta examination, immediate postpartum care.

The scoring system for the observational check-list consisted of giving score 2 for the step that was done, and score 1 for the step that wasn't done. The higher scores indicated a higher level of practices. Those scores classified as: score of $\geq 75\%$ indicates competent, $< 75\%$ indicates uncompetent practice.

Tool III: Maternity Nurses attitude scale regarding prevention of primary postpartum hemorrhage: It was developed to evaluate the maternity nurses' attitude toward prevention of primary postpartum hemorrhage. It includes 10 items and it divided into 2 scores (agree = 2, disagree = 1).

Total score equal 20. Total attitude score ≥ 10 considered positive attitude, score less than 10 considered negative attitude.

Validity and reliability

A panel of five specialists in the field of obstetrics and gynecological nursing reviewed the methods, to test its content validity. Modifications were done accordingly based on their judgment. Reliability was done by Cronbach's Alpha coefficient test which revealed that each item of the utilized tools consisted relatively homogeneous items.

Pilot study was done on (five nurses) to define reliability of research tool: Reliability of knowledge Cronbach's $\alpha = 0.917$, attitude Cronbach's $\alpha = 0.859$, performance Cronbach's $\alpha = 0.64$.

A pilot study

Was done to test whether they are clear, understandable, feasible and valid. For this study, the researcher randomly selected 5 staff nurses to take part in the pilot test. It also helped to estimate the time required to collect data. There was no modification, and the sample was added to the overall study. The study identified practical skills from nurses about the procedures examined. The time it took for complete the checklist depended on the process time.

Ethical consideration.

During all phases of the study all ethical issues were taken into account: the research maintained an anonymity and security of subjects. The researcher introduced himself to each nurse and briefly explained to nurses the scope and purpose of the study before engaging in the study. Nurses were told that the research technique would not do them any real or possible harm. Also, they were assured that professional help will be provided for them whenever needed. Nurses were also told that the data taken during the analysis would be confidential and only used for the purpose of the research.

Field of the work:

Approval: An official written letter was obtained from the Dean Faculty of Nursing at Zagazig University as an approval for data collection to conduct the study. The letter explained the study purposes and its main procedure.

Implementation phase was divided into 3 stages:

1- The pre-intervention phase: Data collection took a period of 6 months, from the first of October 2019 to the end of March 2020. After getting the official permission, the pilot testing of the study tools was done and analyzed. The researcher started the data collection for 3 days per week from 10 AM to 5 PM (Saturday, Tuesday, Wednesday). The researchers introduce themselves to maternity nurses and explained the purpose and importance of the study. Hence, the approval for participation was secured from each nurse. Data collection for the pre-test continued for 2 months. The researchers administered three measurement tools as a pretest for maternity nurses: knowledge questionnaire sheet, competency performance checklist for nurses' practice (Observational Checklist) and maternity nurses' attitude scale and researchers observed each nurse individually.

A self-learning booklet was prepared by the researchers and its contents was validated and then distributed to nurses to be used as a guide for self-learning to upgrade their knowledge, practice and attitudes regarding prevention of primary postpartum hemorrhage.

2- The intervention Phase:

Included the application of the competency nursing intervention; the competency nursing intervention consisted of 6 sessions; one session per week: one theoretical session to increase the nurses' knowledge regarding primary PPH postpartum hemorrhage which included definition of postpartum hemorrhage, types of postpartum hemorrhage, causes of primary postpartum hemorrhage, risk factors of primary postpartum hemorrhage, signs and symptoms of primary postpartum hemorrhage, diagnosis of primary postpartum hemorrhage, complications of primary postpartum hemorrhage and nursing care.

Five competency performance sessions for adequate nurses practice during labor and immediate postpartum period for prevention of primary PPH postpartum hemorrhage.

Competency performance session was done according to the American Nurses association regarding prevention of primary postpartum hemorrhage continued for almost 5 weeks and consists of two stages:

Stage 1: Skill acquisition stage: it included two individualized sessions and each session lasted 60- 80 minutes in which the researchers demonstrate the procedures of primary PPH prevention which included **preparation task** as checking that all needed equipment and instruments are ready, and in working order, asks the woman to empty her bladder when second stage begins, prepares uterotonic as soon as the cervix is completely dilated, **birth care** as instruct the woman not to push until she has the urge to do so, assists the woman to assume the position of her choice (squatting, semi-sitting) and allows her to change position according to what is comfortable for her, provides emotional support, wears protective clothing (gown, mask, gloves) . etc, **uterine message, administration uterotonic drug, placental examination and immediate postpartum care** as estimates blood loss, provide uterine message, removes soiled bedding and makes the woman comfortable, counseling the woman on self-care, encourages the woman to eat, drink and rest, reminds the woman how the uterus should feel and how she can massage it by herself, encourages the mother to empty her bladder and ensures that she has passed urine, counsels the woman on hygiene. All of these procedures were done through role play and use of anatomic models.

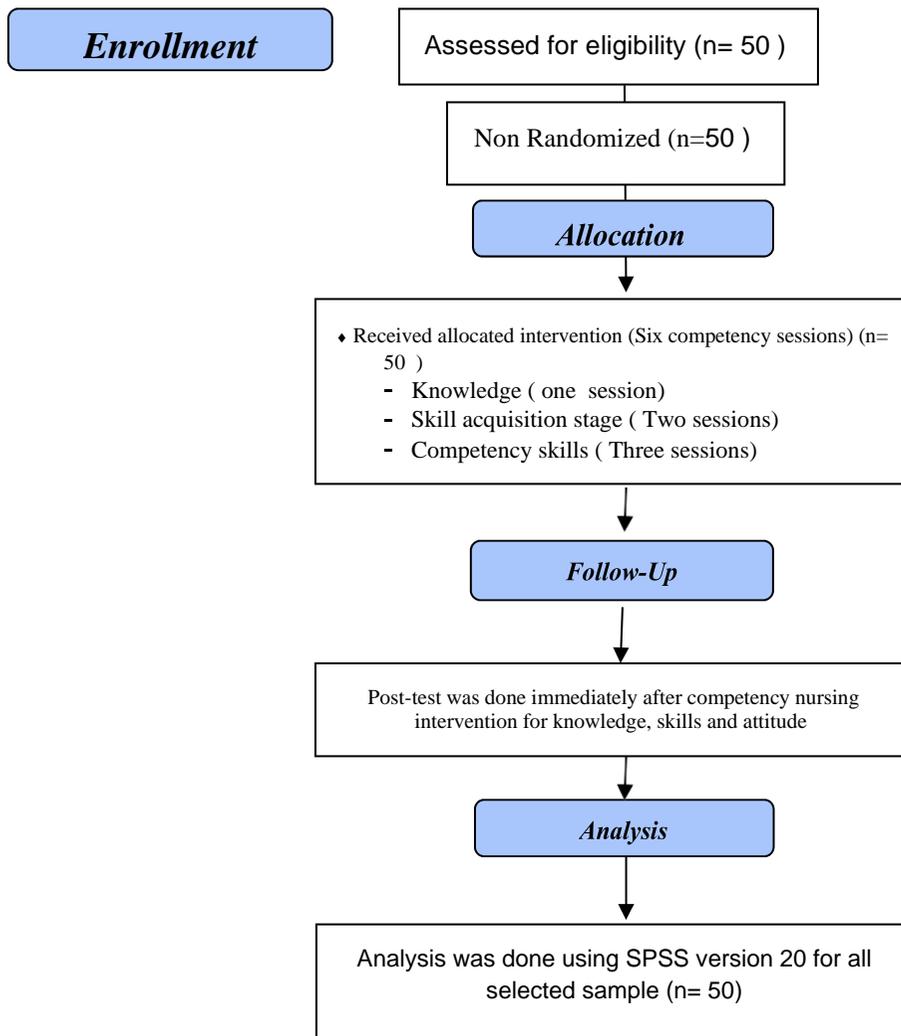
Stage II: Competency skills: it included three individualized sessions and each session lasted 45 minutes-60 minutes in which the researchers allowed nurses to re demonstrate primary PPH prevention procedures until achieving the

competency in performing the procedures while the researcher observe and provide feedback (Overt observation) using learning guide.

3-Phase III: (Evaluation phase):

The researchers administered the post-test to the nurses immediately after the competency intervention sessions (Tool I ,second part & Tool III), The researcher observe the actual skills (practice) done by the nurse during labor stages and early postpartum period while conducting two deliveries and was filled by the researchers as observed, each overt observation took about 30 minutes (Tool II). The evaluation phase took 6 weeks. All questionnaires and observation checklists were kept under lock and key for security and confidentiality of obtained information.

Figure 1: CONSORT Flow Diagram



Statistical analysis

All data were collected, tabulated and statistically analyzed using SPSS 20.0 for windows (SPSS Inc., Chicago, IL, USA 2011). Quantitative data were expressed as the mean \pm SD & (range), and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage). Percent of categorical variables were compared using Chi-square test or Fisher's exact test when appropriate. MC Nemar test was used to compare two dependent categorical variables. Spearman rank correlation coefficient was calculated to assess relationship between various study variables, (+) sign indicate direct correlation & (-) sign indicate inverse correlation, also values near to 1 indicate strong correlation & values near 0 indicate weak correlation. All tests were two sided. P-value < 0.05 was considered statistically significant (S), $p < 0.001$ highly significant and $p\text{-value} \geq 0.05$ was considered statistically insignificant (NS).

Results

Table (1) reveals socio-demographic characteristics of studied nurses. The nurses had a mean age of 27.86 ± 5.16 years with a range of 19-39 years. Regarding nurses qualification, 50.0% of them had technical institute. 74.0% of them were staff nurses. Additionally, 86.0% of them hadn't training courses about prevention of primary postpartum hemorrhage.

Table (2) clarifies that, 96.0% of nurses had unsatisfactory knowledge about primary postpartum hemorrhage (PPH) pre intervention. After implementation of the competency nursing intervention, 78.0% of studied nurses had satisfactory knowledge about primary PPH. There were highly statistically significant differences ($P < .001$) before and after implementation of competency nursing intervention in relation to nurses' knowledge regarding primary PPH.

Table (3): represents that, there was a highly statistically significant difference between mean scores of nurses' attitude related to prevention of primary postpartum hemorrhage pre and post competency nursing intervention ($p < 0.001$).

Table (4): Displays that, there were highly statistically significant differences ($P < .001$) before and after intervention in relation to nurses' performance regarding preparation tasks, birth care, administration of uterotonic drug, uterine

massage, placental examination and immediate postpartum care.

Figure (2) illustrates that, 78% of maternity nurses had satisfactory knowledge regarding prevention of primary postpartum hemorrhage post intervention compared to 4% pre intervention. In addition to 32% of them had competent practice during labor and immediate postpartum period to prevent primary postpartum hemorrhage compared to 6% pre intervention.

Table (5) points out that there were statistically significant relations between nurses' knowledge level about primary postpartum hemorrhage and their age, years of experience and previous training courses about primary PPH at post intervention with statistically significant differences ($p\text{-value} < 0.05$).

Table (6) reveals that there were statistically significant relation between nurses' attitude level about primary postpartum hemorrhage and their years of experience and previous training courses about primary PPH prevention at post intervention with statistically significant differences ($p\text{-value} < 0.05$).

Table (7) demonstrates that there were statistically significant relation between nurses' performance level about primary postpartum hemorrhage prevention and their age, years of experience and previous training courses about primary PPH prevention at post intervention with statistically significant differences ($p\text{-value} < 0.05$).

Table (8) demonstrates that there was positive correlation between nurses' knowledge score, attitude scores, performance scores and age. Additionally, there was positive correlation between nurses' attitude scores, performance score, and age and experience years. Moreover, there was positive correlation between nurses' performance scores, age and experience years. There were statistically significant differences ($p\text{-value} < 0.05$).

Table (1): Distribution of studied nurses according to their socio-demographic characteristics. (n=50):

Socio demographic characteristics of studied nurses	no	%
Age per years		
≤25	23	46.0
>25	27	54.0
mean± SD	27.86±5.16	
Range	19-39	
Nurses qualification		
Nursing school diploma	12	24.0
Technical institute	25	50.0
Bachelor	13	26.0
Job position		
Staff nurse	37	74.0
Head nurse	13	26.0
Previous training courses about prevention of primary postpartum hemorrhage		
Yes	7	14.0
No	43	86.0
Experience per years		
≤5	26	52.0
>5	24	48.0
mean± SD	5.7±4	
Range	2-20	

Table (2): Comparison level of nurses' knowledge about primary postpartum hemorrhage pre and post competency nursing intervention (n = 50).

items	Knowledge				Mc p
	Pre intervention		Post intervention		
	no	%	no	%	
Knowledge regarding primary postpartum hemorrhage(8)					<0.001
Satisfactory	7	14.0	41	82.0	
Unsatisfactory	43	86.0	9	18.0	
Mean ± SD	4.04±1.19		6.58±1.5		
Range	2-7		2-8		
Knowledge regarding prevention of primary postpartum hemorrhage(5)*					<0.001
Satisfactory	13	26.0	41	82.0	
Unsatisfactory	37	74.0	9	18.0	
Mean ± SD	2.76±1		3.98±0.65		
Range	1-5		2-5		
Total Knowledge regarding primary postpartum hemorrhage(13)*					<0.001
Satisfactory	2	4.0	39	78.0	
Unsatisfactory	48	96.0	11	22.0	
Mean ± SD	6.8±1.58		10.56±1.6		
Range	4-10		5-12		

McNemar test (*) maximum score p<0.001 highly significant

Table (3): Comparison level of nurses' attitude regarding prevention of primary postpartum hemorrhage pre and post competency nursing intervention (N = 50):

	attitude				Mc p
	Pre intervention		Post intervention		
	no	%	no	%	
Attitude regarding prevention of primary postpartum hemorrhage (10)*					<0.001
Positive	0	0.0	26	52.0	
Negative	50	50	24	48.0	
Mean ± SD	4.18±0.63		7.38±1.4		
Range	4-7		4-10		

() *Maximum score () * maximum score McNemar test p<0.001 highly significant

Table (4): Comparison level of nurses 'performance during labor and immediate postpartum period pre and post competency nursing intervention (N = 50).

Items	Nurses 'performance				Mc p
	Pre- intervention		Post- intervention		
	no	%	No	%	
Preparation task(6)					<0.001
Competent	1	2.0	41	82.0	
Un competent	49	98.0	9	18.0	
Mean ± SD	2.58±1.16		5.14±0.76		
Range	0-6		3-6		
Birth care(14)					0.125
Competent	2	4.0	7	14.0	
Un competent	48	96.0	43	86.0	
Mean ± SD	4.94±2.3		8.32±2.1		
Range	1-12		4-13		
Administration uterotonic drug(4)					0.01
Competent	4	8.0	11	22.0	
Un competent	46	92.0	39	78.0	
Mean ± SD	1.08±1		1.82±1.3		
Range	0-4		0-4		
Uterine massage(10)					<0.001
Competent	3	6.0	12	24.0	
Un competent	47	94.0	38	76.0	
Mean ± SD	3.3±2.3		5.48±2.6		
Range	1-10		0-10		
Placenta examination(4)					<0.001
Competent	19	38.0	32	64.0	
Un competent	31	62.0	18	36.0	
Mean ± SD	2.44±1.3		3.12±1.02		
Range	0-4		0-4		
Immediate Postpartum care(16)					<0.001
Competent	5	10.0	50	100.0	
Un competent	45	90.0	0	0.0	
Mean ± SD	7.66±2.3		14.5±0.58		
Range	6-16		14-16		
Nurses' performance during stages of labor and immediate postpartum period(54)					<0.001
Competent	3	6.0	16	32.0	
Un competent	47	94.0	34	68.0	
Mean ± SD	22.1±6.1		38.38±4.2		
Range	13-44		31-47		

() * maximum score

McNemar test p<0.001 highly significant

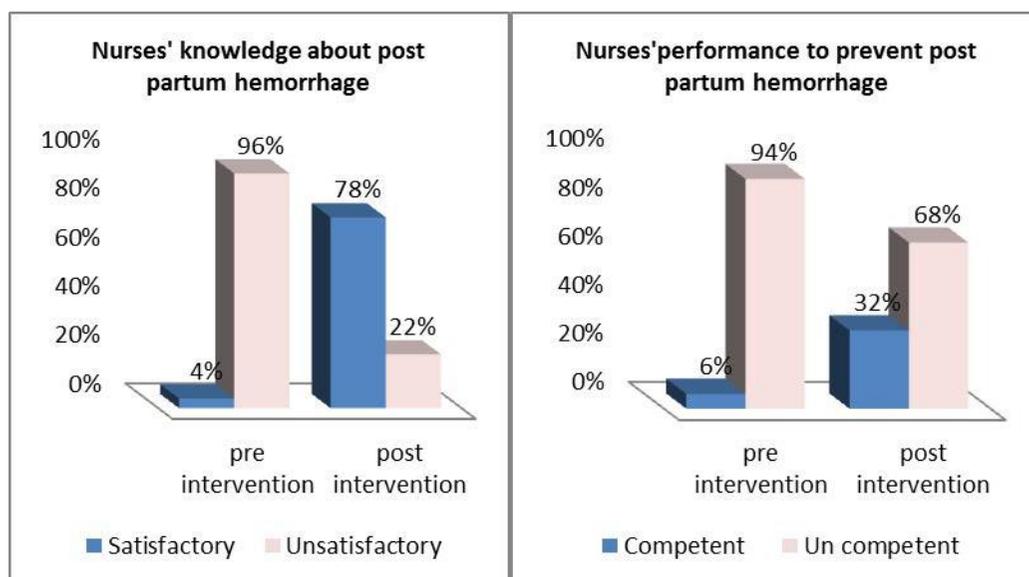


Figure (2): Nurses' knowledge and performance level during labor and immediate postpartum period regarding prevention of primary postpartum hemorrhage pre and competency nursing intervention

Table (5): Relation between nurses' knowledge level about primary postpartum hemorrhage and their socio demographic characteristics at post intervention (n=50):

	Post intervention knowledge level				number	χ^2	P
	Satisfactory $\geq 75\%$		Unsatisfactory $< 75\%$				
	no	%	No	%			
Nurses age							
≤ 25	15	65.22	8	34.78	23	4.04	0.04(S)
> 25	24	88.89	3	11.11	27		
Nurses qualification							
Nursing school diploma	7	58.33	5	41.67	12	4.3	0.12
Technical institute	20	80.00	5	20.00	25		
Bachelor	12	92.31	1	7.69	13		
Job position							
Staff nurse	27	72.97	10	27.03	37	F	0.25
Head nurse	12	92.31	1	7.69	13		
Experience per years							
≤ 5	17	65.38	9	34.62	26	5.02	0.02(S)
> 5	22	91.67	2	8.33	24		
Previous training courses regarding prevention of primary PPH							
Yes	34	85.0	6	15.0	40	F	0.03 (S)
No	5	50.0	5	50.0	10		

(S) Significant $p < 0.05$ χ^2 Chi-square test

Table (6): Relation between nurses' attitude level about primary postpartum hemorrhage prevention and their socio demographic characteristics at post intervention (n=50):

	Post intervention nurses' attitude				Number	χ^2	p
	Agree $\geq 75\%$		Disagree $< 75\%$				
	no	%	No	%			
Nurses age							
≤ 25	10	43.48	13	56.52	23	1.2	0.27
> 25	16	59.26	11	40.74	27		
Nurses qualification							
Nursing school diploma	5	41.67	7	58.33	12	0.98	0.61
Technical institute	13	52.00	12	48.00	25		
Bachelor	8	61.54	5	38.46	13		
Job position							
Staff nurse	18	48.65	19	51.35	37	0.64	0.42
Head nurse	8	61.54	5	38.46	13		
Experience per years							
≤ 5	10	38.46	16	61.54	26	3.97	0.046(S)
> 5	16	66.67	8	33.33	24		
courses regarding prevention of primary PPH							
Yes	24	60.0	16	40.0	40	f	0.035(S)
No	2	20.0	8	80.0	10		

(S) Significant $p < 0.05$ χ^2 Chi-square test**Table (7):** Relation between nurses' performance level regarding primary postpartum hemorrhage prevention and their socio demographic characteristics at post intervention (n=50):

	Post intervention nurses' performance level				number	χ^2	P
	Competent $\geq 75\%$		Incompetent $< 75\%$				
	no	%	No	%			
Nurses age							
≤ 25	2	8.70	21	91.30	23	10.6	0.001(S)
> 25	14	51.85	13	48.15	27		
Nurses qualification							
Nursing school diploma	4	33.33	8	66.67	12	0.02	0.99
Technical institute	8	32.00	17	68.00	25		
Bachelor	4	30.77	9	69.23	13		
Job position							
Staff nurse	12	32.43	25	67.57	37	f	0.99
Head nurse	4	30.77	9	69.23	13		
Experience per years							
≤ 5	4	15.38	22	84.62	26	6.87	0.009(S)
> 5	12	50.0	12	50.0	24		
Previous training courses regarding prevention of primary PPH							
Yes	16	40.0	24	60.0	40	f	0.02(S)
No	0	0.0	10	100	10		

(S) Significant $p < 0.05$ χ^2 Chi-square test

Table (8): Correlation matrix between nurses' knowledge, attitude, performance scores, age of nurses and experience per years post competency nursing intervention about primary postpartum hemorrhage prevention (n=50):

<i>Parameters</i>	Nurses 'knowledge score		Nurses' attitude score		Nurses' performance score	
	(r)	P	(r)	p	(r)	p
Nurses' attitude score	.360*	0.01	1	-.	.295*	0.037
Nurses' performance score	.382**	0.006	.295*	0.037	1	-.
Age year	.313*	0.027	.363**	0.01	.480**	0.0001
Experience year	0.327	0.02	0.41**	0.005	0.384**	0.006

(r) Correlation coefficient

*significant $p < 0.05$

**significant $p < 0.01$

Discussion

By the World Health Organization, the maternal mortality ratio in Egypt stood at forty-five deaths per 100,000 live births in 2013 (WHO, 2012). PPH represents about one third of the direct causes of maternal mortality (Prata et al., 2014). Nearly eighty-eight percent of these deaths that occurs in the first four hours of delivery, emphasizing the time needed for proper management (Ruth & Kennedy, 2011). Several studies indicate a clear need for competency intervention concerning PPH prevention. Ruth and Kennedy, (2011) observed an improvement in positive patient outcomes during primary PPH management after staff nurses received in-service training on primary PPH prevention and management. Similarly, Motanya, (2015) study which indicated that there is a need for applying education programs for nurses to provide professional standards performance related to reducing PPH.

According to the results of the current study it can be noticed that, the studied nurses had a mean age of 27.86 ± 5.16 years. More than two thirds of them were staff nurses. Additionally, most of them hadn't any training courses about prevention of primary PPH. This is matching with the study of Abd-Elgany et al., (2019) who assessed nurses' knowledge of primary PPH prevention and management in Egypt and reporting a mean nurse age of 29.45 ± 9.67 . More than two-thirds of them were

working as staff nurses. And three quarters of them had no training about primary PPH prevention. In this respect, Ibrahim & Abdelmenim, (2016) study about improving maternity nurses' performance regarding prevention and control of primary postpartum haemorrhage in Egypt reported that, more than two fifth of the nurses were aged from 30-40 years, the most majority of them were staff nurses and only 9.4% of nurses received training programs about primary PPH prevention.

In the present study, it was found that there is a lack of knowledge about primary PPH. The majority of nurses had unsatisfactory knowledge about primary PPH pre competency nursing intervention. These results were supported by Abdel Azim, et al., (2013) in Egypt who stated that maternity nurses had very little knowledge regarding management of postpartum hemorrhage. These results was also confirmed by Stocker, et al., (2014), who demonstrated deficit knowledge about primary PPH prior to the educational program. This may be attributable to the reality that nurses hadn't receive adequate PPH prevention information or may be required in-service training refreshment about high risk factors that may lead to PPH. The study findings were contradicted by Faiza, (2015) study, in which the nurses showed good knowledge regarding PPH. The difference may be attributed to the difference in sample size.

The current study findings revealed highly significant improvement in the nurses' knowledge and practice level regarding prevention of primary PPH after implementation of the competency nursing intervention; about three quarters of studied nurses had satisfactory knowledge and competent performance regarding primary PPH prevention. This could be due to nursing competency intervention sessions that were effective in raising nurses' knowledge and performance level regarding prevention of primary PPH. This is in the same line with **Hassan, (2015)** who studied "the effect of nursing intervention program on reduction of primary PPH and reported similar results.

The present study also showed that, there was improvement in nurses' knowledge regarding prevention of primary PPH and performance level during labor to prevent primary postpartum hemorrhage after implementation of competency intervention compared to pre intervention. This indicated that the competency intervention was a positive factor that affected scores of nurses' knowledge and performance about prevention of primary PPH. This is in agreement with **McHugh & Lake, (2010)** who stated that development of professional nurses is the ability of nurses to build on their basic education and experience in providing quality care and influence the expertise of nurses through the provision of a theoretical and clinical knowledge base that can be assessed and modified. The expertise of a nurse affects her decision making in the face of an actual clinical situation that positively affected outcomes of the patient.

Results of the present study also showed that, there were statistically significant relations between nurses' level of knowledge about primary PPH prevention and their experience years and previous training courses about primary PPH post competency intervention. This is in harmony with the study of **Abd- Elgany et al., (2019)** who found that there is significant relationship between the knowledge level and years of experience. As increasing professional qualification and experience years,

the knowledge level concerning primary PPH prevention increases and vice versa.

The results of the present study demonstrated that, there was positive correlation between nurses' knowledge score, attitude scores and performance scores. This is comparable with that reported by **Ibrahim & Abdel-menim, (2016)** study who reported that there was highly statistically significant positive correlation between the total scores of nurses' knowledge and performance before and after the intervention program. This strong correlation between the knowledge and performances of nurses is highly expected; whereas effective nursing performances regarding prevention of primary PPH is often hindered by lack of knowledge.

The current study revealed that there was positive correlation between nurses' attitude scores, performance score, and age and experience years. Moreover, there was positive correlation between nurses' performance scores, age and experience years. On the contrary **Ibrahim & Abdel-menim, (2016)** study showed that there were negative, statistically significant correlations between total knowledge and performance scores of nurses and their ages as well as total knowledge and performance scores of nurses and their years of experience. That means that with decreased ages and years of experience, the level of expertise and performances of nurses is higher. This may be due to the fact that the older nurses transferred nursing tasks to the younger nurses and have a limited number of registered patients in addition to certain administrative duties, as well as the reality that younger nurses are able to recognize and remember details better than old nurses .

Limitation of the study:

This study had some limitations; often the sessions were extended because of the workload, the noise and the interference of other people, which demanded more time than the devoted as well as more effort. Overcome by staying long time.

Conclusion

There was a highly statistically significant improvement in the maternity nurses knowledge, attitude and performance level of nurses regarding prevention of primary PPH after competency nursing intervention compared to pre intervention, also, the above mentioned findings proved and reinforced the study hypothesis.

Recommendations:

- Increasing ongoing in-service training to improve the knowledge and skills of nurses about primary PPH prevention and management.
- Competency based standards for maternity nurse's practice and support guidance should be established.
- Ongoing education program for pregnant women about risk factors and route of prevention primary postpartum hemorrhage.
- Replication of the study with large sample size to further settings.

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