Effect of Nursing Care Protocol on Atonic Postpartum Hemorrhage Outcomes

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Abstract: Postpartum hemorrhage (PPH) is the leading cause of maternal morbidity and mortality in developing countries. PPH is defined as any blood loss >500 ml following vaginal delivery and >1000 ml after cesarean section. It can also be defined as fall in hematocrit >10% or blood loss >15% of total blood volume, or 10% measured peripartum decline in hemoglobin levels. The aim of this quasi-experimental research was to examine the effect of nursing care protocol on atonic Postpartum Hemorrhage (APPH) outcome. Purposive sample with a total of 100 women diagnosed with atonic Postpartum Hemorrhage was recruited. The research was carried out at the Postpartum Units which located at El-Manial Educational University Hospital. Tools for data collection were: A Structured Interviewing questionnaire; Women Assessment Tool; and Follow-up assessment Tool. Results indicated that Mean amount of blood loss after 2 hrs of delivery was 1055.40 ± 978.8 ml. Four hrs after delivery, it was 362.9 ± 190.8 ml and after 6 hrs of delivery, the mean amount of blood loss was 118.7 ± 78.7 ml. These findings showed that about one third (33%) of the women had been discharged after 6 hours from delivery, 6% of them had recovered and been discharged after 8 hours, 12% of women had been discharged after 12 hours, an equal percentage of 13% of women had been discharged after 24 hours, 36 hours and 48 hrs, respectively. Also, 90% of women recovered and had been discharged without surgical intervention, minorities of them had partial and total hysterectomy (3 & 4%, respectively) and 3% of them were died. Findings indicated that, there was a statistically significant relationship between current pregnancy complications and parity (P= 0.001 & P= 0.00, respectively), as factors that might affect the amount of blood loss at fourth stage of labor. Findings showed that there were statistically significant relationship between maternal age (t=-3.037, p=0.003), period from last labor or abortion (t=-2.914, p=0.005), complications during pregnancy (χ^2= 12.94, P= 0.000), parity (t=-2.01, P= 0.047) and tone of the uterus at fourth stage of labor. Findings indicated that there were highly statistically positive correlation between parity (r= 1.000, p<0.001), maternal age (r=0.723, p=0.001), period from last labor / abortion (r= 0.715, p<0.001) and hemoglobin level at fourth stage of labor. Findings indicated that there were statistically significant relationship between placental condition (t= -4.214, P<0.001), tone of the uterus (t= -6.07, p< 0.001) and the duration of third stage of delivery (r=0.323, p=0.001), as factors might affect amount of blood loss at 4th stage of labor after 4hrs of delivery. Findings indicated that there were statistically significant relationships between placental condition (t=-6.29, P<0.001), tone of the uterus (t= -8.22, P< 0.001) and amount of blood loss after 6 hrs of delivery. This research concluded that women with APPH who received the nursing care protocol will reduce atonic primary postpartum hemorrhage outcome.

Key words: Atonic Postpartum Hemorrhage · Postpartum Complication Outcome

INTRODUCTION

The postpartum hemorrhage (PPH) is an obstetric emergency associated with both the vaginal birth and cesarean section. PPH and hypertensive disorders of pregnancy are the leading causes of maternal morbidity and mortality in developing countries. Bleeding is the main cause of maternal death in Africa (33.9%) and Asia (30.8%) [1]. Moreover, PPHis defined as any blood loss >500 ml following vaginal delivery and >1000 ml after cesarean section [2]. It can also be defined as fall in hematocrit >10% or blood loss >15% of total blood volume, or 10% measured peripartum decline in hemoglobin levels, recent definitions paid greater attention to symptoms (e.g., weakness, palpitations, diaphoresis, restlessness, confusion, air hunger and/or

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syncope) and signs of hypovolemia (e.g., hypotension, tachycardia, oliguria, low oxygen saturation). Most of healthy women do not exhibit signs or symptoms of hemodynamic instability until blood loss of 1200 ml. However, some PPH may not be recognized prior to onset of hypovolemia because blood loss is often underestimated, bleeding may occur intra-abdominally [3].

Obstetric hemorrhage is the leading cause of maternal death and accounting for 27% of all maternal deaths that occur worldwide [4]. Almost all maternal deaths 99% (286 000) occur in developing countries, more than half of these deaths occur in sub-Saharan Africa 62% (179 000), followed by Southern Asia (69 000) [5]. Most hemorrhages occur during the postpartum period [6] and are generally related to uterine atony, retained placenta and/or genital lacerations [7]. In Egypt, the maternal mortality ratio stood at 45 deaths per 100, 000 live births in 2013 according to the World Health Organization [5]. Postpartum hemorrhage is attributed for highest cause of all maternal deaths by (41%) and represent 19.7% of all direct causes of maternal deaths [8].

The bleeding that occurs during the first 24 hours after delivery is called primary hemorrhage. When this occurs after 24 hours of birth until six weeks, it is called secondary postpartum hemorrhage [9].

The Risk factors for PPH reported by RCOG [10] and NICE [11] as a) antenatal risk factors as antepartum hemorrhage in current pregnancy; placenta Previa (increases risk by 12 times); suspected or proven placental abruption; multiple pregnancy (increases risk by 5 times); over-distended uterus (polyhydramnios or macrosomia); Pre-eclampsia or pregnancy-induced hypertension (4 times risk); grand multiparity (four or more pregnancies); Previous PPH (3 times risk) or previous history of retained placenta; Asian ethnic origin (2 times risk); existing uterine abnormalities; maternal age (=40 years); maternal anemia; b) Intrapartum risk factors as induction of labor (Twice risk); Labor of >12 hours duration (2 times risk); emergency caesarean section (4 times risk); Retained placenta (5 times risk); episiotomy (5 times risk); Baby weight >4 kg (2 times risk); maternal pyrexia in labor (2 times risk); and c) Pre-existing maternal coagulopathy: Hemophilia A or B; Von Willebrand's disease.

Another study done by Blomberg [12] reported that PPH is also linked with obesity. It was found that, the risk of atonic uterine hemorrhage rapidly rises with rising Body Mass Index (BMI); in women with a BMI > 40, the risk was 5.2% with normal delivery and 13.6% with instrumental delivery.

According to Lalonde [13] PPH resulted from many causes that are generally divided into; Atonic, Traumatic and Mixed. Another way of describing the causes of PPH is "four T's" i. Tone: uterine atony, distended bladder; ii. Trauma: lacerations of the uterus, cervix, or vagina; iii. Tissue: retained placenta or clots; iv. Thrombin: pre-existing or acquired coagulopathy.

Prevention of PPH, WHO considers Active management of the third stage of labor (AMTSL) to be the "gold standard" to reduce the incidence of PPH, the quantity of blood loss, the need for blood transfusion and thus should be included in any program of intervention aimed at reducing death from PPH [14]. It combines non drug interventions with administration of uterotonic drugs [15]. It is a combination of a uterotonic administration (preferably Oxytocin) immediately upon delivery of baby, b. Early cord clamping and cutting and c. Gentle cord traction with uterine counter traction when the uterus is well contracted (Brandt-Andrews maneuver).

Other interventions related to prevention of postpartum hemorrhage are being studied, such as skin-to-skin contact, breastfeeding, early cord clamping time [16]. It was therefore necessary to identify and analyze better nursing practices used for prevention and control of PPH. The International Confederation of Midwives and International Federation of Gynecology and Obstetrics further state: "Every attendant at birth needs to have the knowledge, skills and critical judgment needed to carry out AMTSL for preventing postpartum hemorrhage". Hence, it is recommended that all women should benefit from AMTSL, the only intervention known to prevent PPH [17, 18].

Obtaining treatment quickly is essential to save the woman's life; a woman bleeding from PPH due to uterine atony can die within two hours. Moreover, once a woman has bled sufficiently she will become shocked, fluids and blood must be administered rapidly to restore hemodynamic stability and prevent irreversible damage or tissue death. Delays in obtaining care have been identified as important contributors to maternal mortality in low resource settings [19].

The treatment of patients with PPH has two major components: first is resuscitation , management of the hemorrhage and hypovolemic shock, second is identification & management of the underlying cause(s). Thus the successful management of PPH should focus on both components, moreover; first line of treatment is the medical therapy, which includes bimanual uterine massage in combination with uterotonic agents, such as oxytocin, ergometrine and prostaglandins. In the case of failure of

medical therapy, the second line of treatment includes organ sparing surgical interventions, such as B-Lynch brace sutures, uterine artery ligation, uterine artery embolization, bilateral hypogastric artery ligation and intrauterine balloon tamponade (IUBT). If the above mentioned treatment options fail, hysterectomy should be performed to prevent further blood loss and to reduce maternal morbidity and mortality [20].

The midwife is often the first and/or only person present when the woman has PPH. It is crucial that she is competent and skilled in basic life support. She must be aware of the risk factors for PPH and the immediate steps to be taken for controlling blood loss. They are central to the effective prevention, recognition and treatment of PPH. The management is based on an understanding of the Pathophysiology of hypovolemic shock, of the normal physiological processes of the third stage of labor and close monitoring are essential. In addition, nurses play important roles in providing care for women with PPH as check and record vital signs, monitors the mother's vital signs every 5–10 minutes during the first 30 minutes, then every 15 minutes for the next 30 minutes and then every 30 minutes for the next 2 hours, blood pressure, pulse, level of the uterine fundus. massages the uterus, looks for bleeding and makes sure the uterus is contracted [21].

Other roles that midwife nurses carried out in case of PPH occurs (emergency roles); assess airway, breathing, circulation and administer oxygen by mask at 10–15 liters/minute. Access (large gauge intravenous cannula), position the women flat, keep the woman warm using appropriate available measures, transfuse blood as soon as possible. Until blood is available, infuse up to 3.5 liters of warmed fluid solution, crystalloid (2 liters) and/or colloid (1–2 liters) rapidly as required. Monitor temperature every 15 minutes continuous pulse, blood pressure monitoring (using oximeter, electrocardiogram and automated blood pressure recording). Insert Foley catheter to monitor urine output two peripheral cannula, 14-gauge consider arterial line monitoring (once appropriately experienced staff available for insertion) transfer to a high dependency unit on delivery suite once the bleeding is controlled or an Intensive therapy unit if appropriate, recording of parameters on a flow chart such as a high dependency chart or the modified obstetric early warning system charts, documentation of fluid balance, blood, blood products and procedures [22].

Significance of the Study: PPH is one of the most alarming and serious emergencies, which the nurse midwives may face first and may be the only professional person present when hemorrhage occurs, her prompt and competent action will be crucial in controlling blood loss and reducing the risk of maternal morbidity or even death [21].

The findings of study carried out by Prata *et al*. [23] indicated that AMTSL significantly reduces the risk of PPH. AMTSL has been recommended as a routine management for vaginal deliveries in hospital settings. Also, they recommended that program planners and policy makers need to focus on the development and enforcement of protocols for prevention and treatment of PPH by considering the capacity and limitations of each context.

A study was carried out by Saleh *et al*. [24] on 49, 838 pregnant women, who studied audit of maternal mortality ratio and causes of maternal deaths in the largest maternity hospitals in Cairo (Kasr Al-Ainy) in 2008 and 2009. They found that 17 and 21 women died in the first and second year, respectively and the main cause of death were uncontrolled obstetric hemorrhage (postpartum hemorrhage) accounting for 35.3 and 33.3% for 2008 and 2009, respectively. They reported that there were avoidable factors that likely contributed to maternal deaths as inadequate supplies and drugs and difficulties in communication between departments e.g. the intensive care unit (ICU), anesthesia and blood bank. So, this was reflected in the time between admission and the start of blood transfusion. substandard quality of medical records. There are scarce number of researches that carried out in Egypt related to nursing management of PPH complications and its reduction of outcomes. This research will contribute that nursing care protocol will affect on the reduction of postpartum hemorrhage complications, throughout early detection and proper management.

The aim of the Research: This research aimed to examine the effect of nursing care protocol on atonic Postpartum Hemorrhage(APPH) outcome.

Research Hypothesis: Women who receive nursing care protocol will reduce atonic postpartum hemorrhage outcomes.

Operational Definition of Postpartum Hemorrhage Outcome: Postpartum Hemorrhage outcomes in this research were included the following; maternal recovery and discharge from the hospital, morbidity as hysterectomy (total or partial), blood transfusion and maternal mortality.

MATERIALS AND METHODS

Research Design: A quasi experimental design (post-test only with one group), was adopted to examine the effect of nursing care protocol on the atonic postpartum hemorrhage outcomes.

Setting: This research was carried out at the Postpartum Units. This unit was at El Manial Educational University Hospital, which provides free health care services to obstetrics & gynecologic clients.

Sample: A purposive sample with a total 100 women with APPH was recruited from the postpartum unit. The sample size was determined by using the rule of sum (sum of the study variables and multiply by constant).

Data Collection Tools: Three tools were designed and filled by researchers to collect the required data for this research:

Structured Interviewing Tool: It included questions related to demographic characteristics as age and educational level; medical history as hypertension, diabetes mellitus, anemia, cardiac diseases, obstetric profile as; parity, mode of delivery, previous post partum hemorrhage, previous complications during 3rd stage of labor and presence of risk factors during the present pregnancy as; antepartum hemorrhage, multiple gestation, polyhydramnios and large fetus size. Data was collected from the women's file and the missing data was completed from women when their condition was stabilized.

Women Assessment Tool: It included two parts 1) data related to 3rd stage of labor as duration of 3rd stage of labor, Placental assessment, if it was complete or there were retained tissues, vital signs. These data was collected from the women's file; part 2), it included data related to 4th stage of labor as assessment of episiotomy if present for (presence of redness, edema, ecchymosis, discharge, & approximation of the suture "REEDA method "), uterine assessment (consistency, position, & level), assessment of vital signs (pulse, blood pressure, respiratory rate), assessment of blood loss in relation to (amount of blood loss, & consistency) and laboratory investigation as hemoglobin level and cross matching for blood grouping. Women's assessment done every 15 minutes in the 1st hour; every 30 minutes in the 2nd hour; and then every hour in the following 4hours if the women's condition was stabilized. If didn't stabilized continuous monitoring was done.

Follow Up assessment Tool: Women were followed-up in the postpartum unit for a period of 6 hours or till discharged to collect data related to; assessment of blood loss, uterine assessment and vital signs.

Ethical Consideration: An official permission was granted from the director of El Manial Educational University Hospital. The researchers introduced themselves to obstetrician on charge and responsible for the management of women with APPH and explained the aim of the research to him/her in order to obtain their acceptance and co-operation to be one of the team of management and oral informed consent was taken from women to obtain their acceptance to participate in the research. Code numbers were created to keep patients' anonymity.

Tool Validity: Validation of the tool was done through submission to the panel of 5 experts in the field. Modifications were carried out according to the experts' judgments on the clarity of sentences and the appropriateness of content.

Pilot Study: It was conducted on 10 women to ensure clarity, applicability and objectivity of the research tools as well as to estimate the needed time for data collection. Subjects who participated in the pilot study were excluded from the actual research.

Procedure: Data were collected through a period of eight months from first of August 2013 till the end of March 2014. The researchers collected all the needed data from the women's files as demographic characteristics, obstetric profile and women medical history, data related to the assessment of women during the 3rd stage of labor was collected from the women's files as vital signs (Bp, pulse, respiration and temp), duration of 3rd stage of labor, placenta examination for intactness to ensure that no portion remained in the uterine cavity, also, uterine examination, to inspect the uterine tone and position after placental delivery and the missed data was collected from the women when their conditions were stabilized.

Assessment: During the 1st two hours after placental delivery, the researchers assessed women's for: vital signs, uterine examination to inspect the uterine tone and size, vaginal examination was carried out to assess the amount of blood loss by applied new clean pad and then observed the amount of blood stain in peripad and recorded based on Jacobson [25] as the amount of blood loss was described as scant, small, moderate and large, if the peripad blood stain was <10 ml this indicated to scant amount; if the peripad blood stain was 10 to 25 ml this indicated to mild amount; if the peripad blood stain was 25 to 50 ml this indicated to moderate amount, if the peripad blood stain was 50 to 80 ml this indicated to sever amount. Assessment carried out every 15 minutes for the first hour, then every 30 minutes for the second hour, as well as once every hour (after 4hrs of delivery) and finally once after 6 hours from delivery . Assessment of episiotomy was carried out if present by using Davidson [26] REEDA method, which (R) indicated to the presence of redness, (E) indicated to the presence of edema, (E) indicated to the presence of ecchymosis, (D) indicated to the presence of discharge, (A) indicated to the approximation of the sutures.

Implementation: Nursing care protocol was applied from the moment the women have been diagnosed as APPH. Researchers with the medical team started anti-shock measures as, women were under close observation and care till time the women were stabilized. Nursing care protocol of APPH was included: 1) initial measures as; insert two large bore IV cannulas, blood sample withdrawn for hemoglobin and cross matching for blood grouping, vigorous IV volume replacement as doctor ordered, also maintained warmness of the women to prevent shock, applied oxygen mask, monitoring vital signs, inserted folly catheter and assessed urine output. 2) Secondary measures as: Continuous uterine massage was done to stimulate the uterus to gain its tone, till the uterus become contracted and bleeding was stopped. If the uterine massage failed to give the uterus some degree of tone, bimanual compression should be applied. So, the obstetrician responsible about the women started bimanual uterine compression by wearing sterile gloves, insert a hand into the vagina and formed a fist, placed the fist into vagina and applied pressure against the anterior wall of the uterus, with the other hand pressed deeply into the abdomen behind the uterus and applied pressure against the posterior wall of the uterus. The obstetrician

continuously performed bi-manual massage until the uterus become contracted and bleeding stopped. At the same time, Oxytocics medications as doctor ordered such as: Syntocinon 30 IU/ 500 ml normal saline, Methergine 2 ampoules IV were given to women ; 3) third measures, if the previous measures failed to stop bleeding and the uterus gained its tone, activate massive blood transfusion protocol followed as ordered; and transferred women to the operating theatre which either uterine artery embolization (UAE), dilatation and curettage (D&C), or hysterectomy should be considered.

Follow-Up and Evaluation: The researchers collected data related to the outcome of nursing and medical interventions to reduce the amount of blood loss and to prevent its complications. The researchers continuously followed up the women after implementation was carried out and the women's condition was stabilized, through assessment and evaluation of the women's condition by measuring of the vital signs, assessing uterine condition, amount of blood loss and urine output every hour until 6 hours. The researchers finally documented all the assessment results.

Statistical Analysis: Statistics were done using SPSS window statistical package for social science version 21. Frequency and percentage were used for numerical data as well as mean and standard deviation. Correlation coefficient was used to describe association between variables, Correlation coefficient (r) of 0.5 was considered fair correlation, if more than 0.5 to 0.75, it was considered good correlation and if more than 0.75, then it was considered as very good correlation, probability less than 0.05 was considered significant and less than 0.001 considered as highly significant. For parametric analysis t-test and ANOVA (Analysis of Variance) were used. Probability (p-value) less than 0.05 was considered significant.

RESULTS

Findings of this research were presented in three main sections: 1) description of the sample; 2) effect of nursing care protocol on postpartum hemorrhage outcomes ;-and 3) factors affecting women's condition

Section 1: Description of the Sample: Which include two parts.

Characteristics of the Women: Women's age ranged between 16-45 years old with mean 27.14+ 7.24. Forty-five percent of women can't read and write, less than one third of the women (27%) had secondary school education and 14% had primary school & 14% were highly educated and 68% were housewives. Findings indicated that one quarter (25%) of the women had medical health problems as hypertension, cardiac disease and diabetes (48, 32 and 20% , respectively). Findings of this research indicated that 51% of women were multiparous; 94.1 had history of vaginal delivery, 34% of the women their last abortion was from 2 years ago, 96 % had no previous history of postpartum hemorrhage. Regarding to the current pregnancy complications, 30% of women had pregnancy complications as antepartum hemorrhage, pregnancy induced hypertension, large fetal size, multiple gestation, fibroids, & polyhydramnios (23.3, 20, 20, 16.7, 13.3and 6.7%, respectively).

Current Labor and Delivery Characteristics: Findings of this research indicated that 75% of the women had vaginal deliveries with episiotomy, while, 17% of them were delivered by normal vaginal deliveries and 8% of them were delivered by cesarean section. Mean duration of third stage of labor was 19.4 ±7.9 minutes. Twenty-one percent of women had incomplete placental tissue (retained part of placenta).

Section 2: Effect of Nursing Care Protocol on Postpartum Hemorrhage Outcomes: This part describes women's condition in response to nursing intervention after 2 hrs, 4 hrs and 6 hrs of delivery, as regarding to their uterine tone, amount of blood loss, vital signs, hemoglobin level, blood transfusion, period of recovery and discharge and maternal outcome.

Regarding to uterine tone during the fourth stage of delivery and after nursing intervention was performed, findings indicated that 28% of women had contracted uterus after 2hrs of delivery as compared with 32% of them after four hours of delivery and 85% of them had contracted uterus after 6 hrs of delivery which indicated the effect of nursing intervention on the tonicity of the uterus. Concerned to the amount of blood loss, findings showed that amount of blood loss after 2 hrs of delivery was ranged between 550 ml to 1150 ml with a mean of 1055.40 ± 978.8 ml. Four hrs after delivery, it was ranged between 100 to 1000 ml with a mean of 362.9 ± 190.8 ml and after 6 hrs of delivery, the amount of blood loss was

ranged between 25 ml to 400 ml with mean of 118.7 ± 78.7 ml. The findings showed that measurement readings of vital signs at fourth stage of labor was as follows, after 2hrs of delivery, the mean systolic Bp was 105.9 ± 17.87, while the mean diastolic Bp was 68.55 ± 12.87, mean temperature was 37.7 ± 3.7, mean respiration was 25.5 ± 4.5 and mean pulse was 93.5 ± 10.5. Vital signs after 4 hrs of delivery, the mean systolic Bp was 109.7 ± 17.7, while the diastolic Bp was 70.7 ± 12, mean temperature was 36.6 ± 0.52, mean respiration was 25.9 ± 5.02 and mean pulse was 92.13 ± 11.17. As for vital signs after 6 hrs of delivery, the mean systolic Bp was 108.5 ± 16.7, while the diastolic Bp was 69.9 ± 10.8, mean temperature was 36.8 ± 0.53, mean respiration was 23.9 ± 4.3 and mean pulse was 88.06 ± 11.1. Findings indicated that the mean hemoglobin level after delivery was 8.2 ± 1.67 mg/dl, 25% of women had got blood transfusion. Findings of this research showed that about one third (33%) of the women had been discharged after 6 hours from delivery, 6% of them had recovered and been discharged after 8 hours, 12% of women had been discharged after 12 hours, an equal percentage of 13% of women had been discharged after 24 hours, 36 hours and 48 hrs respectively. Minorities of women were discharged after 72hrs., 96hrs. and 120hrs. (4, 2, & 1% respectively), there were 3% of women were died (Fig. 1). Majority of women (90%) recovered and had been discharged without surgical intervention, minorities of them had partial and total hysterectomy (3 & 4% respectively) and 3% of them were died (Fig. 2).

Section 3: Factors That Might Affect Maternal Outcomes: This section includes two parts. A) Prenatal demographic and medical factors that might affect the amount of blood loss and uterine tone at fourth stage of labor as they are the main indicators of women outcome. B) Postnatal factors that might affect the amount of blood loss, women outcome and period of recovery and discharge because they are the main indicators of maternal condition after 6 hrs of delivery.

A) Prenatal demographic and medical factors that might affect the amount of blood loss and uterine tone at fourth stage of labor as they are the main indicators of maternal outcome.

1-Prenatal Demographic and Medical Factors That Might Affect Amount of Blood Loss: One way ANOVA indicated
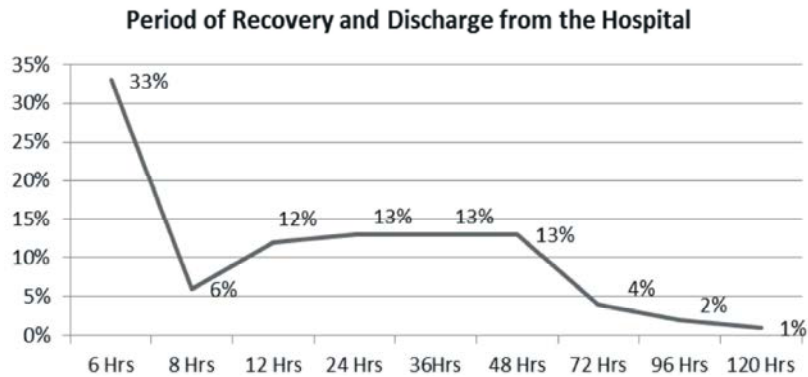
Period of Recovery and Discharge from the Hospital

Fig. 1: Distribution of Mothers According to Period of Recovery and Discharge

Maternal Outcome

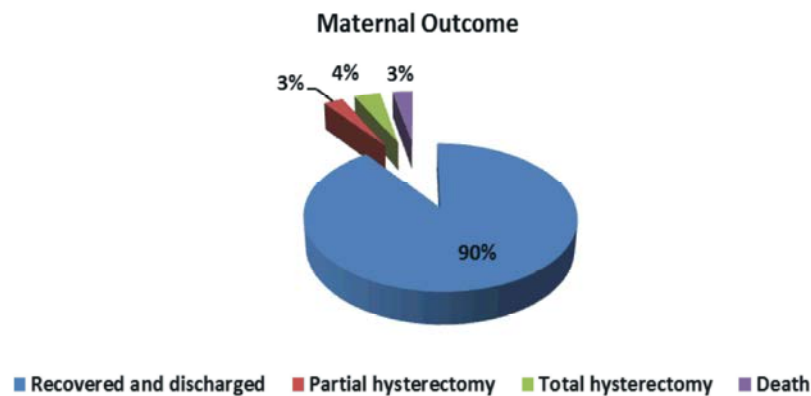■ Recovered and discharged   ■ Partial hysterectomy   ■ Total hysterectomy   ■ Death

Fig. 2: Distribution of Mothers by their Maternal outcome

Table 1: Prenatal Demographic, Medical and Obstetric Factors That Might Affect Amount of Blood Loss during 4th stage of Labor

Factors	Amount of Blood Loss		Test
- Age	Mean	±SD	f=1.6
16-20	341.2	187.3	p=0.176
21-25	334.8	193.5	
26-30	389.6	201.1	
31-35	291.7	127.6	
36-40	490.00	215	
41-45	450.00	158.1	
- Educational Level	Mean	SD	f=1.3
Cannot read & write	147.6	76.8	p=0.3
Primary school	121.4	85.3	
Secondary school	117.6	86.9	
University	123.9	66.1	
- Occupation	Mean	SD	f=1.24
House wife	375.8	196.2	p=0.3
Office work	304.00	151.2	
Industrial work	392.7	216.3	
History of Medical Disease	Mean	±SD	f=0.08
Yes	365.7	231.4	P=0.94
No	362.00	178.2	
History of PPH	Mean	±SD	f=1.01
Yes	500.00	141.4	P=0.32
No	363.5	187.7	
Pregnancy Complications	Mean	±SD	f=3.3
Yes	455.9	201.2	P=0.001
No	325.2	172.9	

that, women age, educational level and occupation, were not factors that might affect amount of blood loss at fourth stage of labor. There were no statistically significant relations (f=1.6, p=0.176; f=1.3, p= 0.3; & f= 1.24, p= 0.3; respectively). As well t-test indicated that there were no statistically significant relationships between history of medical disease (t=0.08, p=0.94), previous history of postpartum hemorrhage (t=1.01, p= 0.32), as factors affecting the amount of blood loss at fourth stage of labor. On the other hand, there was a statistically significant relationship between current pregnancy complications and parity (p= 0.001 & p= 0.00 respectively), as factors that might affect the amount of blood loss at fourth stage of labor (Table 1).

2-Prenatal Demographic and Medical Factors That Might Affect Tone of the Uterus: Chi-square test indicated that, there were no statistically significant relationship between occupation (χ^2=0.093, P=0.954), previous history of PPH (χ^2=0.572. P= 0.499), history of medical disease (χ^2= 1.058, P= 0.304) and tone of the uterus at fourth stage of labor. On the other hand t-test indicated that there were statistically significant

Table 2: Demographic, Medical and Obstetric Factors That Might Affect Tone of the Uterus during 4th Stage of Labor

Item	Tone of Uterus				
- Occupation	Contracted (n=28)		Soft (n=72)		Test
House wife (n=68)	19	67.9	49	68.1	χ^2=0.093
Office work (n=20)	6	21.4	14	19.4	P=0.954
Industrial work (n=12)	3	10.7	9	12.5	
-Previous History of PPH	Contracted		Soft		
	Freq	%	Freq	%	
Yes (n=2)	-	-	2	100	χ^2=0.572
No (n=49)	11	21.6	38	74.4	P=0.499
-History of Medical Disease	Contracted		Soft		
	Freq	%	Freq	%	
Yes (n-25)	5	20	20	80	χ^2=1.058
No (n=75)	23	30.7	52	69.3	P=0.304
- Complications during Pregnancy	Contracted		Soft		
	Freq	%	Freq	%	
Yes (n=30)	1	3.3	29	96.7	χ^2=12.935
No (n=70)	27	38.6	43	61.4	P<0.000
- Maternal age	Contracted		Soft		
	Mean	±SD	Mean	±SD	t=-3.04
	23.7500	4.8045	28.4583	7.6231	p=0.003
- Parity	Contracted		Soft		
	Mean	±SD	Mean	±SD	t=-2.01
	1.571	0.7902	2.083	1.2532	p=0.047

*Number of primiparous women = 49

relationship between maternal age (t=-3.037, p=0.003), complications during pregnancy (χ^2= 12.94, P= 0.000), parity (t=-2.01, P= 0.047) and tone of the uterus at fourth stage of labor (Tables 2).

3-Prenatal Factors Might Affect Hemoglobin Level:
Regarding to the factors that might affect hemoglobin level, findings indicated that there were highly statistically positive correlation between parity (r= 1.000, p<0.001), maternal age (r=0.723, p=0.001), as factors affecting hemoglobin level at fourth stage of labor.

B) Postnatal Factors Might Affect women Condition.

This part might be classified into two sections, 1) Factors that might affect women's condition after 4 hrs of delivery and 2) Factors that might affect mother's condition after 6 hrs of delivery.

1- Factors might affect mother's condition after 4 hrs of delivery This part explores factors that might affect the amount of blood loss, period of recovery and discharge and progress of mother's condition, because

they are the main indicators of women outcome after 4 hrs of delivery.

Regarding factors might affect amount of blood loss at fourth stage of labor, t-test indicated that there were statistically significant relationship between placental condition (t= -4.214, P<0.001), tone of the uterus (t= -6.07, p< 0.001) and the duration of third stage of delivery (r=0.323, p=0.001), as factors might affect amount of blood loss at 4th stage of labor after 4hrs of delivery. On the other hand, there were no statistically significant relationship between mode of delivery (f=2.6, p= 0.080) and amount of blood loss at 4th stage of labor (Table 3).

Concerning factors that might affect period of recovery and discharge, there were statistically significant relationships between mode of delivery (f=3.371, p=0.039), duration of third stage of delivery (r=0.328, P=0.001), placental condition (t= -4.722, P=0.001) and blood transfusion (t= 8.22, p= 0.001) and period of recovery and discharge. (Table 4).

Regarding factors that might affect progress of women's condition, chi-square indicated that there were no statistically significant relationship between

Table 3: Mean Postnatal Factors That Might Affect the Amount of Blood Loss after 4 hrs of Delivery

	Amount of Blood Loss		
Item	Mean	±SD	Test
- Placental Condition			
Complete	323.29	172.44	t= -4.214
Incomplete	506.19	188.96	p<0.001
- Tone of the uterus			
Contracted	205.36	95.70	t=-6.07
Soft	426.81	182.73	p<0.001
- Mode of Delivery			
Normal Vaginal Delivery	406.25	167.96	f= 2.59
Vaginal delivery with episiotomy	341.22	173.45	p= 0.080
Cesarean section	492.86	339.64	

Table 4: Relationship between Mean Postnatal Factors and Period of Recovery and Discharge

	Period of Recovery and Discharge		
Item	Mean	±SD	Test
- Placental Condition			
Complete	22.05	23.52	t=-4.722
Incomplete	51.00	27.77	p = 0.001
Blood Transfusion			
Yes	60.00	26.19	t=8.22
No	18.64	18.92	p=0.001
Mode of Delivery			
NVD	22.12	23.17	f=3.371
Vaginal delivery with episiotomy	27.27	27.32	p=0.039
Cesarean section	54.00	21.13	

Table 5: Relationship between Postnatal Factors and Maternal Outcome

	Maternal Outcomes				
Item	Discharged	Partial Hystrectomy	Total ystrectomy	Death	Test
Mode of Delivery	%	%	%	%	χ^2=19.75 P=0.003
NVD (17)	94.1	5.8	--	--	
Vaginal delivery with episiotomy (75)	92	1.3	5.4	1.3	
Cesarean section (8)	62.5	12.5	--	25	
- Placental Condition					
Complete (79).	92.5	2.5	2.5	2.5	χ^2=2.820 P=0.420
Incomplete (21)	80.9	4.8	9.5	4.8	
Mean Duration of 3rd Stage of Labor	18.8 ±7.50	20.0 ±10.0	25.75 ±10.275	32.5 ±3.53	f=3.044 P=0.033

placental condition (χ^2=2.820, P=0.420) and progress of women's condition. On the other hand there were statistically significant relationships between mode of delivery (χ^2=19.75, P=0.003), duration of third stage of delivery (F=3.044, P=0.033) and progress of women's conditions (Table 5).

2- Factors Might Affect Women Outcome after 6 Hours of Delivery: This part explores factors that might affect amount of blood loss after 6 hrs of delivery. T-test indicated that there were statistically significant relationships between placental condition (t=-6.29, P<0.001), tone of the uterus (t= -8.22, P< 0.001) and amount of blood loss after 6 hrs of delivery. In addition, there was a highly statistically positive correlation

between duration of third stage of delivery (r=0.674, P=0.001) and amount of blood loss after 6 hrs of labor. On the other hand, one way ANOVA indicated that there was no statistically significant relationship between mode of delivery (f=0.33, P= 0.72) and amount of blood loss after 6 hrs of labor.

DISCUSSION

In this research, researchers attempted to find the effect of Nursing care protocol on atonic postpartum hemorrhage outcomes. The findings of this research supported the research hypothesis which is " women who receive nursing care protocol will reduce atonic postpartum hemorrhage outcomes".

The research findings indicated that there was a statistically significant relationship between current pregnancy complications and parity, as factors that might affect the amount of blood loss at fourth stage of labor. This results are supported by American College of Obstetricians and Gynecologists [27], Jaleel and Khan [28] and Bateman *et al.* [7] who found that high parity and complications during pregnancy as pregnancy induced hypertension, polyhydramnios, uterine fibroids, antepartum hemorrhage (including hemorrhage from placenta previa and placental abruption) and multiple gestation seem to increase the prevalence of PPH. This may be referred to that high parity decreases the uterine muscular tone and increases the amount of blood loss at fourth stage of labor, while, the primiparous woman tends to have strong muscle tone and consequently well contracted uterus that decreases the amount of blood loss postpartum.

Findings of this research indicated that history of medical diseases have no clear association with developing of PPH. These findings are In contrast to the study which was carried out by Rueda *et al.* [29] who stated that chronic diseases altered the physiological health status of the woman and increased the risk of organ dysfunctions when a hemorrhagic complication arises. Also, findings indicated that previous history of postpartum hemorrhage have no clear association with developing of PPH and increasing the amount of blood loss. These findings are contradictory with the studies which done by Sheldon *et al.* [30] and Claudio *et al.* [31] who reported that history of postpartum hemorrhage are considered risk factors of developing PPH and increasing the amount of blood loss.

Findings of the current research revealed that maternal age is a predictor variable of uterine atony. This finding may be attributed to that mothers with old age tend to have weak muscle tone compared to mothers with young age who have strong muscle tone and contracted uterus. This finding is supported by the studies which done by Sheldon *et al.* [30] and Lao *et al.* [32] who reported that maternal age has statistically significant relation with tone of the uterus. In the same line, these findings are similar to the study done by Mgaya *et al.* [33] who found that multiple pregnancies and high parity tend to decrease uterine tone and are considered as risk factors of PPH, which supported the findings of the current study, as parity revealed to be a predictor variable of uterine tone.

Current results of research indicated that complications occurred during pregnancy were factors that might affect the uterine tone, which indirectly responsible for the developing of PPH. These finding are in accordance with the studies carried out by Lim *et al.* [34] and Oyelese and Ananth [35] who revealed that complications during pregnancy leads to general exhaustion of the mothers which results in decreasing the uterine ability to be well contracted.

Findings of the current research revealed that uterine tone is a variable that might affect the amount of blood loss and incidence of PPH, since women with contracted uterus had less amount of blood loss than those with soft uterus with mean amounts of blood loss 205.4 ± 95.7 ml and 426.8 ± 182.7 ml for women with contracted and soft uterus respectively. This finding is supported by Neligan and Laffey [36] who reported that failure of sustained uterine contraction following partial or complete placental separation, may result in massive hemorrhage from placental vascular bed.

Findings of this research indicated that duration of the 3rd stage of labor is a variable that might affect the amount of blood loss and incidence of PPH. This finding may be referred to that a prolonged 3rd stage of labor increases the amount of blood loss at this stage. This finding is in agreement with the studies conducted by Mahboubeh Taebi *et al.* [37] and FIGO [38] who reported that PPH is mostly associated with prolonged second and third stages of labor as well as no use of oxytocics medications.

Findings of this research indicated that placenta condition is a variable that may affect the amount of blood loss, which the amount of blood loss was larger in women with incomplete delivered placenta than those with complete delivered placenta. These findings may be referred to that incomplete placental separation (retained placental fragments) results in the uterus becomes unable to contract effectively to close the open sinuses of the placenta site detachment. These findings are similar to what mentioned by WHO [39] that incomplete placental separation leads to massive PPH and atonic uterus.

Findings of this research indicated that mode of delivery is not a variable that might affect the amount of blood loss at fourth stage of labor and incidence of PPH. This finding is in accordance with the study findings done by McDonald *et al.* [40] who reported that there's no statistically significant relationship between mode of delivery and incidence of PPH.

To conclude, factors which may be predictors of the amount of blood loss at fourth stage of labor included; tone of the uterus, duration of third stage of labor and placenta condition. However, the mode of delivery was not a predictor variable of amount of blood loss at fourth stage of labor.

Findings of the current research revealed that period of recovery and discharge seem to play a crucial role in clarification of maternal condition. So, the researchers studied the variables which affect period of recovery and discharge. Findings of this research indicated that mode of delivery, duration of the 3rd stage of labor and placental condition are variables that might affect period of recovery and discharge . Findings indicated that mean duration of recovery and discharge were longer in women who delivered by cesarean section than women delivered by normal delivery. This finding is supported by the study carried out by Briand *et al.* [41] who reported that there was clear association between mode of delivery and period of recovery and discharge. Also, findings of this research indicated that women who had prolonged 3rd stage of labor were recovered and discharged lately. This finding is in agreement with the study carried out by Mahboubeh Taebi, *et al* [42] who reported that PPH is mostly associated with prolonged second and third stages of labor as well as the non use of oxytocics drugs and prolonged period of recovery and discharge. Moreover, findings indicated that women with incomplete placental separation (retained placental fragments) had increased period of recovery and discharge versus women with complete delivered placenta. This finding is congruent with that of Abd Elmonem [43] who indicated that incomplete placental separation leads to massive PPH and prolongs the duration of mothers' hospitalization to recover and be discharged.

Regarding to the effect of prolonged 3rd stage of labor and non stopped postpartum bleeding on the occurrence of maternal outcomes, findings revealed that women who had lesser duration of third stage of labor and controlled postpartum bleeding recovered and were discharged without surgical interference, while, women who had prolonged third stage of labor and uncontrolled postpartum bleeding had surgical interference (partial or total hysterectomy). This finding is in accordance with the studies done by Nisa *et al*. [44] and Kumar *et al*. [45] who highlighted that, prolonged second and third stages of labor results in deterioration of maternal outcome, explaining that this is mostly due to massive PPH.

CONCLUSION

Based on results of the present study, it could be concluded that the proposed nursing intervention for women with APPH was effective in decreasing the amount of blood loss especially after 6 hrs; strengthen the tone of the mother's uterus and controlling the PPH adverse outcomes which might have been occurred. So, the maternal outcome was revealed through early recovery and discharge and general maternal condition.

This study revealed also that, there were multiple variables affecting the maternal outcome as prenatal and postnatal variables. Prenatal variables, included; maternal age, complication during pregnancy, parity, history of PPH and history of medical disease. Postnatal variables are concerned with, uterine tone at fourth stage and after 6 hrs of delivery, duration of third stage of labor, placental condition and amount of blood loss within 6 hrs of delivery.

Recommendations: Based on the findings of this study the followings are recommended:

- Efforts to reduce PPH should not only be directed to proper management of labor but also to training and retraining of primary health care workers and alternative health care providers for early referral of patients with prolonged labor.
- All nurses in obstetrics and gynecology departments especially those at postnatal department should be trained to perform postpartum care with regular observation of women from admission till discharge and be aware that early detection and reporting of PPH is a crucial role.
- Women with high-risk factors for PPH (polyhydramnios, previous complications at third stage, antepartum hemorrhage or multiple pregnancies) should be delivered to hospital.

The following is crucial to study:

- Further study is necessary to examine effect of level of hemoglobin before delivery on maternal outcome and incidence of PPH.
- Further study is necessary to examine the effect of training programme of all nurses in postnatal departments on early detection and management of PPH.

REFERENCES

1. Zubor, P., K. Kajo, K. Dokus, S. Krivus, L. Straka, K. Bodova and J. Danko, 2014. Recurrent Secondary Postpartum Hemorrhages due to placental site vessel subinvolution and local uterine tissue coagulopathy. BMC Pregnancy Childbirth, 14: 1-5 .http://dx.doi.org/10.1186/1471-2393.

2. Rath, W.H., 2011. Postpartum hemorrhage--update on problems of definitions and diagnosis. Acta Obstet Gynecol Scand., 90: 421-8. doi: 10.1111/j.1600-0412.2011.01107.x.

3. Ayadi, A., N. Robinson, S. Geller and S. Miller, 2013. Advances in the Treatment of Postpartum Hemorrhage. Expert Review of Obstetrics & Gynecology, 8: 525-537. http://dx.doi.org/10.1586/17474108.2013.847622

4. Say L., D. Chou, A. Gemmill, O. Tunçalp, A.B. Moller, J. Daniels, A.M. Gülmezoglu, M. Temmerman and L. Alkema, 2014. Global causes of maternal death: a WHO systematic analysis. Lancet Glob Health, 2: e323-e333. http://dx.doi.org/10.1016/S2214-109X(14)70227-X

5. 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/10665/112682/2/9789241507226.

6. Haeri, S. and G.A. Dildy, 2012. Maternal mortality from hemorrhage. Semin Perinatol., 36 :48-55. doi: 10.1053/j.semperi.2011.09.010.

7. Bateman, B.T., M.F. Berman, L.E. Riley and L.R. Leffert, 2010. The Epidemiology of Postpartum Hemorrhage in a Large, Nationwide Sample of Deliveries. Anesthesia & Analgesia, 110: 1368-1373. doi: 10.1213/ANE.0b013e3181d74898.

8. Egypt Demographic and Health Survey, 2000, 2005, 2008 and 2014. United Nations Children's Fund, Egypt, 87Misr Helwan Agricultural Road, Maadi, Cairo, Egypt. www.unicef.org/egypt.

9. Chapman, L. and R. Durham, 2014. Maternal-Newborn Nursing: The Critical Components of Nursing Care. 2nd ed., Philadelphia, PA: F A Davis, pp: 357-362.

10. RCOG: Royal College of Obstetricians and Gynecologists, 2011. Prevention and management of postpartum hemorrhage. Green-top Guideline No. 52, pp: 1-24.

11. NICE National Institutes for Health and Care Excellence, 2014. Intrapartum care: care of healthy women and their babies during childbirth, NICE Clinical Guidelines [CG190].

12. Blomberg M., 2011. Maternal obesity and risk of postpartum hemorrhage. Obstet Gynecol., 118: 561-568.

13. Lalonde, A., 2012. FIGO Guidelines: Prevention and treatment of postpartum hemorrhage in low-resource settings. International Journal of Gynecology and Obstetrics, 117: 108-118.

14. Prendiville, W., D. Elbourne and S. McDonald, 2009. Active Versus Expectant Management in the Third Stage of labor. Cochrane Database Syst Rev., (3): CD000007.

15. World Health Organization, 2012. WHO Recommendations for the Prevention and Treatment of Postpartum Haemorrhage. WHO, Geneva, Switzerland, pp: 1-48.

16. Leduc, D., V. Senikas, A.B. Lalonde, C. Ballerman, A. Biringer, M. Delaney, L. Duperron, I. Girard, D. Jones, L.S. Lee, D. Shepherd and K. Wilson, 2009. Active management of the third stage of labor: prevention and treatment of postpartum hemorrhage. J. Obstet Gynaecol Can [Internet], 1 31(10): 980-93. Available from: http://europepmc.org/abstract/med/19941729.

17. International Confederation of Midwives; International Federation of Gynecologists and Obstetricians Joint Statement, 2004. Management of the third stage of labor to prevent post-partum hemorrhage. J Midwifery Womens Health, 49: 76-7.

18. Kongnyuy, E.J., G. Mlava and N.V.D. Broek, 2008. Using Criteria-Based Audit to Improve the Management of Postpartum Hemorrhage in Resource Limited Countries: A Case Study of Malawi. Maternal Child Health Journal, 13: 873-878.

19. Das, V., S. Agrawal and A. Agarwal, 2010. Consequences of delay in obstetric care for maternal and perinatal outcomes. International Journal Of Gynecology & Obstetrics, 109: 72-73. http://dx.doi.org/10.1016/j.ijgo.2009.11.003.

20. İncebşyşk, A., A Camuzcuoğlu, N.H. Gül, A. Küçük, H.H. Yüce, H. Aydoğan, H. Camuzcuoğlu and M. Vural, 2014. Approach to cases with postpartum hemorrhage: Retrospective analysis of 41 cases. Journal of Clinical and Experimental Investigations, 5: 18-23 doi: 10.5799/ahinjs.01.2014.01.0352.

21. Mobeen, N., J. Durocher, N. Zuberi, N. Jahan, J. Blum, S. Wasim, G. Walraven and J. Hatcher, 2010. Administration of misoprostol by trained traditional birth attendants to prevent postpartum hemorrhage in homebirths in Pakistan: International Journal Of Obstetrics & Gynaecology, 118:353-361.DOI:10.1111/j.1471-0528.2010.02807.x www.bjog.org.

22. RCOG, Royal College of Obstetrics and Gynecology, 2014. Clinical practice guideline prevention and management of primary postpartum hemorrhage Institute of Obstetricians and Gynecologists Royal College of Physicians of Ireland and Directorate of Strategy and Clinical Programmes Health Service Executive Version 1.1 Guideline No. 17 Revision date: May 2014.

23. Prata, N., S. Hamza, S. Bell1, D. Karasek, F. Vahidnia and M. Holsto, 2011. Inability to predict postpartum hemorrhage: insights from Egyptian intervention data. BMC Pregnancy and Childbirth, 11: 1-10. http://www.biomedcentral.com/1471-2393/11/97.

24. Saleh, W.F., W.S. Ragab and S.S. Aboulgheit, 2013. Audit of Maternal Mortality Ratio and Causes of Maternal Deaths in the Largest Maternity Hospital in Cairo, Egypt (Kasr Al Aini) in 2008 and 2009; Lessons Learned African Journal of Reproductive Health, 17: 105-109.

25. Jacobson, H., 1985. A standard for assessing lochia volume. MCN: Amerian Journal of Maternal- Child Nursing, 10(3), 175; Luegenbiehl, DL., Brophy, GH., Artique, GS., Phillips, KE., Falk, RJ. (1990). Standardized assessment of blood loss. MCN: American Journal of Maternal- Child Nursing, 15: 241-244.

26. Davidson, N., 1974. REEDA: evaluating postpartum healing. Journal of Nurse Midwifery, 19: 6-8.

27. American College of Obstetricians and Gynecologists, 2006. ACOG practice bulletin: Clinical management guidelines for obstetrician gynecologists. Obstetrics and Gynecology, 108: 1039-1047

28. Jaleel, R. and A. Khan, 2010. Postpartum Hemorrhage, a risk factor analysis. Mymensingh Medical Journal, 19: 282-9.

29. Rueda, C.M., R. Laritza, D.J. José, A. Barboza, C.B. Maura, M. Flor, O. Guillermo and E. Francisco, 2013. Severe Postpartum Hemorrhage from Uterine Atony: A Multicentric Study Journal of Pregnancy, 2013, Article ID 525914, 6 pages available at http://dx.doi.org/10.1155/2013/525914.

30. Sheldon, W.R., J. Blum, J.P. Vogel, J.P. Souza and A.M. Gulmezoglu, 2014. Postpartum Hemorrhage Management, Risks and Maternal Outcomes: Findings from the World Health Organization Multicounty Survey on Maternal and Newborn Health. International Journal of Obstetrics and Gynecology, 121(Suppl 1): 5-13. DOI: 10.1111/1471-0528.12636 www.bjog.org.

31. Claudio, G., C.G. Sosa, F. Althabe, J.M. Belizán and P. Buekens, 2009. Risk Factors for Postpartum Hemorrhage in Vaginal Deliveries in a Latin-American Population Obstet Gynecol., 113: 1313-1319. Doi: 10.1097/AOG.0b013e3181a66b05.

32. Lao, T.T., D.S. Sahota, Y.K.Y. Cheng, L.W. Law and T.Y. Leung, 2014. Advanced maternal age and postpartum hemorrhage – risk factor or red herring? The Journal of Maternal-Fetal & Neonatal Medicine, 27: 243-246.

33. Mgaya, A.H., S.N. Massawe, H.L. Kidanto and H.N. Mgaya, 2013. Grand multiparity: is it still a risk in pregnancy? BMC Pregnancy & Childbirth, 13: 1-8. doi: 10.1186/1471-2393-13-241.

34. Lim, P., M. Shafiee, N.C. Kampan, A.S. Sulaiman, N.A. Ghani, N.M. Ismail and M. Yassin, 2012. Uterine atony*: Management strategies, blood transfusion in clinical practice.* Retrieved from http://www.intechopen.com/books/blood-transfusion-in-clinical-practice/uterine-atony-management-strategies.

35. Oyelese, Y. and C. Ananth, 2010. Postpartum hemorrhage: Epidemiology, risk factors and causes. Clinical Obstetrics and Gynecology*, 53: 147-156. Retrieved from http://williams.medicine.wisc.edu/ postpartum_hemorrhage.

36. Neligan, P.J. and J.G. Laffey., 2011. Clinical review: Special populations - criticalillness and pregnancy. Critical Care, 15: 1-10. doi: 10.1186/cc10256

37. Mahboubeh Taebi, M., M.A. Kalahroudi, Z. Sadat and F. Saberi, 2012. The duration of the third stage of labor and related factors. Iranian Journal of Nursing and Midwifery Research, 17(2 Suppl1): S76-S79. PMCID: PMC3696975.

38. FIGO Guidelines: Prevention and treatment of postpartum hemorrhage in low-resource settings, 2012. International Journal of Gynecology and Obstetrics, 117: 108-118.

39. WHO guidelines for the management of postpartum hemorrhage and retained placenta, 2009. ISBN 978 92 4 159851 4.

40. McDonald, S., W.J. Prendiville and D. Elbourne, 2003. Prophylactic syntometrine versus oxytocin for delivery of the placenta Cochrane review in the Cochrane Library issue. Update software, Oxford.Located in www.emedicine.com.

41. Briand, V., A. Dumont, M. Abrahamowicz, A. Sow, M. Traore, P. Rozenberg, L. Watier and P. Fournier, 2012. Maternal and Perinatal Outcomes by Mode of Delivery in Senegal and Mali: A Cross-Sectional Epidemiological Survey. PLoS ONE 7(10): e47352. doi:10.1371/journal.pone.0047352.

42. Mahboubeh Taebi, M., M.A. Kalahroud, Z. Sadat and F. Saberi, 2012. The duration of the third stage of labor and related factors. Iranian Journal of Nursing and Midwifery Research, 17(2 Suppl1): S76-S79. PMCID: PMC3696975.

43. Abd Elmonem, R., 2005. Prevention of postpartum hemorrhage. Randomized comparative study between misoprostol and syntometrine. M.S. Thesis. Faculty of Medicine, Cairo University, pp: 92-120.

44. Nisa, S.U., S.U. Nisa and M.U. Nisa, 2013. Maternal Outcome in Active and Expectant Management of Third Stage of Labor. P J M H S. 7: 758-760.

45. Kumar, J.S., B.B. Kumar and S. Samal, 2011. Active Management of Third Stage of Labor – Methylergometrine Or Syntometrine. Indian Journal of Maternal and Child Health, 13: 1-10.