Effect of the Intervention Design of Nursing Practices on the Monitoring and Management of Postpartum Hemorrhage

[1] Hameida Alam Eldien & [2] Safaa Ibrahim Ahmed

[1] Assistant professor of Obstetrics and Gynecology Nursing, Faculty of Nursing, Assuit University
[2] Lecturer of Obstetrics and Gynecology Nursing, Faculty of Nursing, Sohage University

Abstract: Postpartum hemorrhage (PPH) of pregnancy, the main causes of maternal morbidity and mortality in developing countries. Prevention and control of PPH is an intervention in which nurses should be enabled to be implemented in order to reduce PPH rates. The aims of this study were to monitor, manage postpartum hemorrhage, improve patient outcomes and reduce possible complications. A quasi experimental research design was used in this study. A **Convenience sample** of 140 postpartum hemorrhage women at Assuit University Hospital was recruited. A study sample divided into two groups control and study (control group before nursing practices intervention and study group was another group post nursing practices intervention).History, medical and obstetrical data were obtained . Designing nursing practices intervention on monitoring and management of PPH was implemented. *Results:* There was statistical significance differences between both groups regarding nursing practices intervention of postpartum hemorrhage, There were a clear improvement in patient outcomes (bleeding stopped (95 .7%)in study group, 82.8%in control group)and deceased the complications As Shock(4.3%)in study group and(17.1%)in control group, Renal failure(8.6%) in study group and(22.9) in control group. *Conclusion:* The implementation of the intervention design of nursing practices for the management of PPH had a positive effect on the results of PPH patients and reduced PPH complications. *Recommendations:* Guidelines for management of PPH are clearly written, adapted to a private hospital, should be developed and used in clinical practice.

Keywords: nursing practices, intervention, monitoring, management, postpartum hemorrhage

INTRODUCTION

It attributed hemorrhage after childbirth to the highest cause of maternal mortality rate (41%) and represents 19.7% of all causes of maternal mortality **El-Zanaty & Way (2001).** In Egypt, the maternal mortality rate was 45 deaths per 100,000 live births in 2013, according to the World Health Organization (WHO, 2014).

It is often defined bleeding after childbirth as more than 500 ml or 1000 ml of blood loss during the first 24 hours after birth. Some added condition signs or symptoms of low blood volume because of the situation **(Weeks, 2015).**

Postpartum primary hemorrhage (PPH) is a blood loss estimated to be> 500 ml of the reproductive system, within 24 hours of delivery (most common obstetric bleeding) **(weeks, 2015).** Secondary PPH is known as abnormal bleeding of the reproductive system, from 24 hours postpartum to six weeks after birth **(Chandraharan et al., 2017).**

Although the width of PPH is most often dramatic, bleeding may be slower and appears to be less negligible but may still lead eventually to great loss and shock. This is most likely to be true from secondary bleeding to retention or trauma tissue. Nursing practices should include routine care in the postpartum period and closely monitor and document the mother's vital signs and condition, vaginal blood loss, uterine tone and size. The uterus should be periodically administered to express any clots accumulated in the womb or vagina **(Westhoff et al., 2013).**

"Massage the uterus while supporting the lower uterus .Express clots Insert the catheter to vacate the bladder and allow a precise measurement of the output Put the woman in a weak position Avoid the position of the trand that may interfere with respiratory diseases and cardiac function. Continue IV access and start IV with Large cavity catheter is capable of carrying full blood **(WHO, 2011).**

The nurses are responsible for administering IV fluids, volume expanders, blood as directed, blood drawing (for each protocol or orders) for hemoglobin, hematocrit, type and crossmatch, platelet, prothrombin time, partial activation time coagulation (APTT), fibrinogen Division of leptin, administration of prescribed drugs, such as oxytocin, prostaglandin, or methyl-ergonofin solvents, and application of pulse oximeter to determine oxygen saturation. Manage the warm oxygen mask face at 8-10 liters / min or as directed by your doctor or protocol facility **(Lowdermilk et al., 2014).**

Prevention of uterine atony and subsequently, postpartum hemorrhage, depends on the active management of the third stage of labor **(Sanghvi et al, 2010).**

Common prevention measures include emptying the bladder and administering oxytocin. If bleeding persists, health providers must search for cervical/vaginal lacerations **(Densiriaksorn, 2010).** Active Management of the Third Stage of Labor (AMTSL) has been known to reduce the incidence of blood loss of 1 liter and more, lowers the need for transfusion and more uterotonics **(Sanghvi et al, 2010).**

Active management of the third stage of labor is effective at preventing postpartum hemorrhage in facility-based deliveries and is known to reduce severe postpartum hemorrhage by 60 to 70 percent **(Stanton et al, 2009 &Gülmezoglu et al, 2009).**

While it is managed differently across the world, the central aim of active management is to combat post partum blood loss **(Gülmezoglu et al. 2009).**

It comprises three components including the administration ofuterotonics immediately after delivery, controlled cord traction, and uterine massage after delivering the placenta **(Gülmezoglu et al, 2009& Miller et al. 2004).**

Primary prevention methods will help lower mean postpartum blood loss, reducing the incidence of postpartum hemorrhage **(Raghavan et al, 2015).** Primary prevention methods include the active management of the third stage of labor, the administration of oxytocin and misoprostol, a non-inflatable antis hock garment to address shock in postpartum hemorrhage, and the hydrostatic condom balloon catheter to control postpartum hemorrhage subsequent to uterine atony **(Miller et al, 2014).**

The aim of this study wereto monitoring and management of postpartum hemorrhage, improve patient outcomes and decrease the possible complications

METHODOLOGY

A quasi-experimental design was used in the current study and control group .This study was conducted in postpartum words of obstetrics department at Assiut university hospital. A convenience sample of140 postpartum women during the period of this study (from March 2016 to January 2017) .The sample divided into two groups 70 women for each.

Control group) before implementing nursing practices intervention who received routine nursing care according to the policy of the hospital. While study group was received a designing nursing practices. Patient with blood diseases or complicated postpartum hemorrhage were excluded.

The tool for data collection was developed by the researcher after reviewing the related literatures then this tool was tested for content validity. It included a structured interview questionnaire which consisted of the personal data, medical and obstetric history of participating women. Assessment of the patient vital signs, conscious level, amount of blood loss, fundal level. Management of postpartum hemorrhage which included: ensure IV access, uterine massage, folly catheter, medication and blood product as ordered , keep the patient warm , attention to the patient response to resuscitation ,Monitor Complete blood count, coagulation studies and blood gases ,assist to move to OR , documentation and reporting. Assessment of patient, general condition of the patient (vital signs, conscious level, bleeding.

Procedure:

Oral consent was obtained from women who were participated in the study, after explaining the nature and purpose of the study. There was no any risk for the women during conduction of the study. The study was followed common ethical principles in clinical research. Confidentiality and anonymity would be assured and the participating women had the right to refuse participation or withdraw from the study without any rational.

Assessment of general condition (conscious level) amount of blood loss (by history & visual estimation),vital signs (especially pulse and BP) , cause of bleeding, fundal level and lochia ,presence of complications **for study and control group.**

For study group, applied the designing nursing practices to assess blood loss, Monitor vital signs especially pulse, blood pressure to determine the degree of shock. Ensure IV assess (2 large lore gauge needles) to facilitate resuscitative measures. Insert Foley catheter to enhance bladder emptying and assess patient status and response. Assess for tachypnea and tachycardia, Assess for narrowed pulse pressure, hypotension and cool extremities (signs of shock). Perform uterine massage in cases of a tony to improve the uterine contractions.

Mobilize additional staff as needed (Charge Nurse), Administer uterotonic medications as ordered, Type and Cross – Consider use of Trauma blood if type and crossed blood not available, Assign single person to communicate with blood bank.

Maintain strict Intake &Output, Weigh materials, calculate and record cumulative blood loss q 5-15 minutes ,Set up blood administration set and blood warmer for transfusion ,Administer blood products and draw labs, as ordered ,Use fluid warmer and/or rapid infuser for fluid & blood product administration. Apply pulse oximeter/ECG monitoring, Elevate legs to 20-30 degree to improve the circulation to the vital organ, Keep patient warm, Anticipate and assess pain management need.

Assessment was done after intervention to evaluate patient response and outcomes. , Close attention to the response to resuscitation, Monitor Complete blood count, coagulation studies and blood gases to evaluate the patient response. Assist with move to operative room (if indicated), Documentation and reporting.

Statistical analysis:

Data were analyzed using statistical package for the social science (SPSS) version 20. Numerical data expressed as means and standard deviations. Qualitative data expressed as frequency and percentage. Chi-square test used to examine the relationship between qualitative variables. Repeated quantitative variables, unpaired T test used for comparison. Probability of error (p-value) < 0.05 considered significant

RESULTS

Table (1): Comparison between the study group and control group according to personal characteristics

Variables	Group				P. value
	Study (n=70)		Control (n=70)		
	No.	%	No.	%	
Age (years)					
Mean ± SD	29.59 ± 5.32		31.06 ± 5.63		0.073
Residence					
Rural	19	27.1	22	31.4	0.577
Urban	51	72.9	48	68.6	

 (P: Significant Value)

Table (1): Comparing the personal characteristics between study and control group in which there was no statistical difference as regard age, residence.
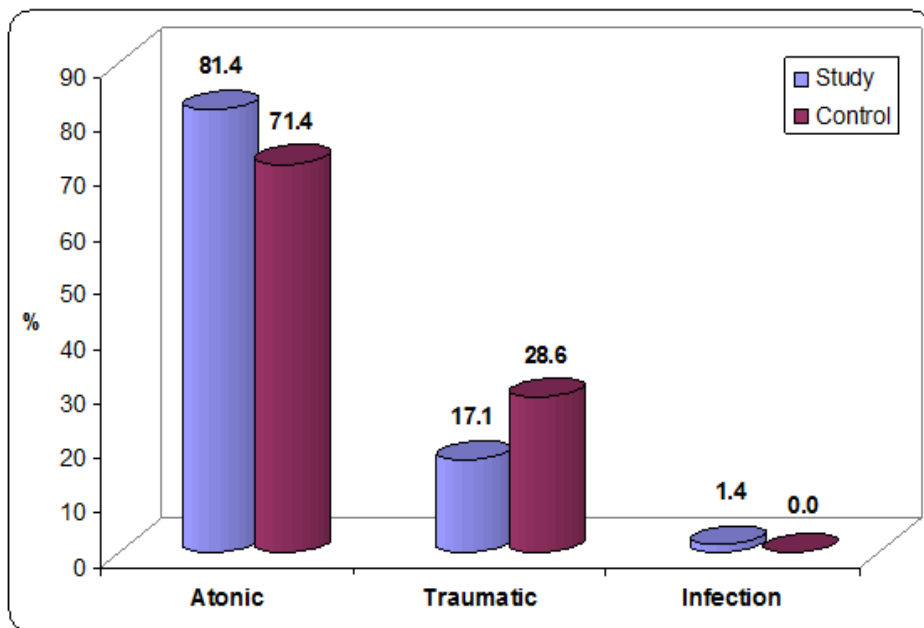
Table (2): Distribution of studied   group according to their Obstetrical data

	Study (n= 70)		Control (n= 70)		P-value
	No.	%	No.	%	
Parity:					0.084
Mean ± SD	2.87 ± 1.67		3.31 ± 1.40		
Range	0 – 8		0 – 7		
Gestational age: (weeks)					0.182
Mean ± SD	36. 11 ± 2.68		36.86 ± 1.75		
Range	26 .0 – 40.0		31.0 – 41.0		
Mode of delivery:					0.858
NVD	23	32.9	24	34.3	
CS	47	67.1	46	65.7	
Type of PPH :					1.000
Primary	67	95.7	67	95.7	
Secondary	3	4.3	3	4.3	

*NVD: Normal vaginal delivery

*CS: Cesearian section

Table 2:show that the most common cause of PPH was uterine atony(76.42%), the most common type of PPH is primary ppH (95%) and(66.4%)of women with PPH were delivered by emergency CS compared with only (33.6%) delivered by NVD.

Figure (1): show distribution of the patients according to the cause of PPH.

This figure show that the most common cause of PPH was uterine atony (76.42%).

Table (3): Comparison between study group and control group according to nursing management of post-partum hemorrhage (Assessment part)

Varibles	Study				Control				P-value
	Done		Not done		Done		Not done		
	No .	%	No.	%	No.	%	No.	%	
Assess blood loss which include:									
Amount	70	100.0	0	0.0	30	42.9	40	57.1	0.000*
Source	70	100.0	0	0.0	43	61.4	27	38.6	0.000*
Cause	70	100.0	0	0.0	20	28.6	50	71.4	0.000*
Monitor vital signs which included:									
Pulse	70	100.0	0	0.0	52	74.3	18	25.7	0.000*
BP	70	100.0	0	0.0	38	54.3	32	45.7	0.000*
RR	70	100.0	0	0.0	22	31.4	48	68.6	0.000*
Temperature	70	100.0	0	0.0	15	21.4	55	78.6	0.000*
Ensure IV access	70	100.0	0	0.0	70	100.0	0	0.0	--
Assess for tachypnea and tachycardia	70	100.0	0	0.0	37	52.9	33	47.1	0.000*
Assess for narrowed pulse pressure, hypotension and cool extremities	70	100.0	0	0.0	48	68.6	22	31.4	0.000*
Assess location and consistency of the fundus	70	100.0	0	0.0	33	47.1	37	52.9	0.000*

Table (3): show the comparison in the nursing assessment of PPH cases in study and control group which reflected that there is a highly statistically significant Difference between planned nursing assessment and routine nursing assessment in cases of PPH.

Table 4: Comparison between study group and control group according to nursing management of post-partum hemorrhage (Intervention part)

	Study				Control				P-value
	Done		Not done		Done		Not done		
	No .	%	No.	%	No.	%	No.	%	
Insert fully catheter and empty the bladder	70	100.0	0	0.0	46	65.7	24	34.3	0.000*
Perform uterine massage	70	100.0	0	0.0	44	62.9	26	37.1	0.000*
Mobilize additional staff as needed	70	100.0	0	0.0	27	38.6	43	61.4	0.000*
Administer uterotonic medications a s ordered	70	100.0	0	0.0	55	78.6	15	21.4	0.000*
Type and cross-consider use of general blood bank if type and Crossed blood not available.	70	100.0	0	0.0	14	20.0	56	80.0	0.000*
Assign single person to communicate with blood bank	70	100.0	0	0.0	26	37.1	44	62.9	0.000*
Maintain strict I&O	70	100.0	0	0.0	28	40.0	42	60.0	0.000*
Weigh materials, calculate and record cumulative blood loss q 5-15 minutes	67	95.7	3	4.3	5	7.1	65	92.9	0.000*
Use fluid warmer and/or rapid infuser for fluid & blood product administration	65	92.9	5	7.1	12	17.1	58	82.9	0.000*
Apply pulse oximeter/ ECG monitoring	70	100.0	0	0.0	62	88.6	8	11.4	0.006*
Elevate legs to 20-30 degree	61	87.1	9	12.9	15	21.4	55	78.6	0.000*
Keep the patient warm	70	100.0	0	0.0	19	27.1	51	72.9	0.000*
Anticipate and assess pain management need	70	100.0	0	0.0	12	17.1	58	82.9	0.000*

Table 4: - show the comparison in the nursing intervention of PPH cases in study and control group which reflected that there is a highly statistically significant Difference between planned nursing management and routine nursing management in cases of PPH.

Table (5): Comparison between study group and control group according to nursing management of post-partum hemorrhage (follow up part)

	Study				Control				P-value
	Done		Not done		Done		Not done		
	No.	%	No.	%	No.	%	No.	%	
Close attention to the response to resuscitation this include assessment of the following:									
Funds level	69	98.6	1	1.4	28	40.0	42	60.0	0.000*
Lochia	63	90.0	7	10.0	5	7.1	65	92.9	0.000*
Vital signs	70	100.0	0	0.0	46	65.7	24	34.3	0.000*
Urine output	70	100.0	0	0.0	41	58.6	29	41.4	0.000*
Conscious level	70	100.0	0	0.0	22	31.4	48	68.6	0.000*
Skin	67	95.7	1	1.4	35	50.0	35	50.0	0.000*
Monitor CBC, coagulation studies and blood gases as ordered	70	100.0	0	0.0	17	24.3	53	75.7	0.000*
Assist with move to OR (if indicated).	70	100.0	0	0.0	31	44.3	39	55.7	0.000*
Documentation and reporting	70	100. 0	0	0.0	34	48.6	36	51.4	0.000*

Table 5: - show the comparison in the nursing follow up after intervention of PPH cases in study and control group which reflected that there is a highly statistically significant Difference between planned nursing assessment and routine nursing assessment in cases of PPH

Table (6): show the comparison in Patients outcome between both group

	Study (n= 70)		Control (n= 70)		P-value
	No.	%	No.	%	
Bleeding:					0.003*
Stopped	67	95 .7	58	82.8	
Not stopped	3	4.3	12	17.2	
Conscious level:					0.001*
Comatosed	9	12 .9	15	21.4	
Conscious	61	87 .1	55	78.6	

Table(6):-show that the patient outcomes improved in study cases when compared with control cases which appeared in stop of bleeding(95.7%)in study group, (82.8%)in control group and conscious level(87.1%)in study group,(78.6)in control group with normal conscious level.
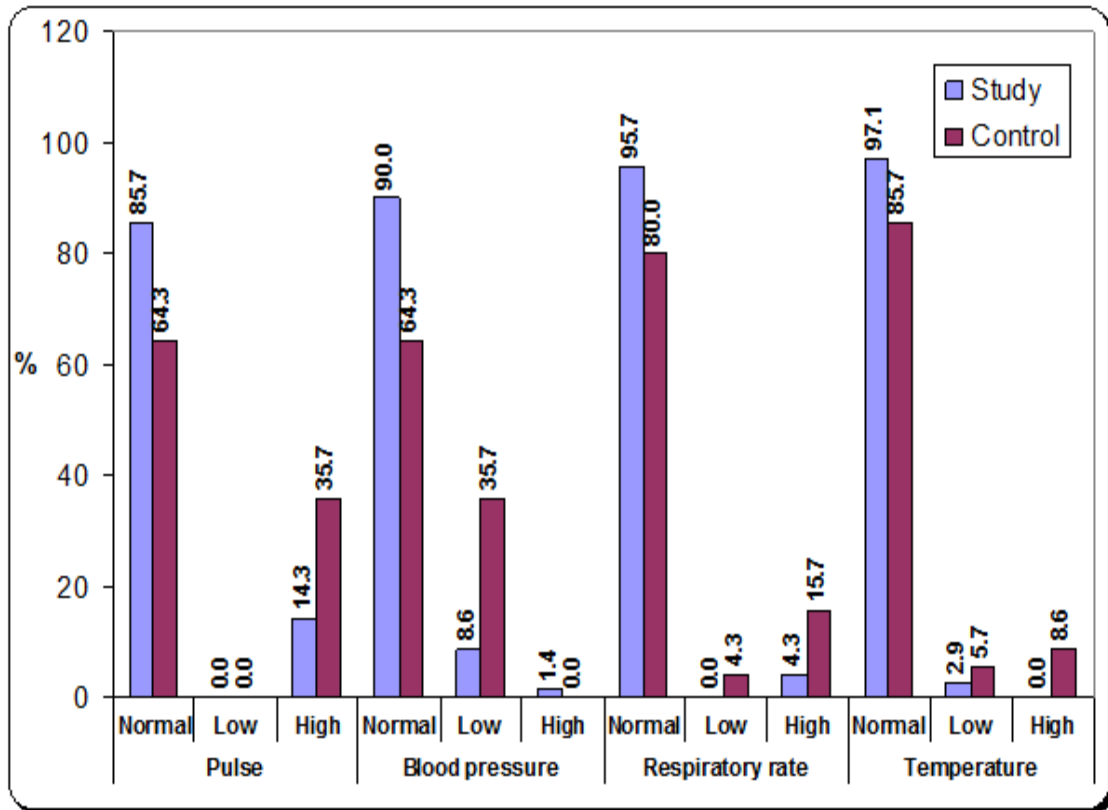
Figure (2): comparison between two groups according to patients Vital signs

Figure (2): show the progress of patients vital signs post intervention , better improvement in study group than control group, normal pulse rate (85.7% in study and 64.3% in control), normal blood pressure (90% in study and 64.3% in control), normal respiratory rate (95.7% in study and 80% in control), normal temperature (97.1% in study and 85.7 % in control).
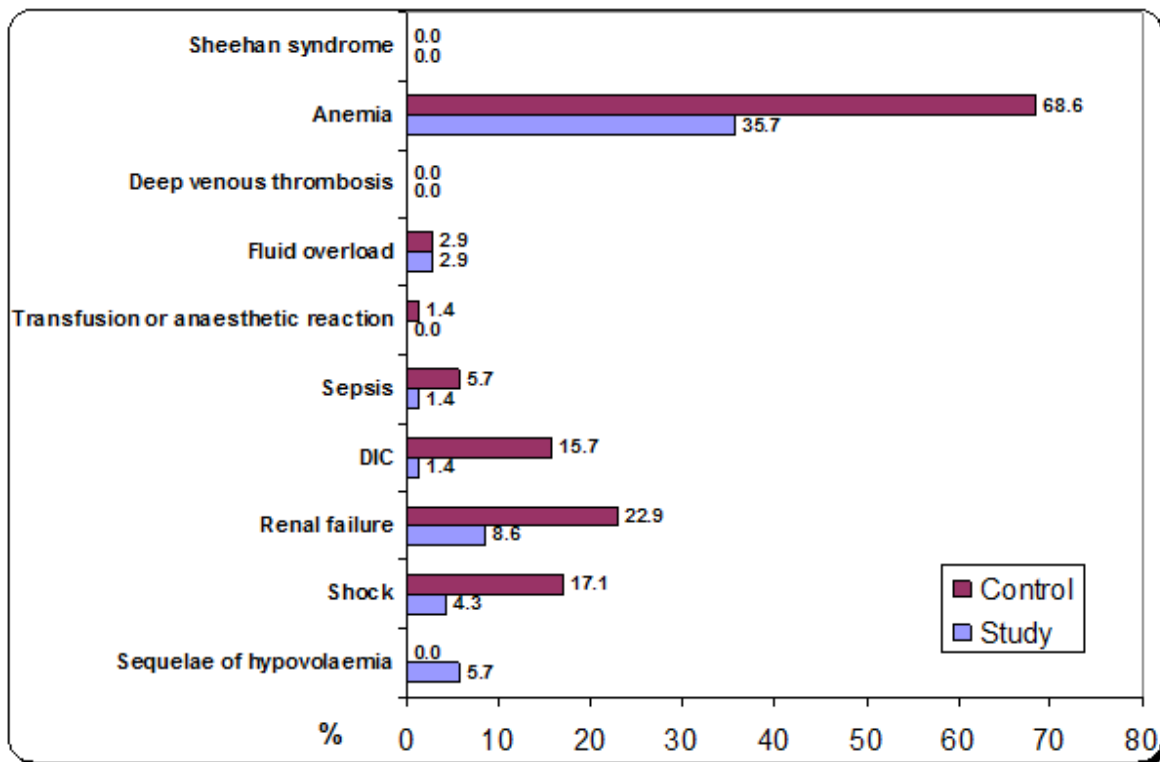
Figure (3):comparison between two groups according to patients Complications

Figure (3): show decreased patients complications in study group when compared with study group, shock (4.3%in study group and 17.1% in control group), Renal failure (8.6%in study group and 22.9%in control group), DIC (1.4%in study group and 15.7% in control group), Anemia (35.7%in study and 68.6% in control group).

DISCUSSION

Postpartum hemorrhage is a serious complication after childbirth, especially when clinical signs are detected at a later stage. There can be increased risk of complications that can lead to other health issues or even death. **Brennan, et al., (2013).**The best patient outcome occurs when healthcare providers notice the subtle clinical changes in a patient that indicate the condition. Noticing these changes is the first step to better patient outcome; being able to implement the care required is the next step. When healthcare providers are able to quickly recognize these changes, patients are more likely to receive the appropriate care and more quickly recover from their condition. This project provides nurses with the educational tools needed to provide appropriate care for patients during a postpartum hemorrhage.

Farquhar et al (2011) & Geller et al, 2014)identify contributing factors that can avoid maternal mortality, including organizational factors and staff such as inadequate education and training, or lack of knowledge of staff. Two other studies reported less than optimal management of severe PPH and non-application of guidelines in nearly 40% of cases, partly due to the status of the maternity unit. These studies have used retrospective medical records, however, and it is difficult to control the combination of the case in retrospective review of the scheme. Moreover, the abstraction reduces the quality of care.The present study is a comparative study that aims to compare the patient outcome

between the study &control groups. It was conducted on 140 patients divided into two groups each group contain 70 patients, study group received the designing nursing practices intervention, control group received the routine nursing care.

Results of the current study demonstrate that when comparing both groups, there was no statistically significant difference between them at the baseline as regard age, parity, mode of delivery, cause of PPH, this shows that both groups are very similar and well matched.

This project was designed to monitoring and management of postpartum hemorrhage, improve patient outcomes and decrease the possible complications. In our study strict assessment of clinical signs of PPH was performed successfully in study group compared with control group as regard assessment of blood loss , source of bleeding, cause of bleeding , Blood pressure, location and consistency of the fundus ,the assessment of the patients was an important point in early detection , management and improving of the outcomes, and thisis consistent with **Miller et al.,(2014)**,who concluded that the best patient outcomes occur when guidelines, resources and education are provided to healthcare providers. Equipping bedside nurses with the knowledge and resources needed to make appropriate decision during emergent situation will lead to better patient outcomes. This is also agreed by good knowledge among midwives concerning risk factors, prevention, and monitoring a PPH event.

These are very important training packages that have been proved to increase knowledge, skills and preparedness to nurse midwives hence reduce PPH and maternal mortality. Our current study also consistent with **Evensen, et al., (2017) ,** the important thing is for providers to be able to

recognize the signs and symptoms of excessive blood loss (clinical signs) earlier and to have the resources at hand for successful management of PPH.

In our present study findings are highly matched with the **Dorji (2016**), if postpartum hemorrhage is suspected, a physical exam should be performed to quickly inspect the uterus, cervix, vulva, and perineum to identify the source of bleeding. Once the cause has been identified, a treatment plan specific to the etiology of the bleeding can be implemented and so reduce possible complications.

In our study there is a statistical significant difference between study group in estimation of blood loss by weighing materials (95.7%)and control group) in hospital(7.1%)that affected positively in early detection and management of PPH , this strict & accurate estimation of blood loss by weighting materials helped us in early diagnosis and early intervention resulting in better outcomes, the results by **Lertbunnaphong et al., (2016) concluded that,** regarding accuracy at 100 mL discrete categories of postpartum blood loss, visual estimation was found to be inaccurate, resulting in underestimation, with low correspondence (27.6%) and poor agreement (Cohen's kappa coefficient 0.07; $p < 0.05$), compared with objective measurement using the drape. Two-thirds of cases of immediate PPH (65.4%) were misdiagnosed using visual estimation , So **Lertbunnaphong et al.,(2016) concluded that,** visual estimation is not optimal for measurement of postpartum blood loss in PPH. This method should be withdrawn from standard obstetric practice and add, staff nurses continuously underestimate blood loss when assessing a patient's

Lochia (bleeding) after delivery. This underestimation of blood loss leads to improper management of postpartum hemorrhage and in (*Abdul-Kadir* **et al., 2011**) reported the use of weighing of blood loss collected on a sensitive scale, to diagnose immediate PPH.Which also agreed by **(Roston, 2012)** Experts have suggested that improving the accuracy and reliability of blood loss estimation is the 'crucial step' in early detection of PPH and that most deaths from PPH could be avoided through 'appropriate diagnosis'.

Additional evidence suggests a strong need for education in this area. **(Ruth and Kennedy, 2011)** noted an increase in positive patient outcomes during treatment of postpartum hemorrhage after staff nurses attended training on the appropriate documentation and quantification of blood loss during the postpartum period. Similarly, a cohort study by **(Leach and Mayo, 2013)** that examined the role of staff nurses during a rapid response code revealed that while staff nurse response rates to a rapid response

In our study, the early intervention of PPH. improves the patient outcomes as stopping of bleeding (95, 7%) in studied group in comparison to (82.8%)in control group and the patient complications decreased following the implementation of the guidelines. This is consistent with several previous studies, where the decrease in the PPH and severe PPH rates was reported after the implementation of the new PPH management guideline.

(Roston et al, 2012) who denoted that Delays in the diagnosis and treatment of PPH are believed to have a direct effect on the severity of bleeding, the development of complications such as coagulopathy and increasing rates of morbidity and mortality. Delays are reported to be caused by misinterpretation of the extent of blood loss and its physiological effects, failure to recognise hidden bleeding, and failure to escalate care to more senior colleagues .Experts have suggested that improving the accuracy and reliability of blood loss estimation is the 'crucial step' in early detection of PPH.

According to **(Miller, 2014),** the best patient outcomes occur when guidelines, resources and education are provided to healthcare providers. Equipping bedside nurses with the knowledge and resources needed to make appropriate decision during emergent situation will lead to better patient outcomes. This evidence-based project provided nurses with clear role expectations and was designed to improve patient outcomes in the future and to decrease complications and mortality related to postpartum hemorrhage.

According to **(Hoffman, Aitken, and Duffield, 2009),** nurses lack the critical knowledge and skills needed for identifying changes in their patients' condition. Increasing awareness and education are key strategies in the prevention and management of postpartum hemorrhage.

In our study there is statistically significant difference between study group & control group in decreasing incidence of complications (Anemias, hypovolemic shock, renal failure&DIC), it was consistent with a meta-analysis study by **(Anderson and Etches, 2007),** researchers examined 54 postpartum hemorrhage incidents and found that in 45 of these cases the bedside nurse's quick response prevented further complications for the patient. In six of these cases, the patient suffered hypovolemic shock due to late recognition of postpartum hemorrhage.

The results of the present study showed that in both groups ,in study group the bleeding stopped in 67(95.7 %) case ,while in control group the bleeding stopped in 58 (82.8%)case conscious level(87.1%)in study group,(78.6)in control group with normal conscious level. The failure rate in study & control groups were 4.3%, 17.3% respectively There was significant difference identified between groups as regard stopping of bleeding.

When health workers make the diagnosis for postpartum hemorrhage, the WHO recommends a uterine massage and initial fluid resuscitation with isotonic crystalloids. If the uterine massage and initial fluid resuscitation fail to stop bleeding, tranexamic acid should also be considered. In addition, the intrauterine balloon tamponade can be used to counter refractory bleeding if the health worker does not have access to uterotonics **(World Health Organization, 2012).**

CONCLUSION &RECOMMENDATIONS

The implementation of the intervention design of nursing practices for the management of PPH had a positive effect on the results of PPH patients and reduced PPH

complications. We can recommend that, nurses perform essential and lifesaving interventions on a daily basis. Equipping nurses with knowledge and techniques needed to identify the patient experiencing postpartum hemorrhage is essential in the management of postpartum hemorrhage. Hospitals should develop postpartum hemorrhage projects designed to increase awareness associated of postpartum hemorrhage mortality and morbidity by improving nurses' recognition of, readiness for, and response to a postpartum hemorrhage event.

REFERENCES

[1]. *Abdul-Kadir R, McLintock C, Ducloy AS, et al. Evaluation and management of postpartum hemorrhage: consensus from an international expert panel. Transfusion. 2014*

[2]. **Brennan, C. W., Daly, B. J., & Jones, K. R. (2013).** State of the science: the relationship between nurse staffing and patient outcomes. *Western Journal of Nursing Research*, *35*(6), 760-794

[3]. **Chandraharan, Edwin, and Archana Krishna.** "Diagnosis and management of postpartum haemorrhage." *BMj* 358 (2017): j3875.

[4]. *Cunningham FG, Gant NF, Leveno KJ, et al,(2011).* Conduct of normal labor and delivery pp. 320-5.

[5]. **Densiriaksorn, S. (2010).** Active management of the third stage of labor (AMTSL) without controlled cord traction at Nongkai Hospital. *Chulalongkorn Medical Journal*, *54*(6), 581-591

[6]. **Dorji Phurb 2016:**STANDARD GUIDELINE FOR MANAGEMENT OF POSTPARTUM HAEMORRHAGE Reproductive, Maternal and Neonatal Health Programme Department of Public Health Ministry of Health , Second Edition 2016, *This publication is available in hard copy or PDF in the Ministry of Health's website*

[7]. **El**-Zanaty, F., & Way, A. A. (2001). Egypt Demographic and Health Survey 2000.

[8]. **Evensen, A., Anderson, J. M., & Fontaine, P. (2017).** Postpartum hemorrhage: prevention and treatment. *birth*, *12*, 18.

[9]. Farquhar C, Sadler L, Masson V, Bohm G, Haslam A. Beyond the numbers: classifying contributory factors and potentially avoidable maternal deaths in New Zealand, 2006–2009. Am J Obstet Gynecol. 2011. October; 205: 331.e1–8. 10.1016/j.ajog.2011.07.044

[10]. Geller SE, Koch AR, Martin NJ, Rosenberg D, Bigger HR, Illinois Department of Public Health Maternal Mortality Review Committee Working Group. Assessing preventability of maternal mortality in Illinois: 2002–2012. Am J Obstet Gynecol. 2014. December; 211: 698.e1–11. 10.1016

[11]. *Gülmezoglu, A. M.-A. (2009).* Active management of the third stage of labour without controlled cord traction: a randomized non-inferiority controlled trial. *Reprod Health, (6*(1), 1-10.

[12]. **Hoffman, K. A., Aitken, L. M., & Duffield, C. (2009).** A comparison of novice and expert nurses' cue collection during clinical decision-making: Verbal protocol analysis. *International journal of nursing studies*, *46*(10), 1335-1344

[13]. **Leach, L. S., & Mayo, A. M. (2013).** Rapid response teams: qualitative analysis of their effectiveness. *American Journal of Critical Care*, *22*(3), 198-210.

[14]. **Lertbunnaphong, T., Lapthanapat, N., Leetheeragul, J., Hakularb, P., & Ownon, A. (2016).** Postpartum blood loss: visual estimation versus objective quantification with a novel birthing drape. *Singapore medical journal*, *57*(6), 325.

[15]. **Lowdermilk, D. L., Perry, S. E., Cashion, M. C., & Alden, K. R. (2014).** *SPEC-Maternity and Women's Health Care*. Elsevier Health Sciences.

[16]. **Maaløe, N., Housseine, N., Meguid, T., Nielsen, B. B., Jensen, A. K. G., Khamis, R. S., ... & Bygbjerg, I. C. (2018).** Effect of locally tailored labour management guidelines on intrahospital stillbirths and birth asphyxia at the referral hospital of Zanzibar: a quasi- experimental pre- post study (The PartoMa study). *BJOG: An International Journal of Obstetrics & Gynaecology*, *125*(2), 235-245

[17]. *Miller S., Lester, F., Hensleigh, P (2014).* Prevention and Treatment of Postpartum Hemorrhage: New Advances for Low-Resource Settings. J Midwifery Womens Health, pp 283-292

[18]. *Raghavan, S. G. (2015).* Misopr ostol for primary versus secondaryprevention of postpartum haemorrhage: acluster-randomised non-inferiority communitytrial. BJOG: An International Journal of Obstetrics & Gynaecology, 123 (1), 120-127.

[19]. *Roston AB, Roston AL, Patel A (2012)* .Blood loss: Accuracy of Visual Estimation. pp71–72

[20]. **Ruth, D., & Kennedy, B. (2011):**Acute volume resuscitation following obstetric hemorrhage. Journal of Perinatal & Neonatal Nursing,; 25(3): 253-260

[21]. *Sanghvi, H.A (2010).* Prevention of postpartum hemorrhage at home birth in Afghanistan. International Journal of Gynecology & Obstetrics, 108 (3), 276-281.

[22]. *Stanton, C. A. (2009).* Use of active management of the third stage of labour in seven developing countries. Bulletin of the World Health Organization, 87(3), 207-215.

[23]. *Weeks, A (January 2015).* "The prevention and treatment of postpartum haemorrhage, 122 (2):202–10

[24]. **Westhoff, G., Cotter, A. M., & Tolosa, J. E. (2013).** Prophylactic oxytocin for the third stage of labour to prevent postpartum haemorrhage. *Cochrane Database of Systematic Reviews*, (10).

[25]. *WHO (2011).* Guidelines for the management of postpartum hemorrhage and retained placenta pp1-62.

[26]. World Health Organization, 2014.Trends in Maternal Mortality: 1990 to 2013 Estimates by WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division. Geneva. Available from: http://apps.who.int/iris/bitstream/10665/112682/2/9 789241507226. *www.health.gov.bt*