

# Effect of implementing bundle care on reducing early Postpartum haemorrhage among primiparous

Sabah R. H. Ahmed<sup>(1)</sup>, Amany M. Ahmed<sup>(2)</sup>, Hala A. Ali<sup>(3)</sup>, Mohamed H. Mohamed<sup>(4)</sup>,  
Nagat S. Shalaby<sup>(5)</sup>, Amal K. Khalil<sup>(6)</sup>

- (1) Assistant Professor of Maternal and Newborn Health Nursing, Faculty of Nursing, Helwan University, Egypt.  
e-mail: ramadan\_sab@yahoo.com
- (2) Lecturer of Woman's Health and Midwifery Nursing, Faculty of Nursing, Kafrelsheikh University, Egypt.  
e-mail: monyosad@yahoo.com
- (3) Assistant Professor of Women's Health and Maternity Nursing, Faculty of Nursing, Kafr El-Sheikh University, Kafr ElSheikh, Egypt. e-mail: dr.halaftah@yahoo.com
- (4) Lecturer of Gynecology and Obstetrics, Porto Said University, Faculty of Medicine, Egypt.  
e-mail: D.hafez31@yahoo.com
- (5) Assistant professor of Maternity, Gynecology& Obstetrics Nursing, Faculty of Nursing, Port Said University, Egypt.  
e-mail: Nagatsalama@gmail.com
- (6) Lecturer of Maternal and Newborn Health Nursing, Faculty of Nursing, Menoufia University, Egypt.  
e-mail: amal.khalifa.@nursing.menofia.edu.eg

## Abstract

**Background:** Postpartum hemorrhage (PPH) is associated with an increased risk of complications after delivery for both the mother and the newborn in postnatal period and later life. **Aim:** Aim of the study was to assess the effect of implementing bundle care on reducing early postpartum haemorrhage among primiparous. **Methods:** A quasi-experimental **design** (nonequivalent control group pretest/posttest) was adopted. **Setting:** The current study was conducted in the postpartum words of Obstetrics and Gynecology department in Maternity hospital, Portsaid Governorate, Egypt. A purposive **sample** of 70 primiparous with early PPH was carefully chosen from the nominated setting and dispersed accidentally into two equal groups (study and control group). Two **tools** were used for collecting the study data: A structured interviewing questionnaire schedule and tool of bundle care of early PPH that consists of three parts. **Results:** There is a statistically significant difference between the study and control groups in reducing early PPH among primiparous and improve outcomes. The current study results display that the primiparous outcomes improved in study group compared to control group which seemed in mild of bleeding 68.6% in study group, 37.1% in control group and conscious level 94.3% in study group, 60% in control group with normal conscious level. The study group have lower complications, compared to complications of the control group. **Conclusion:** Bundle care was effective in decreasing blood loss complications of early PPH. **Recommendations:** Bundle care should be recommended as a nursing intervention protocol and should become a fundamental part of the total management of early PPH.

**Keywords:** Postpartum hemorrhage, bundle care, primiparous.

## Introduction

The prevalence of primary postpartum haemorrhage (PPH) in the developing world about 1.33% of births and when PPH occurred about 3% of women died. Globally around 0.4 women per 100,000 births die from PPH in the United Kingdom whereas approximately 150 women per 100,000 births die in Africa. Postpartum haemorrhage is one of the foremost causes of maternal morbidity and mortality globally. It occurs mainly in developing countries due to unwell developed substructures and deficiency of expert birth

attendants (Nana, et al., 2021). Currently, primary PPH is the leading cause of maternal death worldwide, with about 140,000 deaths annually and the frequency of one death every four minutes. Most of these deaths are considered preventable and occur in low- and middle-income countries (Osanan, et al., 2018).

Kaur and Ray (2021) stated that; massive PPH has many complications related to sever blood loss and hypovolemic shock. Probable all major organs are damaged; respiratory (adult respiratory distress syndrome) and renal (acute tubular necrosis) damages are the most common but are rare. Pulmonary edema is

infrequent; nevertheless, it may progress acutely or during the recovery phase because of fluid overload or myocardial dysfunction (Rocha-Filho, 2015). Moreover; PPH is the world's leading cause of peripartum hysterectomy (Rani & Begum, 2017).

The collective blood losses over 500 ml or more from the genital tract after vaginal delivery and blood loss of 1,000 mL or more after cesarean section (CS). PPH is classified as primary or secondary; primary PPH is defined as happening within 24 hours of natal otherwise secondary PPH is defined as happening after 24 hours post-natal to 12 weeks postpartum, escorted hypovolemic by signs or symptoms, within 24 hours after natal is also defined as primary PPH which is the most common of major obstetric haemorrhage. The main causes of PPH are uterine atony, birth canal trauma, retention of placental remains and coagulation disorders (American College of Obstetricians and Gynecologists (ACOG), 2017 & Collins, et al., 2019).

Risk stratification for PPH enhances care planning and encourages early implementation of preventive measures. Golden hour (The first hour of bleeding control diagnosis) is the most effective measure for treating PPH that specified by the National Specialty Commission for Obstetric Emergencies of the Brazilian Federation of Gynecology and Obstetrics Associations (FEBRASGO) (Alves, et al., 2020) Nurse is often the primary responder to emergent events because the nurse is readily at the parturients' bedsides. It is essential that they identify the signs and symptoms of PPH and also know how to respond properly in these circumstances (Ruiz, et al., 2017).

Moreover; Joseph, et al., (2020) stated that interventions geared toward firstly; risk assessment and stratification, secondly; hemorrhage identification and management, tertiary; team communication and simulation, and fourthly; debriefs and case review were implemented. Hemorrhage risk assessment stratification rates were tracked overtime as an early measure of bundle compliance. Recently; Escobar, et al., (2021) concluded that the use of PPH care bundles may be associated with lower resource use and fewer interventions.

Most PPH cases used fewer resources after introduction of care bundles. The utmost reduction was in the use of medications, with a decrease of charges by 56.3%. Diagnostic procedure charges decreased by 47.6% and consultation charges decreased by 37.7%. Aim of the study was to assess the effect of implementing bundle care on reducing early postpartum haemorrhage among primiparous.

### Significance of the Study

In Egypt, in multivariate models, PPH is suggestively leading to reduction of antepartum hemoglobin level, history of previous PPH, labor augmentation and prolonged labor. Post model probability estimation displayed that, even among women with three or more risk factors, PPH could only be predicted in 10% of the patients (Pregnancy and Childbirth BMC; 2011). Mahmoud and Omar (2018) stated that; as stated by Millennium Development Goals (2015) some Egyptian Governorates have high rates of maternal mortality rate (MMR), that is 60 to 65 deaths per 100 000 live births in Assiut, Gharbia, Beni Suef, Qena, and Sohag, however others have low rates of MMR that is 24 to 37 deaths per 100 000 live births in New Valley, Ismailia, Suez, and Port Said.

As stated by Egyptian Ministry of Health (2014), MMR is higher in upper Egypt than lower Egypt (61 to 74 %, respectively). Furthermore, the most common cause MM in Egypt is PPH (19.7%) (Kassebaum, et al., 2014). In Egypt, 1400 women and 50% of their newborns die each year due to pregnancy and childbirth complications. According to the global standards, MMR is still high in Egypt, so further efforts should be made to apply the main health strategies for reducing it (Hogan et al., 2010). Assiut Governorate has the highest percentage of MM in Egypt (81 deaths/100 000 live births). The MMR in Fayoum Governorate is 54 deaths/100 000 live births (Egyptian Ministry of Health, 2014). WHO (2016) recommended several strategies to decrease MMR, epitomized by high quality of emergency obstetric care in the form of antepartum, intrapartum, and post-partum care; moreover, effective family planning services; and standardized abortion care.

Nurses are often the first line providers responding to PPH because they are readily at

the bedside. According to the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN), 93% of maternal deaths caused by PPH could have been prevented with improved clinical response (Alden, et al., 2013). Routine care of early PPH in study setting isn't accurate because the nurses do not measure vital signs for all parturients with early PPH and there is no accurate tool for measuring blood loss. Moreover; there is no specific nurse determined to communicate with blood bank, that is the role of any relative of parturient. So, implementing bundle care on reducing early PPH among Egyptian primiparous would improve the understanding and collaboration in reducing the number of diseases that affect newborn and mothers' health. However, this study aimed to assess the effect of implementing bundle care on reducing early PPH among primiparous

### **Aim of the study**

Aim of the study was to assess the effect of implementing bundle care on reducing early postpartum haemorrhage among primiparous.

The aim was achieved through the following:

- To implement bundle care.
- To assess bundle care efficacy on reducing blood loss among primiparous.
- To assess the primiparous outcomes after bundle care.

### **Research hypotheses**

Two research hypotheses were tested to fulfill the aim of the current study.

**H1:** Primiparous with early postpartum haemorrhage, who will receive bundle care, will have lower blood loss than those who don't receive it.

**H2:** Primiparous with early postpartum haemorrhage, who will receive bundle care, will have normal vital signs (blood pressure, pulse and respiratory rate) than those who don't receive it.

**H3:** Primiparous with early postpartum haemorrhage, who will receive bundle care, will have less complications, than those who don't receive it.

## **Subjects & Methods**

### **Research design**

The present study was designed as a quasi-experimental design (nonequivalent control group pretest/posttest). (A quasi-experimental design aims to establish a cause-and-effect relationship between an independent and dependent variable (Dependent variable: Blood loss and early PPH complications. Independent variable: Bundle care). In the current design, subjects are assigned to either intervention or control group. The baseline measures of the dependent variables were performed for all subjects. Then subjects in the intervention group only received the proposed intervention. After that, all subjects were post-tested to measure the degree of change in the dependent variables (Flannelly, et al., 2018). The study group followed the bundle care, while the control group was subjected to conventional care.

### **Research setting**

The current study was carried out in Portsaid city in the postpartum ward of Obstetrics and Gynecology department in the following hospital affiliated to Universal Health Insurance namely; Maternity hospital, Portsaid Governorate, Egypt. The department is divided into two sections each section contains six beds. The care is provided by the nurse as doctor's order. The primiparous number of normal vaginal delivery with episiotomy was 60 and without episiotomy was 582 (Total: 642) during period from January to December 2020 (Statistic department, 2021). The parturient women's admission rate was five to six per day, but the flow rate of parturient women with early PPH was one to three per week. Services provided to the subjects are completely free. The areas served by the hospital are Portsaid city and its neighboring villages. The establishment at three days per week (Saturday, Monday and Wednesday). Those days were the high-risk clinic follow-up.

### **Subjects**

A non-probability purposive sample of 70 primiparous with early PPH was recruited and carefully chosen from selected setting to share in the current study; subjects were distributed

randomly into two equal groups (n=35), study group (bundle care) and control group (routine care). According to the following **inclusion criteria:** All primiparous who have early PPH were eligible to participate if they were in: Primigravida or multigravida; medically diagnosed with early PPH; single or multiple pregnancy; normal vaginal deliveries with or without episiotomy; free from any other medical or obstetric problems (e.g., diabetes mellitus, pregnancy-induced hypertension) (self-reported); age from 18-35 years old and accepting to participate in the study. While, **exclusion criteria included:** All primiparous who have blood diseases; primiparous who eligible to CS; primiparous who have any medical health problems during the recruitment period were excluded.

### Sample size calculation

Based on data **considering level of** significance = 5%, Power = 80%, Type of test = two-sided

Formula of calculating sample size is

$$n = [2(Z_{\alpha/2} + Z_{\beta})^2 \times p(1-p)] / (p_1 - p_2)^2$$

where

n = sample size required in each group,

p = pooled proportion (proportion of event in group 1 + proportion of event in group 2)/2

p<sub>1</sub>-p<sub>2</sub> = difference in proportion of events in two groups

Z<sub>α/2</sub>: This depends on level of significance, for 5% this is 1.96

Z<sub>β</sub>: This depends on power, for 80% this is 0.84

$$n = [2(1.96 + 0.84)^2 \times 0.957(1 - 0.043)] / (0.136)^2 = 34.9$$

Based on above formula the sample size required is 35 in each group.

### Recruitment and groups' assignment

Seventy primiparous eligible with early PPH were identified and assigned to the study or control groups. Primiparous of each group were thirty-five (n = 35). Primiparous who met the inclusion criteria were invited to participate and received brief study information. primiparous were volunteers, and before taking part in the study. Primiparous

were divided into two groups (study or control group). This method enhances the likelihood of detecting differences between the groups.

### Tools of the study

#### Structured Interviewing Questionnaire Schedule:

This tool was developed by the researchers after reviewing the related literatures and consists of two parts:

**Part one; sociodemographic data;** it includes the following items; code, age, residence, level of education, employment status, economic status, telephone number.

**Part two; obstetrics data;** it includes the following items; parity, singleton or multiples, date of admission, mode of delivery (normal vaginal delivery (NVD) with or without episiotomy), cause of early PPH (Uterine atony, Placental retention, Traumatic) (Alves, et al., 2020).

#### Bundle care of postpartum hemorrhage: This tool consists of three parts:

**Part one** included assessment of the primiparous' vital signs (Pulse, blood pressure (BP), respiratory rate (RR) and Temperature), consciousness level (conscious or comatose), amount of blood loss, fundal level, tachypnoea, tachycardia, cool extremities.

**Part two** included data related to bundle care of early PPH which included: Ensure intravenous (IV) access, Empty the bladder, inserting foley catheter, , accomplishing uterine massage, assemble extra nurses as required, preparing medication (uterotonic) and blood product (for blood transfusion if needed in sever PPH) as ordered, Type and cross-consider use of general blood bank if type and Crossed blood not available, assign nurse to connect with blood bank, estimate and record blood loss (Estimated blood loss is the method of visually estimating the amount of blood loss by the staff. Quantified blood loss is defined as measuring blood loss with volumetrically calibrated drapes and suction canisters or weighing saturated pads and assuming that 1 gram equals 1 milliliter of blood (Simms, 2021)). Keep the primiparous warm, elevate legs to 20-30 degree, anticipate and assess pain management need, apply pulse oximeter/ ECG

monitoring, attention to the primiparous response to resuscitation, monitor complete blood count (CBC), coagulation studies and blood gases, assist to move to operative room if indicated, ended by documentation and reporting.

**Part three** included data related to post intervention (bundle care) assessment which included: general condition of the primiparous (vital signs, consciousness level, bleeding) and presence of complications as (Disseminated intravascular coagulation (DIC), sepsis, transfusion or anesthetic reaction, fluid overload (pulmonary edema), anemia (normocytic normochromic, Sheehan syndrome).

#### **Reliability:**

The internal consistency of the questionnaire was calculated using Cronbach's alpha coefficients. The reliability of the tools was done using test-retest reliability and proved to be reliable was 0.82 for bundle care. The given values of Cronbach's alpha coefficients indicated accepted reliability for the tools.

#### **Validity:**

For the current study, a panel of five experts confirmed the content validity of second tool (Bundle care) in maternity and newborn health nursing, before introducing it to the primiparous because there was not a clearly written bundle care for PPH in the study setting and modifications were carried out according to the experts to collect the required data for the current study. Validation was done to ensure that the questions were consistently conveyed and carry the intended meaning; to ensure the tools' clarity and understandability.

#### **Ethical considerations:**

The study was accepted by the Research Ethics Committee of the Faculty of Nursing, Portsaid University. The researchers explained the study's aim to all primiparous with early PPH. Primiparous were also informed about their right to withdraw from the study at any time without giving a reason. They were reassured that all research data would be confidential and used only for the study. Subjects' privacy was always maintained.

Then, the primiparous gave their informed written consents before enrollment. Primiparous who enrolled in control group receive care that safe their life in severe cases.

#### **Administrative considerations:**

Official approval was obtained from the board of Obstetrics and Gynecology Department of Maternity hospital, Portsaid city. Before conducting the study, permission was obtained from the director of Obstetrics and Gynecology Department of Maternity hospital, Port Said city to carry out the study.

#### **Pilot study:**

After staff training and before implementing the bundle care, a pilot study was conducted on 10% of the pre-assigned sample size (8 primiparous; 4 assigned to the bundle care group and 4 assigned to the control group). It aimed to assess the clarity of the measures and acceptability of bundle care in the real clinical field. According to pilot study findings, the study tools were clear, and no modifications were done. The tools were acceptable from the pilot subjects. The pilot sample was included in the analyzed study sample.

#### **Fieldwork:**

#### **Procedures**

The researchers met the primiparous, and the aim of the study was explained to them. Their informed written consents were secured before collecting data. The field work was carried out in 6 months. The study was conducted through assessment, implementation, follow up and outcomes assessment. These were carried out from the beginning of January 2021 to the end of June 2021. The previously mentioned setting was visited by the researchers 3 days/week (Saturday, Monday, and Wednesday) from 7.00 a.m. to 2.00 p.m. The study group received care according to the bundle care.

#### **Preparation for the intervention**

The researchers prepared the study tools, the obtained the acceptance letter of study setting to carried out the current study, The researchers met medical and nursing staff at the Obstetrics and Gynecology Department of

Maternity hospital explaining the study's aim and procedures to ensure the success of the bundle care and to obtain cooperation. The research team members and assistant medical and nursing academic staff (n = 6; one junior obstetrician, one researcher, and four nurses) were subjected to 2-hour meeting divided into one hour was theory and one was practice. The meeting session was implemented over one day. It focused on learning the research team about bundle care approach regarding early PPH and revising the required clinical skills. By the end of session, the team mediator assigned roles to each member. The researchers' staff was responsible for early PPH diagnosis and risk assessment to confirm that the primiparous was free from any other medical or obstetrical complications through physical examination. The researchers and nursing staff was responsible for accomplishing bundle care. The researchers achieved written consent from primiparous.

#### **Implementation of the intervention**

Each primiparous in the control and study group was individually face to face interviewed to collect basic data using structured interviewing questionnaire schedule. Each primiparous allocated to one of the two groups as follows; the control group comprised 35 primiparous; were receiving the routine nursing care according the policy of hospital. The study group comprised 35 primiparous; were receiving bundle care according to the current study intervention. The researchers assessed bundle care and primiparous outcomes for both control and study groups after intervention using second tool.

The control group will be started and completed before starting the study group to prevent confusion between the two groups. Primiparous who attained to control group had routine care. Unfortunately; there is no written protocol of bundle care for primiparous with early PPH. The researchers met the primiparous individually face to face to complete structured interviewing questionnaire schedule. This meeting at private room in the study setting; lasting 15 to 20 minutes.

The implementation of the intervention consisted of providing the written protocol of bundle care. The aim of a bundle care is

reducing blood loss of early PPH and reducing PPH complications. Diagnosis of early PPH risk assessment is very significant in the first, the obstetrician performs physical assessment to primiparous. After that, primiparous were transferred to a nearby room to complete the intervention.

The researcher started the assessment for primiparous immediately after admission; the primiparous were assessed for general condition (consciousness level; conscious or comatose) , amount of blood loss either by a standardized absorbent sanitary pad (stained partly (30ml)), Saturated capacity (100ml)) OR by weighting materials (1gm=1ml), vital signs (Especially pulse and BP), cause of bleeding (Uterine atony, Placenta retention, Traumatic, Infection), fundal level, presence of complications (Disseminated intravascular coagulation (DIC), sepsis, transfusion or anesthetic reaction, fluid overload (pulmonary edema), anemia (normocytic normochromic, Sheehan syndrome).

After finishing assessment, the implementing immediately was started. The researcher with the assistant staff started anti shock measures. Confirm IV access to simplify resuscitative procedures. Insert Foley catheter to augment bladder emptying and assess primiparous status and response, monitor vital signs particularly pulse, blood pressure to distinguish the degree of shock. Assess for tachypnea and tachycardia. Assess for signs of shock. Accomplish uterine massage in primiparous of atony to recover the uterine contractions (Explained the procedure to the mother. Encouraged the mother to empty her urinary bladder and instructed her to lie down in the flat supine position on the bed. The researcher supporting the fundus by placing one hand on top of the fundus and the other hand above the symphysis pubis. Gentle manual massage in a rotatory movement for 30 seconds, and repeated this massage for 5 times for 10 minutes throughout the hospital stay (El Sayed, 2021)). Assemble extra staff nurse as needed (Charge Nurse or Nurse Assistant), uterotonic medicines were administered as ordered, type and Cross – Consider use of trauma blood if type and crossed blood not available, allocate one nurse to connect with blood bank. Preserve accurate intake & output,

weight materials, estimate and record collective blood loss. Set up blood administration set and blood warmer for transfusion, administer blood products and draw labs. Pulse oximeter applying / ECG monitoring, raise legs to 20-30 degree to enhance the circulation to the vital organ, keep primiparous warm, need of pain management was assessed.

### Follow up and outcomes assessment

The researchers incessantly followed up the primiparous after implementation was carried out and the primiparous' ailment was steadied through close attention to the resuscitation response. Monitor CBC, coagulation studies and blood gases. Assist with move the primiparous to operative room (if indicated), the researchers finally recognized and reporting all the assessment findings.

### Limitations of the study

The study sample was nominated from only one setting, so a generalization of the findings could not be accessible.

### Data analysis

All statistical analyses were carried out using Statistical Package for Social Science for windows version 20.0 (SPSS, Chicago, IL). Continuous data were normally distributed and expressed in mean  $\pm$  standard deviation (SD). Categorical data expressed in number and percentage. The comparisons were determined using Student's t-test for numerical variables, and Chi-square test was used for the comparison of qualitative variables. Statistical significance was set at  $p \leq 0.05$ .

### Results

Findings of the current study presented in six sections each one described the study factors. As shown in table 1, mean of the study group's age was  $26.3 \pm 6.9$ , compared to  $25.7 \pm 7.0$  of the control group. Concerning the place of residence, 45.7% of the study group were lived in urban areas compared to 40.00% of the control group. There was no statistically significant difference between the study and control group regarding all sociodemographic data.

**Table (1):** Comparison between the study group and control group according to demographic data

	Study Group (n=35)		Control Group (n=35)		Chi square test		
	Frequency	%	Frequency	%	X <sup>2</sup>	p	Significance
Age (years)							
18-	17	48.6	20	57.1			
23 –	14	40.0	10	28.6			
28 > 35	4	11.4	5	14.3			
					1.021	0.600	Insign
Mean $\pm$ SD#	26.3 $\pm$ 6.9		25.7 $\pm$ 7.0		0.395	0.694	Insign
Residence							
Rural	19	54.3	21	60.0			
Urban	16	45.7	14	40.0			
					0.233	0.629	Insign

# Compared using the student's t test

As shown in table 2, 88.6 % of the study group have singleton gestation, compared to 85.7% of the control group. Concerning gestational age, 34.3 % of the study group were < 28 weeks of gestation compared to 31.4% of the control group. Concerning mode of delivery, 80.0% of the study group have NVD with episiotomy compared to 71.4 % of the control group. Related to causes of PPH, 28.6, 20.0, 25.7 and 25.7% respectively of the study group have uterine atony, traumatic, placenta retention and infection respectively compared to 34.3, 28.6, 17.1 and 20.0 % respectively of the control group. There was no statistically significant difference between the study and control group regarding all obstetric data.

**Table (2):** Comparison between the study group and control group according to the obstetric data

	Study Group (n=35)		ControlGroup (n=35)		Chi square test		
	Frequency	%	Frequency	%	X <sup>2</sup>	p	Significance
Gravidity							
Primi	14	40	16	45.7			
Multi	21	60	19	54.3			
					0.233	0.629	Insign
Gestation							
Singleton	31	88.6	30	85.7			
Multiples	4	11.4	5	14.3			
					0.128	0.721	Insign
Mode of delivery							
Normal vaginal delivery with episiotomy	28	80.0	25	71.4			
Normal vaginal delivery without episiotomy	7	20.0	10	28.6			
					0.699	0.403	Insign
Causes of PPH							
Uterine atony	10	28.6	12	34.3			
Traumatic	7	20.0	10	28.6			
Placenta retention	9	25.7	6	17.1			
Infection	9	25.7	7	20.0			
					1.561	0.668	Insign

As shown in table 3, 68.6% of the study group have normal Pulse, compared to 42.9% of the control group. Concerning Blood pressure, 80.0% of the study group were normal blood pressure compared to 51.4% of the control group. Concerning respiratory rate, 40.0% of the study group have tachypnoea compared to 68.6% of the control group. Concerning temperature, 37.1% of the study group have hypothermia compared to 62.9% of the control group. Related to consciousness level, 5.7 % of the study group were comatose in consciousness level compared to 25.7% of the control group. As regard blood loss, 8.6% of the study group have blood loss >750 ml compared to 34.3% of the control group. Regarding extremities, 20.0% of the study group have cold extremities compared to 42.9% of the control group. There was statistically significant difference between the study and control group regarding all bundle care of PPH (Assessment part).

**Table 3.** Comparison between study group and control group according to bundle care of PPH (Assessment part)

Variable's assessment	Study Group (n=35)		Control Group (n=35)		Chi square test		
	Frequency	%	Frequency	%	X <sup>2</sup>	P	Significance
Vital Signs							
Pulse/b/min							
Normal	24	68.6	15	42.9			
Tachycardia	11	31.4	20	57.1			
					4.690	0.030	Sign
Blood pressure/mmHg							
Normal	28	80.0	18	51.4			
Hypotension	7	20.0	17	48.6			
					6.341	0.012	Sign
Respiratory rate/c/min							
Normal	21	60.0	11	31.4			
Tachypnoea	14	40.0	24	68.6			
					5.757	0.016	Sign
Temperature/degree							
Normal	22	62.9	13	37.1			
Hypothermia	13	37.1	22	62.9			
					4.629	0.031	Sign
Consciousness level							
Conscious	33	94.3	26	74.3			
Comatose	2	5.7	9	25.7			
					5.285	0.022	Sign
Blood Loss (ml)							
<500	18	51.4	12	34.3			
500 – 750	14	40.0	11	31.4			
>750	3	8.6	12	34.3			
					6.960	0.031	Sign
Extremities							
Normal	28	80.0	20	57.1			
Cold	7	20.0	15	42.9			
					4.242	0.039	Sign

As shown in table 4, regarding insert Foley catheter, accomplish uterine massage, assemble extra nurses as required, connect with blood bank, estimate and record blood loss/ml, elevate legs to 20-30 degree, keep the primiparous warm and assess pain management need of the study group have highly significant difference ( $p < 0.001$ ), compared to the control group. There was statistically significant difference between the study and control group regarding all bundle care of PPH (Intervention part).

**Table (4):** Comparison between study group and control group according to bundle care of PPH (Intervention part)

	Done intervention				Chi square test		
	Study Group (n=35)		Control Group (n=35)		X <sup>2</sup>	p	Significance
	Frequency	%	Frequency	%			
Ensure IV access	29	82.9	18	51.4	7.835	0.005	Sign
Empty the bladder	24	68.6	15	42.9	4.690	0.030	Sign
Insert Foley catheter	31	88.6	17	48.6	12.992	<0.001	Sign
Accomplish Uterine massage	22	62.9	6	17.1	15.238	<0.001	Sign
Assemble extra nurses as required	25	71.4	11	31.4	11.209	<0.001	Sign
Administer uterotonic medications as ordered	22	62.9	13	37.1	4.629	0.031	Sign
Type and Crossed blood	20	57.1	10	28.6	5.833	0.016	Sign
Allocate nurse to connect with blood bank	27	77.1	12	34.3	13.027	<0.001	Sign
Estimate and record blood loss/ml	25	71.4	10	28.6	12.857	<0.001	Sign
Blood product administration	21	60.0	10	28.6	7.006	0.008	Sign
Apply pulse oximeter/ ECG monitoring	26	74.3	13	37.1	9.785	0.002	Sign
Raise legs to 20-30 degree	27	77.1	11	31.4	14.737	<0.001	Sign
Keep the primiparous warm	28	80.0	20	57.1	4.242	0.039	Sign
Assess pain management need	27	77.1	19	54.3	4.058	0.044	Sign

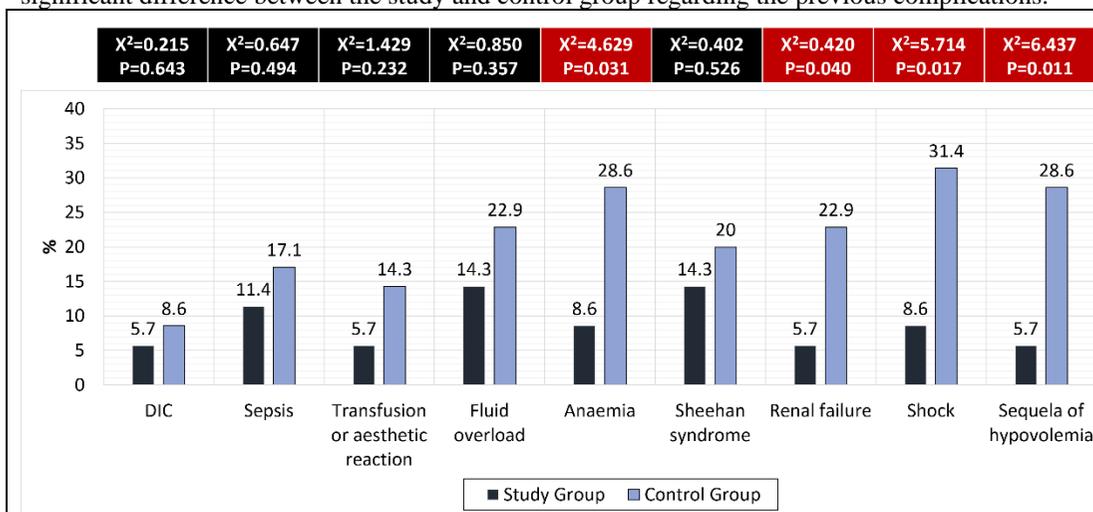
As shown in table 5, regarding bleeding, 68.6% of the study group have mild bleeding, compared to 28.6% of the control group. There was statistically significant difference between the study and control group regarding bleeding and consciousness level.

**Table 5. Comparison between study group and control group according to outcomes**

	Study Group (n=35)		Control Group (n=35)		Chi square test		
	Frequency	%	Frequency	%	X <sup>2</sup>	p	Significance
Bleeding:							
Mild	24	68.6	10	28.6			
Moderate	11	31.4	20	57.1			
Sever	0	0.0	5	14.3			
					6.937	0.008	Sign
Consciousness level							
Conscious	33	94.3	21	60.0			
Comatose	2	5.7	14	40.0			
					9.401	0.002	Sign

As shown in figure 1, regarding complications, 28.6% of the control group have anaemia, compared to 8.6% of the study group. Related renal failure, 22.9% of the control group have renal failure, compared to 5.7% of the study group. Concerning shock, 31.4% of the control group have shock, compared to 8.6% of the study group. As regard sequela of hypovolemia, 28.6% of the control group have sequela of hypovolemia, compared to 5.7% of the study group. Also, DVT, 37.1% of the control group have DVT, compared to 17.1% of the study group. Moreover, DIC

8.6% of the control group have DIC, compared to 5.7 % of the study group. There was statistically significant difference between the study and control group regarding the previous complications.



**Figure (1): Distribution of primiparous in both groups according to complications.**

## Discussion

Massive PPH is a volatile and possibly disastrous complication of delivery. Reliable massive transfusion protocols abridge and accelerate birth of life-saving blood products to an intensely hemorrhagic obstetrical primiparous. Developments in the dealing with hemorrhagic shock are prospective to enhance survival in massive PPH. Quick, primary, and conclusive intervention is essential to augment primiparous outcomes for PPH, accomplished by implementing of bundle care (Althabe, et al., 2020). The current study aimed to evaluate the effectiveness of implementing bundle care on reducing PPH among primiparous. The results of the current study supported the study hypotheses which are; primiparous with PPH, who will receive bundle care, will obtain reducing blood loss. Additionally, primiparous with PPH, who will receive bundle care, will have lower complications.

As related to primary assessment; the results of the current study showed that there was a statistically significant difference between study and control groups (vital signs, level of consciousness, blood loss and extremities' status), the primiparous assessment was a significant theme in initial treatment and enhancing the outcomes. In this context; these findings are reinforced by Miller research (2014), who finalized that the superlative

patient outcomes happen as soon as strategies, possessions and education are obtained to health care workers. Nurses who closed to parturients if equipped with the information and possessions required to make suitable decision during emergent situation will lead to better parturients outcomes. As well, preventable issues of maternal deaths, including administrative and staff issues such as insufficient education and training, or staff knowledge deficiency (Geller et al., 2014).

Results of the current study showed that there was a statistically significant difference between study and control groups as related to perform uterine massage, weight materials, calculate and record collective blood loss, maintain strict intake and output which could affect the diagnosis of the parturients and their outcomes. The findings of the current study showed that the percentage of weighting materials as precise technique in manipulative amount of blood loss in control group was around 40% which can postpone in appropriate care. These findings with the same line of Egyptian study that carried out by Sayed and El Saman (2019); their research showed that the percentage of weighting materials as exact technique in estimating amount of blood loss in control group was less than 10% which can delay in proper management. These outcomes are in arrangement with the studies conducted by Gabel and Weeber (2012) specified that

originate that staff nurses incessantly underestimate blood loss when assessing a parturients' Lochia postpartum.

Al Kadri et al., (2011) displayed this underestimation of blood loss leads to inappropriate management of PPH and in reported the use of a sensitive scale to weight collected blood loss, to diagnose instant PPH is a vital phase for initial management and enhanced outcomes. Additionally, (Roston, 2012) experts have recommended that refining the precision and reliability of blood loss assessment is the 'crucial step' in primary diagnosis of PPH and that most deaths from PPH could be evaded through 'proper diagnoses. Results of the current study specified that there was a statistically significance difference between study and control group in bleeding discontinuing which was more than two-third in study group compared to one-third in control group. Results of the Egyptian research stated that there was a statistically significance difference between study and control group in bleeding stopping which was more than half in study group, less than in control group (Sayed and El Saman, 2019).

As related to primiparous complications in the current study; it reduced after the implementing of bundle care in study group when compared with control group regarding to anemia more than one-quarter of primiparous in control compared to 8.6% in study group, DIC was over 8.6% in control compared to 5.7 % in study group, renal failure was nearby one-quarter in control group compared to 5.7 % in study group. Fortunately, these findings were confirmed by Sayed and El Saman (2019); the findings of their study specify that the patient complications decreased following the implementation of protocol when compared with control group as regard anemia over more than half of patients in control and more than one third in study group, DIC was over 15% in control and below 2% in study group, renal failure was over 20% in control and below 10% in study group. In addition to these findings are in approve with (Roston et al., 2012) who signified those delays in the PPH management are supposed to have a direct effect on the severity of bleeding, the progress of complications such as coagulopathy and

increasing rates of morbidity and mortality. Delays are informed to be caused by misapprehension of the amount of blood loss and its physiological effects, disappointment to distinguish concealed bleeding, and disappointment to worsen care to additional health care providers (Sotunsa, et al., 2019).

In PPH care, training using clinical simulation upgraded actual time blood loss estimations and permitted learners to distinguish and treat early because they evade exaggeration of blood loss and treatment is suspended (Garbuio, et al., 2017). This teaching methodology has also revealed possible in emergency treatment with PPH. It definitely affects effectiveness of nurses in the treatment of this obstetric urgency; as well as signifying that the treatment of other high risk and low incidence obstetric emergencies can also be enhanced (Christian and Krumwiede 2013 & Andrade, et al., 2019).

Garbuio, et al., (2017) confirmed that, the clinical simulation technique has been used as a significant teaching tool and energetic methodology to be used in training of nurses and in enduring education of health professionals. Fortunately; this practice has been progressively used because it is a vital training resource for these professionals, so that they can advance skills, and announcement, health care, decision-making and headship aptitudes, being crucial to determination of the unprotected clinical situation. Thus, the use of clinical simulation presents itself as a viable teaching strategy to prepare students and professionals in the setting of care practice. It can be used even in the academic and hospital environment.

Simulation allows health professionals to identify behaviors that need improvement by offering the opportunity to practice and develop skills in a non-threatening environment away from patient care since stress and anxiety can increase the chances of error not suitable in real practice. Techniques referring to resuscitation and stabilization should be subjugated for hospital practice aiming to improve the performance of students and professionals (O'Donnell, et al., 2016 & Garbuio, et al., 2017). On the same line, researcher in current study make staff training

that was designed to obtain cooperation of medical and nursing staff at hospital and to ensure the success of the bundle care at study setting that in agreement and confirmed by the previous study.

Fortunately, in Egypt, a recent study was conducted by Sayed and El Saman (2019) titled developing and implementing nursing care protocol regarding management of postpartum hemorrhage; concluded that, the proposed nursing protocol for PPH patients was operative in reduction of patient's outcomes and complications. In addition, exposed that both the strategies and the method of application have led to a better diagnosis and treatment of PPH. It also has led to a more conventional method to the treatment of PPH that has fewer undesirable effect on quality of life. These findings were confirmed by the current study findings and the current research hypotheses were accepted.

## Conclusion

Built on finding of the current study; it concluded that the primiparous with PPH who received bundle care obtained reducing blood loss post-delivery and lower PPH complications than those who received routine care. Bundle care was considered an effective method in decreasing blood loss complications of early PPH that has lower undesirable consequence on quality of life.

## Recommendation

This study recommended that

- Bundle care should be recommended as nursing intervention protocol for early PPH.
- Bundle care should become a fundamental part of the total management of early PPH.
- Bundle care was considered a more conservative method to the dealing with PPH that has lower undesirable consequence on quality of life.

## References

**American College of Obstetricians and Gynecologists (2017).** Committee on Practice Bulletins-Obstetrics. Practice Bulletin No. 183: Postpartum hemorrhage. Obstet Gynecol.

2017;130(4):e168-86. doi: 10.1097/AOG.0000000000002351

**Alden, K. R., Lowdermilk, D. L., Cashion, M. C., & Perry, S. E. (2013).** Maternity and women's health care-E-book. Elsevier Health Sciences.

**Al Kadri, H. M., Al Anazi, B. K., & Tamim, H. M. (2011).** Visual estimation versus gravimetric measurement of postpartum blood loss: a prospective cohort study. *Archives of gynecology and obstetrics*, 283(6), 1207-1213.

**Althabe, F., Therrien, M. N., Pingray, V., Hermida, J., Gülmezoglu, A. M., Armbruster, D., ... & Miller, S. (2020).** Postpartum hemorrhage care bundles to improve adherence to guidelines: A WHO technical consultation. *International Journal of Gynecology & Obstetrics*, 148(3), 290-299. DOI: 10.1002/ijgo.13028

**Alves, Á. L. L., Francisco, A. A., Osanan, G. C., & Vieira, L. B. (2020).** Postpartum hemorrhage: prevention, diagnosis and non-surgical management. *Revista Brasileira de Ginecologia e Obstetrícia*, 42, 776-784. DOI: <https://doi.org/10.1055/s-0040-1721882>

**Andrade PON, Oliveira SC, Morais SCR, Guedes TG, Melo GP, Linhares FMP (2019).** Validation of a clinical simulation setting in the management of post-partum haemorrhage. *Rev Bras Enferm.* 2019;72(3):624-31. doi: <http://dx.doi.org/10.1590/0034-7167-2018-0065>

**Christian A, Krumwiede N. (2013).** Simulation enhances self-efficacy in the management of preeclampsia and eclampsia in obstetrical staff nurses. *Clin Simul Nurs* [Internet]. [cited 2016 Jul 20];9(9): e369-77. Available from: <https://doi.org/10.1016/j.ecns.2012.05.006>

**Collins, P. W., Bell, S. F., De Lloyd, L., & Collis, R. E. (2019).** Management of postpartum haemorrhage: from research into practice, a narrative review of the literature and the Cardiff

- experience. *International journal of obstetric anesthesia*, 37, 106-117.
- Egyptian Ministry of Health (2014).** Causes of maternal mortality in Egypt. Cairo, Egypt: Ministry of Health and Population.
- El Sayed, S. L. M. (2021).** Effect of uterine massage and emptying of the urinary bladder on alleviation afterpains among mothers in the immediate postpartum period. *International Journal of Africa Nursing Sciences*, 100327.
- Escobar, M. F., Valencia, P., Jaimes, L. M., Hincapié, L. C., Pulgarín, E. E., Nasner, D., ... & Prada, S. (2021).** Resource use decrease after implementation of care bundles for treatment of postpartum hemorrhage. *The Journal of Maternal-Fetal & Neonatal Medicine*, 1-8. <https://doi.org/10.1080/14767058.2021.1937989>
- Flannelly, K. J., Flannelly, L. T., Jankowski, K. R. (2018).** Threats to the internal validity of experimental and quasi-experimental research in healthcare. *Journal of health care chaplaincy*, 24(3), 107-130.
- Gabel, K. T., & Weeber, T. A. (2012).** Measuring and communicating blood loss during obstetric hemorrhage. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 41(4), 551-558.
- Garbuio DC, Oliveira ARS, Kameo SY, Melo ES, Dalri MCB, Carvalho EC (2017).** Clinical simulation in nursing: experience report on the construction of a scenario. *J Nurs UFPE Online [Internet]*. [cited 2017 Jul 19];10(8):3149-55. Available from: doi:10.5205/reuol.9373-82134-1-RV1008201645
- Geller, S. E., Koch, A. R., Martin, N. J., Rosenberg, D., & Bigger, H. R. (2014).** Assessing preventability of maternal mortality in Illinois: 2002-2012. *American journal of obstetrics and gynecology*, 211(6), 698-e1.
- Hogan M, Foreman K, Naghavi M (2010).** Maternal mortality for 181 countries, 1980-2008: a systematic analysis of progress towards Millennium Development Goal 5. *Lancet* 375:1609–1623
- Joseph, N. T., Worrell, N. H., Collins, J., Schmidt, M., Sobers, G., Hutchins, K., ... & Lindsay, M. K. (2020).** Implementation of a Postpartum Hemorrhage Safety Bundle at an Urban Safety-Net Hospital. *American Journal of Perinatology Reports*, 10(03), e255-e261. DOI <https://doi.org/10.1055/s-0040-1714713>. ISSN 2157-6998.
- Kassebaum, N, Bertozzi A, Coggeshall M (2014).** Global, regional, and national levels and causes of maternal mortality during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 384: 980–1004.
- Kaur, J., & Ray, S. (2021).** Identification and Management of High-Risk Complications during Postnatal Period by Ground Level Workers.
- Mahmoud, G. A., & Omar, A. M. (2018).** Women's awareness and perceptions about maternal mortality in rural communities in Assiut and Fayoum Governorates, Egypt. *Egyptian Nursing Journal*, 15(1), 21.
- Miller, K. (2014).** The Effect of Simulation Activities On Maternal-Newborn Knowledge in a Practical Nursing Course: Implications for Practice. *International Journal of Childbirth Education*, 29(1).
- Nana, T. N., Tchounzou, R., Mangala, F. N., Essome, H., Demgne, J. T., Kobenge, F. M., ... & Halle, G. E. (2021).** Primary Post-Partum Haemorrhage Following Vaginal Deliveries at the Douala General Hospital: Prevalence, Causes and Risk Factors. *Open Journal of Obstetrics and Gynecology*, 11(6), 742-752.
- O'Donnell J, Mann R, Martin D. (2016).** Simulation training for surfactant replacement therapy: Implications for

- clinical practice. *J Neonatal Nurs* [Internet]. 2014 [cited 2016 Jul 28]; 20(6): 283-9. Available from: <http://dx.doi.org/10.1016/j.jnn.2014.04.002>
- Osanan GC, Padilla H, Reis MI, Tavares AB (2018).** Strategy for zero maternal deaths by hemorrhage in Brazil: a multidisciplinary initiative to combat maternal morbimortality. *Rev Bras Ginecol Obstet.* 2018;40(3):103-5. doi: 10.1055/s-0038-1639587
- Pregnancy and Childbirth BMC (2011):** Inability to predict postpartum hemorrhage: insights from Egyptian intervention data, 11:97.
- Rani, P. R., & Begum, J. (2017).** Recent advances in the management of major postpartum haemorrhage-a review. *Journal of clinical and diagnostic research: JCDR, 11(2), QE01.* DOI: 10.7860/JCDR/2017/22659.9463
- Rocha-Filho EA, Costa M, Cecatti JG, Parpinelli MA, Haddad SM, Pacagnella RC, et al. (2015).** Severe maternal morbidity and near miss due to postpartum haemorrhage in a national multicentre surveillance study. *Int J Gynaecol Obstet* 2015;128:131–6.
- Roston, A. B., Roston, A. L., & Patel, A. (2012).** Blood Loss: Accuracy of visual estimation. *A Comprehensive Textbook of Postpartum Hemorrhage. An essential Clinical Reference for Effective Management, 2, 71-72.*
- Ruiz MT, Azevedo CT, Ferreira MBG, Mamede MV. (2015).** Association between hypertensive disorders and postpartum haemorrhage. *Rev Gaúcha Enferm* [Internet]. [cited 2017 Jul 15];36(spe):55-61. Available from: <http://dx.doi.org/10.1590/1983-1447.2015.esp.56776>.
- Sayed, H. A., & El Saman, A. M. (2019).** Developing and Implementing Nursing Care Protocol Regarding Management of Postpartum Hemorrhage. *Assiut Scientific Nursing Journal, 7(17), 173-180.*
- Simms, E. J. (2021).** Staff Feedback on the Feasibility of a New Obstetric Quantitative Blood Loss Policy (Doctoral dissertation, University of Kansas).
- Sotunsa JO, Adeniyi AA, Imaralu JO, Fawole B, Adegbola O, Aimakhu CO, Adeyemi AS, Hunyinbo K, Dada OA, Adetoro OO, Oladapo OT (2019):** Maternal near-miss and death among women with postpartum haemorrhage: a secondary analysis of the Nigeria Near-miss and Maternal Death Survey. *BJOG* 2019; 126 (S3): 19–25. DOI: 10.1111/1471-0528.15624
- Statistic department (2021).** Maternity hospital and El-Hayah port-fouad hospital, Portsaid Governorate, Egypt.
- World Health Organization (2016).** *WHO Recommendations for the prevention and treatment of postpartum haemorrhage.* WHO: Geneva. [Internet]. 2012 [cited 2016 Jul 20] Available from: [http://www.who.int/reproductivehealth/publications/maternal\\_perinatal\\_health/9789241548502/en/index.html](http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/9789241548502/en/index.html).