Epidemiological Study of Risk Factors for Primary Postpartum Hemorrhage: at AL-jumhorya Hospital - Benghazi /2009.

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Dedication:

Special dedication to my husband ***Abdelsalam Abozrida*** *for his continuous support throughout master program.*

To my parent and my sister, marium.

To all my family.

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List of Abbreviation:

WHO	World Health Organization
MMR	Maternal mortality ratio
POPPHI	prevention of postpartum hemorrhage initiative
IU	International unit
SPSS	Statistical Package for Social Sciences
OR	Odds ratio
CI	Confidence interval
PPH	Postpartum hemorrhage
PIH	Pregnancy induced hypertension
APH	Ante partum hemorrhage
AMTSL	Active management of the third stage of labour
HELLP	Hemolysis, elevated liver enzymes, low platelet count
DIC	Disseminated intravascular coagulation
SBA	Skill birth attendant

CHAPTER 1

INTRODUCTION

INTRODUCTION:

Postpartum hemorrhage (PPH) is excessive bleeding from genital tract after delivery (Zaman etal.2007) [(1)].

Primary postpartum hemorrhage defined as blood loss of 500 ml from the genital tract within the first 24 hours following delivery (Thompson etal.2004) [(2)] .

However, there is evidence that 500 ml is actually normal blood loss after vaginal delivery and 1000 ml after caesarean section with little clinical relevance.

Another definition of hemorrhage is a 10% decrease in either the haemoglobin or the haematocrit, but determinations of these values are often delayed and might not reflect the patient's current haemodynamic Status (Walfish etal.2009) [(3)].

Primary postpartum hemorrhage ,accounts for approximately 25% of maternal deaths globally (Tsu etal.2004)[(4)].

Approximately 14 million women suffer from postpartum hemorrhage every year worldwide (Miller etal. 2004)[(5).]

Postpartum hemorrhage (PPH) is one of the leading causes of maternal mortality. Death due to PPH is reported to represent between 17% and 40% of maternal mortality in some parts of the world. Even in developed countries, for example USA and The Netherlands, PPH causes 13% of all recorded maternal deaths (Anderson, Etches.2007) [(6)].

The prevalence of postpartum hemorrhage is approximately 6% with worldwide variation (Mathai etal.2006) [(7)].

The incidence of PPH ranges between 5% and 8% in places where some form of prophylaxis is practiced, but may be as high as 18% when physiological approach is the normal (Carroli etal.2008) [(8)].

In EMRO, incidence ranged from 7.3% to 11 % and maternal mortality from 3.2 % up to 8.7% (Dolea etal.2003) [9].

The classification, definition and treatment of PPH have seen almost no change over the last 50 years. For example a cut-off point of 500 ml implies that any loss smaller than this is within normal limits and can therefore be tolerated without risk. This is certainly not the case in countries where severe anemia is common and where blood loss of as little as 250 ml may constitute a clinical problem (El-Refaey,Rodeck.2003) [10].

Classification of postpartum hemorrhage:

1. Classification based on quantification of blood loss.
2.Classification based on the causes of PPH.
3.Classification based on clinical signs and symptoms.

1. Classification based on quantification of blood loss:

A. Amount of blood lost:

Blood loss at delivery is estimated using various methods. These range from the less modern methods of counting blood-soaked pieces of cloth to more modern techniques.

B. Change in hematocrit:

The American College of Obstetricians and Gynecologists advocates the definitions of either a 10% change in hematocrit between the antenatal and postpartum periods, or a need for erythrocyte transfusion.

C. Rapidity of blood loss:

Severe hemorrhage has been classified as blood loss > 150 ml/min (within 20 min, causing loss of more than 50% of blood volume) or a sudden blood loss > 1500–2000 ml (uterine atony; loss of 25–35% of blood volume).

D. Volume deficit:

Class 1: a volume loss of less than 900 ml, this will rarely lead to any symptoms and signs of volume deficit and will not require any acute treatment.

Class 2: a blood loss of 1200–1500 ml will begin to manifest clinical signs, such as a rise in pulse and respiratory rate. There may also be recordable blood pressure changes, but not the classic cold clammy extremities.

Class 3: These are patients in whom the blood loss is sufficient to cause overt hypotension. The blood loss is usually around 1800–2100 ml.

There are signs of tachycardia (120–160 bpm), cold clammy extremities and tachypnea.

Class 4: This is commonly described as massive obstetric hemorrhage. When the volume loss exceeds 2400(40%), profound shock and the blood pressure , pulse are not easily recordable. Immediate and urgent volume therapy is necessary, as this quantity of blood loss can be fatal secondary to circulatory collapse and cardiac arrest.

2. Classification based on causative factors:

The causes of postpartum hemorrhage can also form a basis of classification Four processes: uterine atony, retained placental tissue, genital trauma. and disorders of coagulation.

3.Classification based on clinical signs and symptoms:

The ideal classification of postpartum hemorrhage should take into consideration both the volume loss and the clinical consequences of such loss. The recorded parameters should be easily measurable and reproducible. This will help in providing an accurate and consistent assessment of blood loss, which can readily be communicated and incorporated into most labour ward protocols (Coker, Oliver.2006) [(11)].

% of volume deficit	amount of blood loss (ML)	Blood pressure (mmHg)	Sign and symptoms
10-15	**500-1000**	**normal**	Palpitations, dizziness, tachycardia
15-25	**1000-1500**	**slightly low**	weakness, sweating, tachycardia
25-35	**1500-2000**	**70–80**	restlessness, pallor, oliguria
35-45	**2000-3000**	**50–70**	collapse, anuria

Control of postpartum hemorrhage:

1. Control by mechanical events.
2. Endocrine mechanisms leading to mechanical events.
3. Coagulation mechanisms.

1. Control by mechanical events:

The two classical methods of placental delivery result in different bleeding patterns. In the Schultze method, separation begins in the center of the placenta (the fetal surface), and this part descends first, with the remainder following. The Matthew Duncan separation method involves detachment of the leading edge of the placenta, and the entire organ slips down and out of the uterus sideways. placental separation is slower in the Matthew Duncan method, allowing more time for bleeding.

Control of postpartum bleeding occurs also by contraction and retraction of the interlacing myometrial fibers surrounding maternal spiral arteries of the placental bed.

2. Endocrine mechanisms leading to mechanical events:

Two classes of hormones have been implicated

in third-stage uterine contractility, namely **oxytocin** and **prostaglandins**

3. Coagulation mechanisms:

Coagulation at the placental site represents an important haemostatic mechanism (Khan, El-Refaey.2006) [12].

Diagnosis of postpartum hemorrhage:

Clinical or quantitative methods.

1. Clinical methods:

Clinical estimation remains the primary means to diagnose the extent of bleeding and to direct interventional therapy in obstetric practice.

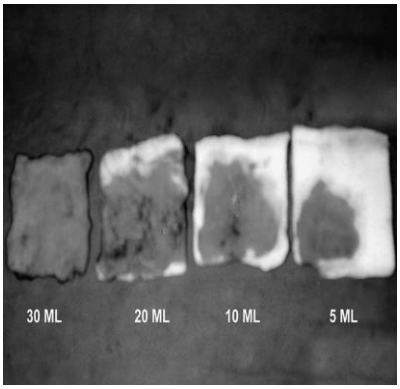
2. Quantitative methods:

A. Visual assessment:

The standard method of observation used for the measurement of blood loss is relatively straight forward and requires no expenditure.

The observer needs to be trained in determining the blood loss using a single collecting container and fixed-sized gauze pads of 10×10 cm.

Blood losses on the delivery table, clothes and floor should also be assessed. At the end of 1 h, the total amount of blood lost is estimated by adding up the blood in the container, in the sponges and secondary blood spillage on the delivery table, clothes and floor. The major disadvantage of this method is underestimation of blood loss.

I.  II. 

I: *Blood drained into a fixed collecting container*

II: *Soakage characteristics of 10 cm Pads*

B. Direct collection of blood into bedpan or plastic bags:

Blood loss was measured from the time of delivery until the mother was transferred to postnatal care. Immediately after the cord was clamped and cut, the blood collection was started by passing a flat bedpan under the buttocks of a woman delivering in a bed or putting in place an unsoiled sheet for a woman delivering on a delivery table,Blood collection and measurement continued until the third stage of the labour was completed and the woman was transferred to the postnatal ward.This period was generally up to **1 h** postpartum. At that time, the collected blood was poured into a standard measuring jar provided by WHO, this result in an approximately 10% increase in the blood loss measurement

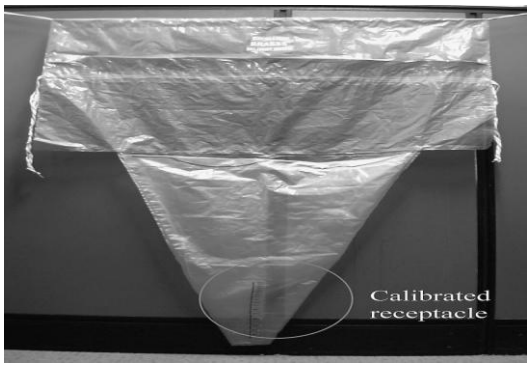
C. Gravimetric method:

This involves weighing of sponges before and after delivery.

D.Determination of changes in hematocrit and hemoglobin:

The changes in values before and after delivery of the hematocrit and hemoglobin levels provide quantitative measurements of blood loss.

F. Blood collection drape:



Calibrated plastic blood collection drape' that would objectively measure the amount of blood collected in the immediate postpartum period, it contains collecting pouch, incorporated within a plastic sheet that is placed under the buttocks of the patient immediately after the delivery of the baby.(Kodkany, Derman.2006) [(13)].

Risk factors of postpartum hemorrhage:

1. Atonic uterus:

1.1. Uterus over-distension:

- Multiple pregnancy.
- Macrosomia.
- Polyhydramnios.

1.2. Uterine muscle fatigue

- Prolonged and precipitate labour.
- High parity, previous pregnancy with postpartum hemorrhage.

1.3. Uterine infection and chorioamnionitis

Prolonged spontaneous rupture of membrane**.**

1.4.Uterine distortion/abnormality

Fibroid uterus, placenta previa**.**

1.5.Uterine relaxing drugs

- Anaesthetic drugs.
- nifedipine, NSAIDs.
- beta-mimetics, MgSO4**.**

2. Retained placental tissue:

- Incomplete placenta at delivery.
- Previous uterine surgery.
- Abnormal placentation.

3. Genital trauma:

1.1. Cervical/vaginal/perineal tears

- Precipitous delivery, manipulations at delivery.
- Operative delivery, mistimed episiotomy.

1.2.Extended tear at caesarean section

- Malposition.
- Deep engagement.

1.3.Uterine rupture

Previous uterine surgery.

1.4.Uterine inversion

- High parity.
- Excessive traction of cord.

4.Coagulation defect:

4.1.Clotting abnormality:

- Hemophilia ,von Willebrand's disease.
- Idiopathic thrombocytopenic purpura.

4.2. Coagulation defect acquired in pregnancy:

- preeclampsia toxemia with thrombocytopenia (HELLP syndrome).
- disseminated intravascular coagulation from preeclampsia toxemia. and abruption placenta.
- Intera uterine fetal death.

4.3.Anticoagulation

- Aspirin, heparin (Ramanathan,Arulkumaran.2006) [(14)].

HAPTER 2

REVIEW OF LITERATURE

Review of Literature:

To quantify the magnitude of postpartum hemorrhage is to look at its contribution to maternal deaths around the world, and in a particular country over time. Trends over time within one country are an important audit tool in examining the care for women with postpartum hemorrhage; however, differences between countries often reflect differences in health-care provision, general economic, geographic conditions and climatic conditions that affect access to obstetric care.(Cameron,Robson. 2006) [(15)].

Postpartum hemorrhage is a major cause of maternal morbidity and mortality worldwide, with an increasing trend in incidence over time also in developed countries, including Australia, Canada, the United Kingdom, and the United States ,in spite of growing knowledge and better management facilities (Ahonen etal.2010)[(16)].

In the developed world like UK, deaths from obstetric hemorrhage are rare (0.8:100,000births). While in the developing world, the risk of death from postpartum hemorrhage alone is1:1000 (Wise,Clark.2010) [(17)].

A study was conducted in united state on trend of postpartum hemorrhage, reported that the prevalence of PPH may be affected by the definition of the event over time, it is important to note that several definitions have been used, traditional definition for PPH in the United States is an estimated blood loss of at least 500 ml for a vaginal delivery and 1000 ml for cesarean delivery. In contrast, an online coding manual defines PPH as blood loss in excess of 500 ml without reference to mode of delivery. However, it is not apparent that the physiologic effect of blood loss differs by mode of delivery and blood loss of 1000 ml is associated with considerable morbidity.Postpartum hemorrhage increased 26% between 1994 and 2006

The increase primarily was due to increase in uterine atony, from (1.6% to 2.4%).the most cause of uterine atony was induction of labour and delivery

by caesarean section.Maternal mortality rates for deaths caused by childbirth-associated hemorrhage did not change significantly over this period (William etal .2010) [18].

Descriptive study was carried out in 16 maternity units in France reported that obstetric hemorrhage is the leading cause of maternal death and overall incidence of 5.4 ± 0.3and the specific maternal mortality ratio due to hemorrhage has been reported to be 2.5times higher than the mean European rate.There is no clear explanation why the French maternal mortality rate is high, but the study points out to some malfunctions in health care service(Dupont etal.2009)[19].

Maternal death in the developed world is a rare event; clinicians have attempted to quantify significant maternal morbidity, which is often describe as a maternal adverse event or a near miss. Studies have generally included massive obstetric hemorrhage as one indicator of severe maternal morbidity.

The Scottish Programme for Clinical Effectiveness in Reproductive Health **(SPCERH)** conducted prospective investigation in Scotland.

Major obstetric hemorrhage was defined as estimated blood loss more than 2500 ml, or transfusion of more than 5 units of blood or the need for fresh frozen plasma or cryoprecipitate.

The rate of major obstetric hemorrhage of 3.5/1000 births ,70% of the cases were due to primary postpartum hemorrhage, 26% to intrapartum hemorrhage and 17% to ante partum hemorrhage with some women falling into more than one category, uterine atony was the commonest identified cause(Brace,Penney.2003)[20] .

In the South East Thames region (England) 19 maternity units participated in a 1-year study, to determine the incidence of severe obstetric morbidity Severe obstetric hemorrhage was defined as estimated blood loss more than 1500 ml or a peripartum fall in hemoglobin concentration of more than 40

g/l or the need for an acute transfusion of four units of blood or more. There were 588 cases of severe obstetric morbidity among 48856 women delivered over the year, giving an incidence of 12/1000 deliveries. Hemorrhage was the leading cause of obstetric morbidity at 6.7 per 1000 deliveries, representing nearly two-thirds of cases. (Waterstone etal.2001)[21].

Retrospective cohort study done in Canada about severe maternal morbidity ,using information on hospital discharges compiled by the Canadian Institute for Health Information, their criteria for severe maternal morbidity included postpartum hemorrhage requiring hysterectomy or transfusion.Their overall rate of all severe maternal morbidity was 4.38 per 1000 deliveries .Within this study, rates for postpartum hemorrhage requiring transfusion reduced (RR 0.5), but hysterectomy rates for postpartum hemorrhage almost doubled (RR 1.76). Because the definition of postpartum hemorrhage was based on management rather than pathophysiology, it is difficult to clarify whether the temporal change reflects a true reduction in the incidence of postpartum hemorrhage or simply a change in clinical managemen (Wen etal.2005) [22].

Study was conducted in university maternity hospital in Montreal to assess risk factors for postpartum hemorrhage reported that major independent risk factors for PPH labour induction, augmentation of labour, and previous caesarean section are significantly associated with the risk of PPH, and their increase over the study period explains the observed rise in PPH (Michael etal.2011) [23].

A systematic review conducted by the WHO found that postpartum hemorrhage is the leading cause of maternal mortality in Africa and Asia, accounting for up to half of the total number of maternal v deaths in these regions (Snelgrove etal.2009) [24].

A study was conducted in West Africa examined severe maternal morbidity from direct obstetric causes, severe obstetric event was defined as peripartum or postpartum hemorrhage leading to blood transfusion, or hospitalization for more than four days or to hysterectomy. Server maternal morbidity event were identified and the near miss obstetric hemorrhage rate was 30.5/1000 live births and the near-miss postpartum hemorrhage represent 17.4 /1000 live births (Prual etal.2000) [25].

Furthermore, study was conducted on near-miss obstetric events in nine referral hospitals in three countries (Benin, Cote d'Ivoire**,** and Morocco) Obstetric hemorrhage was defined as hemorrhage leading to clinical shock, emergency hysterectomy and blood transfusion. The incidence of near-miss cases varied widely between hospitals. Most of the women were already in a critical condition on arrival, with two-thirds being referred from another facility with postpartum hemorrhage ,from 33478 deliveries, representing a near-miss and late obstetric hemorrhage rate of 15.1/1000 deliveries.

In total there were 266 cases of postpartum hemorrhage, representing a near-miss postpartum hemorrhage rate of 7.9/1000 deliveries (Filippi etal.2005) [26].

Cohort study was conducted in Nigeria to determine the incidence, causes and the maternal mortality associated with postpartum hemorrhage, case records of all patients that had postpartum hemorrhage are reviewed and analysed 67% of women had primary postpartum hemorrhage and 32% had secondary postpartum hemorrhage, the commonest cause of post partum hemorrhage was retained products of conception due mismanagement of the third stage of labour, other causes were uterine atony, genital tract laceration, post partum hemorrhage constitutes a significant cause of maternal morbidity and mortality. Most of the deliveries complicated with postpartum hemorrhage seen in this study were conducted by unskilled attendants that have little or no knowledge of active

management of the third stage of labour. In order to reduce the morbidity and mortality from postpartum hemorrhage, every attendant at delivery needs to have knowledge, skills and critical judgment, required to carry out active management of the third stage of labour and have access to appropriate supplies and equipment. Women should be encouraged to make use of existing health facilities by booking and receiving antenatal care (Ajenifuja etal.2010) [(27)].

A case control study was conducted in Zimbabwe for risk factor analysis of postpartum hemorrhage, PPH was defined as excess bleeding with a minimum of 600 ml rather than 500 ml. Cases were much more likely than controls to have a traumatic delivery involving vaginal or cervical tears, which accounted for more than one-third of the hemorrhages. Uterine atony was the most common cause of PPH. Although cases and controls had similar mean gravidity and parity, cases were more likely to had one or more previous caesarean delivery. Cases also had a higher proportion of grand multiparas, women 35 years or more at delivery were at 2.5 times greater risk of PPH than were younger women. Women who were hospitalized antenatally for a pregnancy-related problem were at 3-4 times greater risk of PPH than were women without hospitalization (Tsu.1993)[(28)].

Cohort study was conducted in Ethiopia the current maternal mortality ratio estimate of 673 /100,000 , 70% of all maternal deaths are due to five major obstetric complications: hemorrhage, infection, unsafe abortion, hypertensive disorders of pregnancy, and obstructed labour. The majority of maternal deaths (61%) occur in the postpartum period, and more than half of these take place within a day of delivery, postpartum hemorrhage (PPH) progress fast. It is estimated that a woman dies within two hours of developing postpartum hemorrhage.

Women with postpartum hemorrhage are very unlikely to reach to hospital and appear in hospital statistics if PPH occurs at home delivery, this

Another source of underestimation of PPH leading to the fast deterioration of a woman with PPH (Abdella .2010) [29].

A study was conducted in Peshawar. Data was collected from maternal mortality records was found postpartum hemorrhage to be leading cause of maternal mortality, total of 302 maternal deaths were recorded during the study duration. Out of these 30274 were due to postpartum hemorrhage which constituted 24.5% of maternal deaths. Uterine atony was the cause of death in 45%, rupture uterus in 32% ,genital tract tears in 14% and retained placenta in 6% of the cases of postpartum hemorrhage. Subtotal abdominal hysterectomy was performed in 51% (Fayyaz etal.2011) [30].

Furthermore study was conducted at Medical Centre, Karachi showed that the most common cause of primary postpartum hemorrhage was uterine atony in 76.9%, coagulation failure in 12.8% and placenta previa in 10.3% of cases (Shuja etal.2008) [31].

A study was conducted in Afghanistan reported that maternal mortality ratio is 1600 per 100 000 live births , one of the highest in the world. postpartum hemorrhage is the most common cause of maternal mortality, responsible for about 38% of maternal deaths. Given that only an estimated 19% of women deliver with an skill birth attendant (Sanghvi etal.2010)[32].

A study was conducted by prevention of postpartum hemorrhage Initiative (POPPHI), in Bangladesh reported that postpartum hemorrhage remains a major cause of death ,estimated 22 % of maternal deaths and about 85% of deliveries occur at home. A recent assessment found that AMTSL is practiced in only 16 percent of vaginal deliveries (Kak etal,2009)[33].

A study was conducted in India, risk factors for PPH includes ,prolonged third stage of labour, multiple pregnancy, and history of postpartum hemorrhage, uterine atony is the most common cause of PPH, followed by traumatic PPH. Pregnancies having hypertension, antepartum hemorrhage,

multiple gestation, overdistended uterus, uterine fibroids have a much higher incidence of atonic PPH.

However, PPH also occurs in women with no risk factors. At every delivery strategies for minimising the effect of postpartum hemorrhage include: Identifying and correcting anemia before delivery, being aware of mother's beliefs about blood transfusions and eliminating routine episiotomy.

Rexamination of the patient's vital signs and vaginal flow befor leaving the labour room(Bhau,Koul.2008)[34].

Furthermore, study was done for the impact of primary postpartum hemorrhage in "Near miss" morbidity and mortality in a tertiary care hospital in North India reported that blood loss more than 500 ml occurs in 40% women after vaginal delivery and more than 1000 ml in 30% women after elective cesarean section. Incidence of PPH reported as 2-4% after vaginal delivery and 6% after cesarean section with uterine atony being the cause in about 50% cases(Kaul etal.2006) [35].

In many other countries, postpartum hemorrhage accounts for more than half of the maternal deaths, rather than the quarter of maternal mortality usually cited world-wide. For example, in Indonesia it has been reported at 43%, in the Philippines at 53%, and in Guatemala at 53% .Within given countries, certain populations are also at increased risk. In Latin America, for example, the Pan American Health Organization has identified reasons why maternal mortality is higher among these populations and the reasons may be due to social and cultural causes(Lalonde etal.2006)[36].

A case-control study at Australian tertiary hospital was performed to determine the incidence of primary postpartum hemorrhage (PPH) after vaginal birth to investigate risk factors for primary PPH at this hospital . The study population comprised 125 cases and 125 controls with a primary PPH rate of 12.1 per 100 vaginal births. Risk factors on multivariate

analysis were past history of PPH, second stage labour > 60 min, forceps delivery, and retained placenta (Henry etal.2005) [37].

Data from Viet Nam. Based on the recent Maternal Mortality conducted in seven provinces by the Ministry of Health with support from the World Health Organization (WHO). Estimated that average national maternal mortality ratio (MMR) to be about 165 per 100,000 live births and 41% of maternal deaths are due to hemorrhage.

In Viet Nam a cutoff of 300 ml has been used, partly reflecting concern about widespread underestimation and also in light of the smaller size of Viet Namese women and relatively high rates of anemia among pregnant women 32%. Immediate PPH, heavy bleeding directly following childbirth or within the first 24 hours thereafter, is the most common type of PPH and can be caused by uterine atony, retained placenta, inverted or ruptured uterus, and cervical, vaginal, or perineal lacerations (Phuong,Vivien.2005)[38].

A study was conducted in Egypt reported that risk factor of primary postpartum hemorrhage was ante-partum hemoglobin, history of previous PPH, labour augmentation and prolonged labour .

The predictive probability of ante-partum and intra-partum risk factors for PPH is very low, even among women with three or more risk factors, PPH could only be predicted in 10% of the cases.

The incidence of PPH was 3.71%, history of PPH in a previous pregnancy increased the risk of PPH by almost 69 times (Prata etal.2011) [39].

Another study was carried out in Egypt reported relatively high maternal mortality ratio of 84 maternal deaths per 100,000 live births and postpartum hemorrhage is the leading factor contributing to 27% of maternal deaths(Cherine etal.2004)[40].

Data from Saudi Arabia at university hospital reported that hemorrhage was the leading cause of maternal death in 43.75% of patients, risk factors

for maternal death were maternal age in excess of 35 years, a parity of 5 or greater, and iron deficiency anemia.

The main avoidable factors were identified as the failure of patients to seek timely medical advice (Al-Suleiman etal.2004) [41].

A case-control study was conducted at King Abdulaziz Medical City, Riyadh, Saudi Arabia, included 101 patients with PPH and 209 control patients were included different risk factors for PPH were studied: high parity was associated with a 17% increased risk of PPH, risk factors in preeclampsia was associated with >6-fold increase, history of ante partum hemorrhage (APH) increased the risk for PPH by >8-fold. Other factors were: multiple pregnancy, vaginal delivery, prolonged third stage of labour, and presence of cardiotocograph abnormalities (Al-kadri.2009) [42].

Another study was done on "Near miss"obstetric morbidity in Saudi Arabia, showed that the incidence of hysterectomy was 1.22 per 1000 deliveries. Atonic postpartum hemorrhage was the most common reason, followed by ruptured uterus and placenta accrete (Nasrat etal.1999)[43].

A study was conducted in Sudan, reported that maternal mortality rates and ratios were 80.6 per 100,000 and 713 per 100,000 live births ,respectively

Sudan was one of eleven countries that are responsible for 65% of global maternal deaths according to a recent World Health Organization (WHO) estimate.This high rate of maternal mortality reflects poor maternity services, more than 75% of deaths occurred during childbirth and postpartum, which is consistent with the pattern of causes in Sub-Saharan Africa. Direct obstetric causes were responsible for 58.4% of deaths, the most common cause of maternal death was bleeding, which can kill even a healthy woman within two hours if unattended (Abdalla etal.2011) [44].

In a clinic epidemiological study of maternal deaths out of 79,981 live births at AI-Jamahiriya Hospital, Benghazi .The maternal mortality rate 17.5 per 100,000 live births , the main underlying medical causes of death

were: hypertensive disease of pregnancy 28.6% , hemorrhage 14.3% , pulmonary embolism 14.3% and brain tumor 14.3% .

A series of 117 cases of emergency obstetric hysterectomy performed, indications included ruptured uterus 53.8%, intractable postpartum hemorrhage 20.5%, placenta accrete 7.7% , major degree of placenta pervia 7.7% , hemorrhage at caesarean section 4.5% , couvelaire uterus 3.4% and abdominal pregnancy 2.6% . There were 5% maternal deaths, all due to the severity of the indication for the hysterectomy. Presence of an experienced obstetrician is important to make an early decision to operate before the patient's condition is extreme and to provide the technical skills required to minimize morbidity and mortality (Algabsi etal.2008)[(45)].

CHAPTER 3

OBJECTIVES

OBJECTIVES:

To identify and quantify the potential risk factors for primary postpartum hemorrhage in AL-jumhorya Hospital- Benghazi/2009.

CHAPTER 4

METHODOLOGY

METHODOLOGY:

A case-control study was conducted which involved 353 subjects:

Primary postpartum hemorrhage cases accounted for 153 with previously confirmed diagnosis, selected from obstetrics and gynecology department at Al-jumhorya hospital.

The controls, which accounted for 200, were selected randomly from postnatal ward in the same hospital ,controls were normal vaginal delivery without any assistant and data collected within 24 hours of delivery.

The period of data collection was during six month in the year 2009 (from April to September 2009),cases and controls were matched by age to nearest 5years. Sources of data from patient interview and records review;

Questionnaire was adopted to collect data about:

1. Socio-demographic characteristics:
   - Age of patient: from 17 years-46 years.
   - Residence of patient: Benghazi, outside Benghazi
   - Occupation of patient: Housewife, other occupation.
   - Education of patient: Low education (Illiterate, primary , preparatory) High education (secondary, university, postgraduate).
2. Obstetric history:

   Last menstrual period, expected date of delivery, date of delivery, gravidity, parity, abortion, gestational age, last childbirth.
3. Gynecological history:

   History of curettage, history of myomectomy, history previous caesarean section, history of previous postpartum hemorrhage, fibroid uterus
4. General surgery.
5. Blood transfusion.
6. Antenatal care:
   - Registration of first antenatal visit.(early, late)

- Regularity of antenatal visit.(regular, irregulars)
- Tonic supplement during antenatal visit.

7. Obstetrics complications:

   Pregnancy induced hypertension, eclampsia, placenta preivea, abruption palcenta, polyhydramnios, gestational diabetes, pre mature rupture of membrane, post term pregnancy (more than 42weeks gestation), anemia before delivery.

8. Medical diseases:

   Essential hypertension, diabetes mellitus, bronchial asthma, rheumatic diseases, thyroid diseases, heart diseases.

9. Placental characteristics:

   - Placenta previea, abruption placenta.

10. Intra partum characteristics:

    - Presentation of fetus (cephalic, breech).
    - Number of fetus (single, twins).
    - Status of fetus (alive, dead).
    - Mode of delivery: normal vaginal delivery, abnormal delivery (Instrumental delivery, caesarean section).
    - Birth weight.

11.Characteristics of postpartum hemorrhage: atonic uterus, gential trauma, retained placenta, coagulation deficit.

12. Hysterectomy.

A pilot phase was done at the beginning of the study for accuracy and reliability and completeness of questionnaire.

Inclusion criteria of case and control:

- Age 17years to 46years.
- Both from Al-jumhorya hospital.

- Both were term pregnancy after 36 weeks.
- Data available about primary post partum hemorrhage.
- Cases and controls were Libyan nationality.

Exclusion criteria of case and control:

- Preterm labour and gestational age less than 36weeks.
- Home delivery.
- secondary post partum hemorrhage.
- None Libyan patient.

Analysis:

The collected data was handled and analyzed using SPSS software version 11.5(Nixon.2003) [46].

The statistical analysis included:

Description statistics: included calculation of mean, median, mode and standard deviation for age.

Frequency and percentage were shown in tables and figures.

Inferential statistics:

1. Calculation to χ^2 for association in cross tabulation.

2. Calculation of the odd ratios (OR) and its correspondent 95% confidence interval Level of significance < 5% was adopted

3. Adjusted odd ratio where calculated for significant risk factors by logistic regression analysis and risk factors where used as dichotomous (Hosmer, Lemeshow.1989) [47].

4. Fisher exact test was also used when applicable (applicable in present study when expected frequency in cross tabulation less than five) (Chap.2003) [48]

CHAPTER 5

RESULTS

Results:

Total number of subjects in this study was **353** comprising **153** cases and **200** controls, data collected from AL-Jumhorya hospital, Benghazi/2009.

Cases and their control were selected according to predefined criteria.

Minimum age 17 years, maximum age 46years.

- The mean age for cases was 30.3 years , SD 6.2 years
- The mean age for controls was 29.2 years ,SD 6 years

Among cases of post partum hemorrhage (PPH), the most characteristic of PPH that were found in present study were:

1. Atonic uterus reported in 50.3% of cases.
2. Genital trauma reported in 32.7% of cases.
3. Retained placenta reported in 15% of cases.
4. Coagulation deficit reported in 2 % of cases.

Hysterectomy was done 2.6% of all cases.

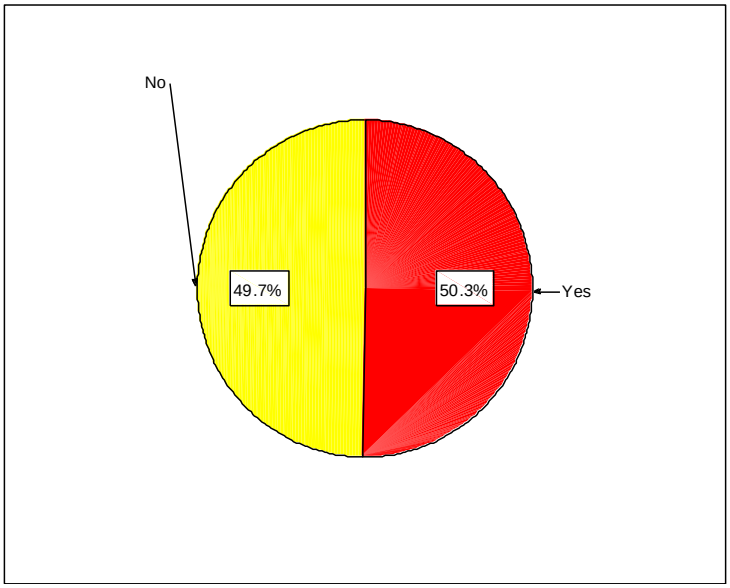


Figure (1): Frequency distribution of atonic uterus among cases of primary PPH, Benghazi/2009.

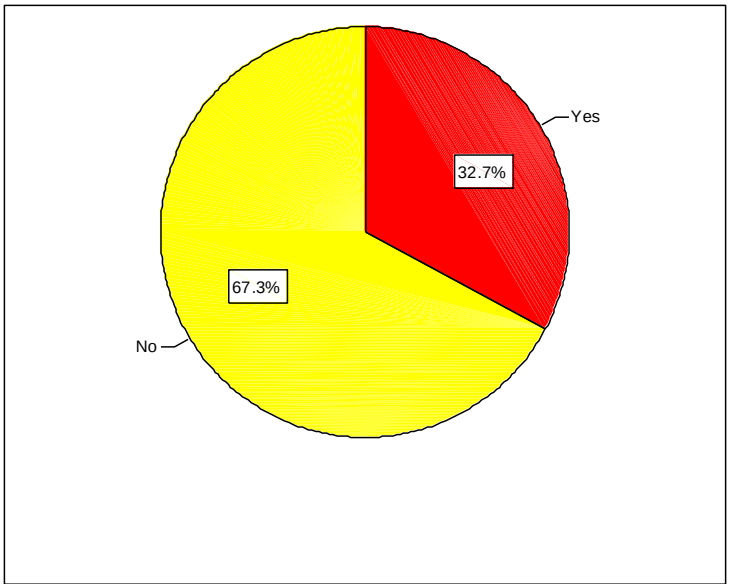


Figure (2): Frequency distribution of genital trauma among cases of primary PPH, Benghazi/2009.

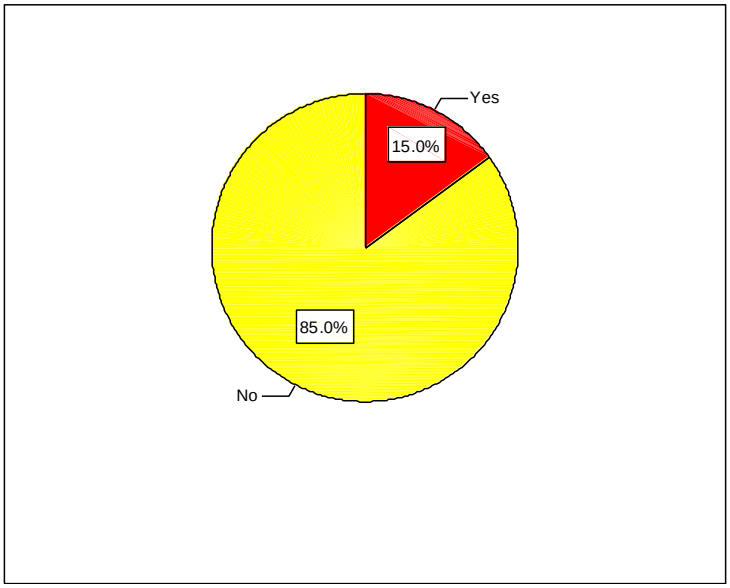


Figure (3): Frequency distribution of retained placenta among cases of primary PPH, Benghazi/2009.

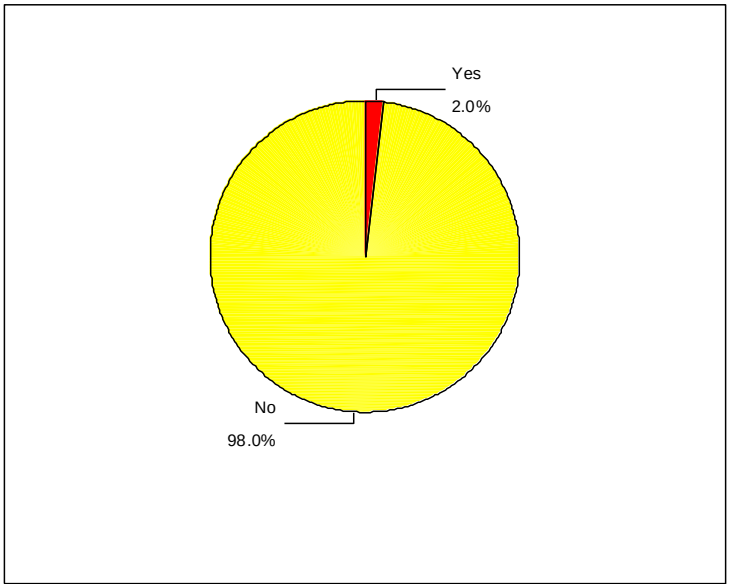


Figure (4): Frequency distribution of coagulation deficit among cases of primary PPH, Benghazi/2009**.**

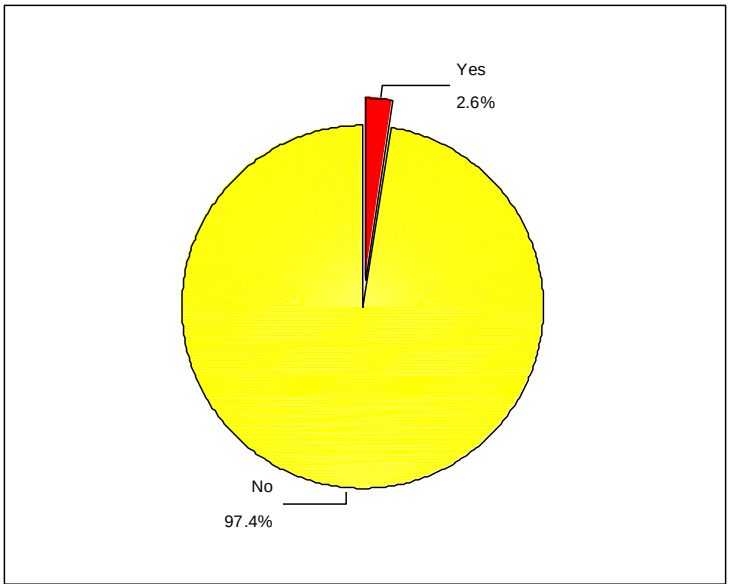


Figure (5): Distribution of hysterectomy among cases of primary PPH, Benghazi/2009**.**

Table (1) Frequency distributions of cases and controls of primary post partum hemorrhage according to socio demographic characteristics, Benghazi/2009.

	Case		Control		Total	X^2	P-value	OR+ (95% CI)
	N=153	(%)	N=200	(%)	N			
Age:								
≤25 Yrs	**28**	**(18.3)**	**53**	**(26.5)**	**81**	**4.2**	**0.2**	**NA**
26-30 Yrs	**55**	**(35.9)**	**73**	**(36.5)**	**128**			
31-35 Yrs	**35**	**(22.9)**	**38**	**(19.0)**	**73**			
≥36 Yrs	**35**	**(22.9)**	**36**	**(18.0)**	**71**			
Residence:								**1.5(0.85-2.7)**
Benghazi	**132**	**(86.3)**	**161**	**(80.5)**	**239**	**2.0**	**0.1**	
Others	**21**	**(13.7)**	**39**	**(19.5)**	**60**			
Occupation:								
House wife	**106**	**(69.3)**	**150**	**(75.0)**	**256**	**1.4**	**0.2**	**0.75(0.47-1.2)**
Others	**47**	**(30.7)**	**50**	**(25.0)**	**97**			
Education:								
Low	**42**	**(27.5)**	**54**	**(27.0)**	**96**	**0.01**	**0.9**	**1.02 (0.64-1.6)**
High	**111**	**(72.5)**	**146**	**(73.0)**	**257**			

+ ***Unadjusted Odds Ratio, NA=Not applicable***

Table (1): Represent the socio demographic characteristic both controls and cases were matched by age to nearest five years. Mean age 29.6 (18-45), median age 29 y, mode 32 y, the most of PPH cases were between age group (25-30) which represent 35.9% . Furthermore, 80.5% controls were living in Benghazi compared to 86.3% of the cases, **($\times^2$=2)**. Likewise, 75% of controls were house wife compared to 69.3% of cases, **($\times^2$=1.4).**Education level was reported equally**, ($\times^2$=0.01), OR=one.**

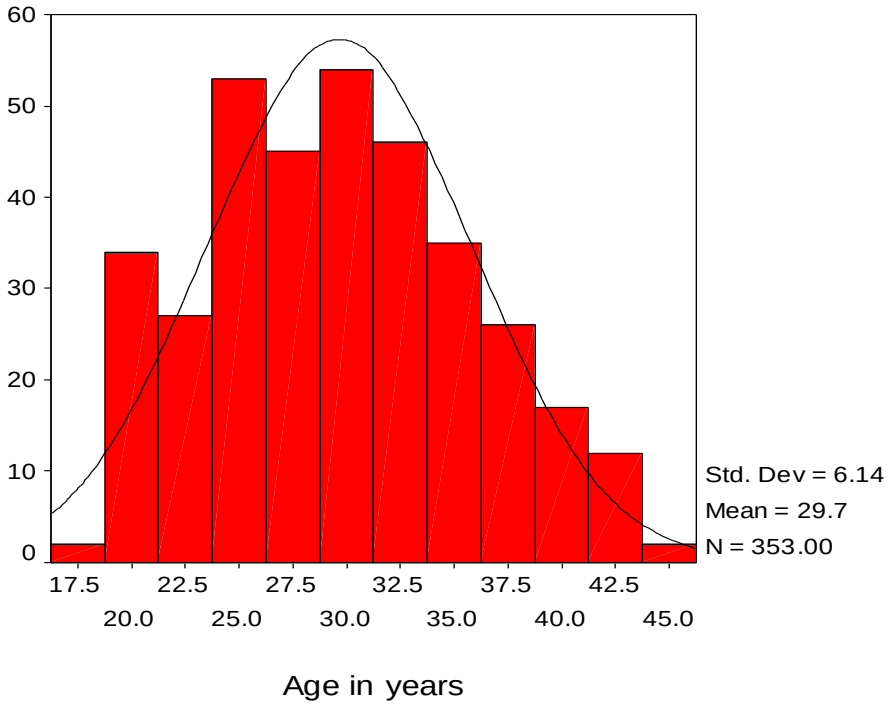


Figure (6): Frequency distribution of age among cases and controls of primary PPH، Benghazi/2009**.**

Figure (7): Frequency distribution of occupation among cases and controls of primary PPH، Benghazi/2009**.**

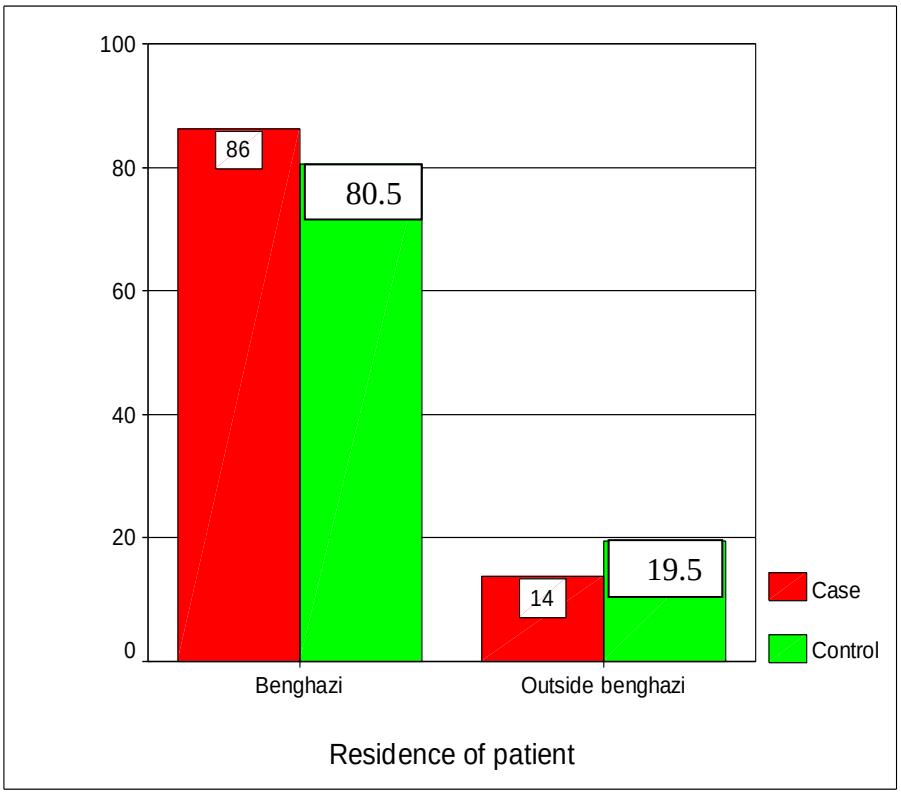


Figure (8): Frequency distribution of residence among cases and controls of primary PPH، Benghazi/2009**.**

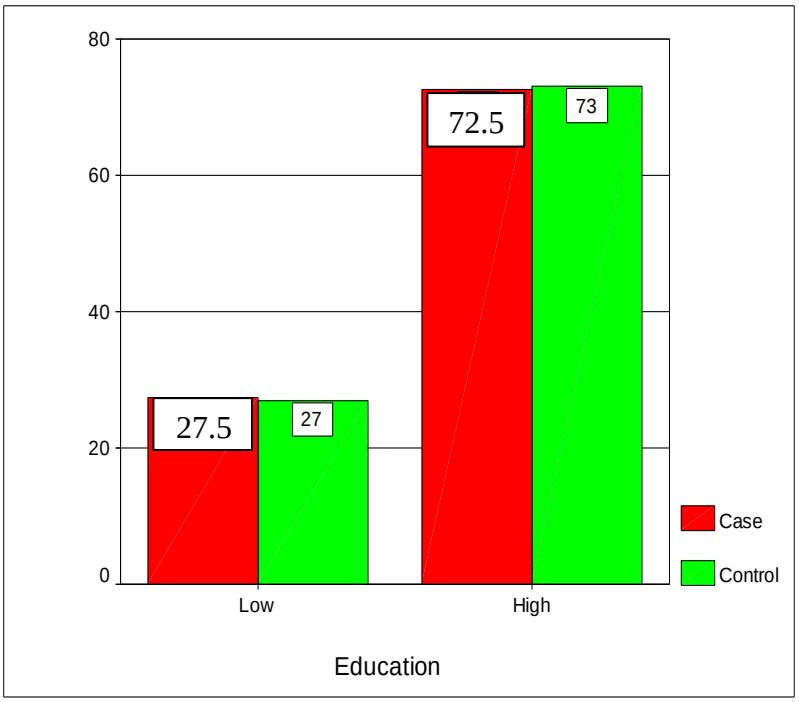


Figure (9): Frequency distribution of educational level among cases and controls of primary PPH، Benghazi/2009**.**

Table (2) Frequency distributions of cases and controls of primary post partum hemorrhage according to obstetric history, Benghazi/ 2009.

	Case N=153	(%)	Control N=200	(%)	Total N	X^2	P-value	OR+ (95% CI)
Gravidity								
≤ 3	**103**	**(67.3)**	**120**	**(60.0)**	**223**			**R**
> 3	**50**	**(32.7)**	**80**	**(40.0)**	**130**	**2.0**	**0.2**	**1.3(0.9-2.1)**
Parity								
≤3	**118**	**(77.1)**	**155**	**(77.5)**	**273**			**R**
>3	**35**	**(22.9)**	**45**	**(22.5)**	**80**	**0.01**	**0.9**	**0.9(0.6-1.6)**
Abortion								
≤3	**148**	**(96.7)**	**199**	**(99.5)**	**347**			**R**
>3	**5**	**(3.30)**	**1**	**(0.50)**	**6**	**3.9**	**.04**	**0.14 (0.02 -1.3)**
Gestational age								
Term	**115**	**(75.2)**	**146**	**(73.0)**	**261**			**R**
Post term	**38**	**(24.8)**	**54**	**(27.0)**	**92**	**0.2**	**0.6**	**1.1 (0.7 -1.8)**

+ ***Unadjusted Odds Ratio, 95% Confidence interval. R=reference.***

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Table (2) Represent obstetric history of both controls and cases, shown that 40% controls had Gravidity more three times compared to 32.7% of cases. Also 22.5% of controls had parity more than three times compared to 22.9% of cases. Furthermore, 0.5% of controls had abortion more than three times compared to 3.3% of cases. Likewise, 27% of controls had post term pregnancy compared to 24.8% of cases.

Table (3) Frequency distributions of cases and controls of primary post partum hemorrhage according to medical diseases, Benghazi/ 2009.

	Case		Control		Total	X^2	P-value	OR+ (95% CI)
	N=153	(%)	N=200	(%)	N			
Bronchial Asthma **Yes** **No**	**3** **150**	**(2.00)** **(98.0)**	**0** **200**	**(0.00)** **(100)**	**3** **350**	**FET**	**0.08**	**NA**
Diabetes Mellitus **Yes** **No**	**0** **153**	**(0.00)** **(100)**	**1** **199**	**(0.50)** **(99.5)**	**1** **352**	**FET**	**1.0**	**NA**
Thyroid Diseases **Yes** **No**	**2** **151**	**(1.30)** **(98.7)**	**2** **198**	**(1.00)** **(99.0)**	**4** **349**	**0.1**	**0.8**	**1.3(.18-9.4)** **R**
Rheumatic Diseases **Yes** **No**	**1** **152**	**(0.70)** **(99.3)**	**0** **200**	**(0.00)** **(100)**	**1** **352**	**FET**	**0.4**	**NA**
Essetional hypertension **Yes** **No**	**1** **152**	**(0.70)** **(99.3)**	**2** **198**	**(1.00)** **(99.0)**	**3** **350**	**0.12**	**0.75**	**0.6 (.06-7.3)** **R**
Heart Diseases **Yes** **No**	**2** **151**	**(1.30)** **(98.7)**	**2** **198**	**(1.00)** **(99.0)**	**4** **349**	**0.0.07**	**0.78**	**1.3(.18-9.4)** **R**

+ Unadjusted Odds Ratio, ***R =****reference*
FET*=fisher exact test,* ***NA=not applicable***

Table(3) Represent history of medical diseases in both controls and cases

Bronchial asthma, diabetes mellitus, thyroid diseases and rheumatic diseases, essential hypertension, heart diseases without statistically significance.

Table (4) Frequency distributions of cases and control group of primary post partum hemorrhage according to gynecological history, Benghazi/ 2009.

	Case N=153	(%)	Control N=200	(%)	Total N	X^2	*P-value	OR^{+} (95% CI)	OR^{++} (95% CI)
History of curettage									
Yes	**26**	**(17.0)**	**34**	**(17.0)**	**60**				**NA**
No	**127**	**(83.0)**	**166**	**(83.0)**	**293**	**0.00**	**0.9**	**0.9 (0.57-1.75) R**	
History of myomectomy									
Yes	**1**	**(0.70)**	**0**	**(0.0)**	**1**	**FET**			**NA**
No	**152**	**(99.3)**	**200**	**(100)**	**352**		**0.4**	**NA**	
History of one previous caesarean									
Yes	**21**	**(13.7)**	**6**	**(3.00)**	**27**				**4.7(1.8-12.9)**
No	**132**	**(86.3)**	**194**	**(97.0)**	**326**	**14.1**	**0.000**	**5(2.02-13.04) R**	
History of postpartum hemorrhage									
Yes	**17**	**(11.1)**	**9**	**(4.50)**	**26**				**2.5(1.0 -5.9)**
No	**136**	**(88.9)**	**191**	**(95.5)**	**327**	**5.6**	**.018**	**2.6(1.15-6.1) R**	
Fibroid uterus									
Yes	**7**	**(4.60)**	**0**	**(0.00)**	**7**			**NA**	**NA**
No	**146**	**(95.4)**	**200**	**(100)**	**346**	**FET**	**0.003**		

$^{++}$ ***Adjusted Odds Ratio*** *for age, Residence, occupation, education ,*
FET*=fisher exact test.*
****p-value*** *less than or equal to* ***0.05****, it is regarding as statistically significant.*
Odd ratio (OR) *equal to* ***one*** *indicate no difference in risk between case and control and odd ratio >* ***one*** *indicate difference in risk between case and control.*
Confidence interval (CI) *for odd ratio does not include one it statistically significant.*

Table (4) Represent gynecological history of controls and cases, history of curettage was reported equally in both controls and cases ,No controls with history myomectomy compared to 0.7% of case without significance differences.

Previous caesarean section represent 13.7% of cases compared to 3% of controls with significance difference $\times^2$ **= 14.1 , OR =5 , CI (2.02-13.04)**.

Previous post partum hemorrhage represent 11% of cases compared to 4.5% of control with significance difference $\times^2$ **= 5.6, OR =2.6, CI (1.15-6.1)** . No controls had fibroid compared to 4.6% of cases with significance difference, FET=0.003.

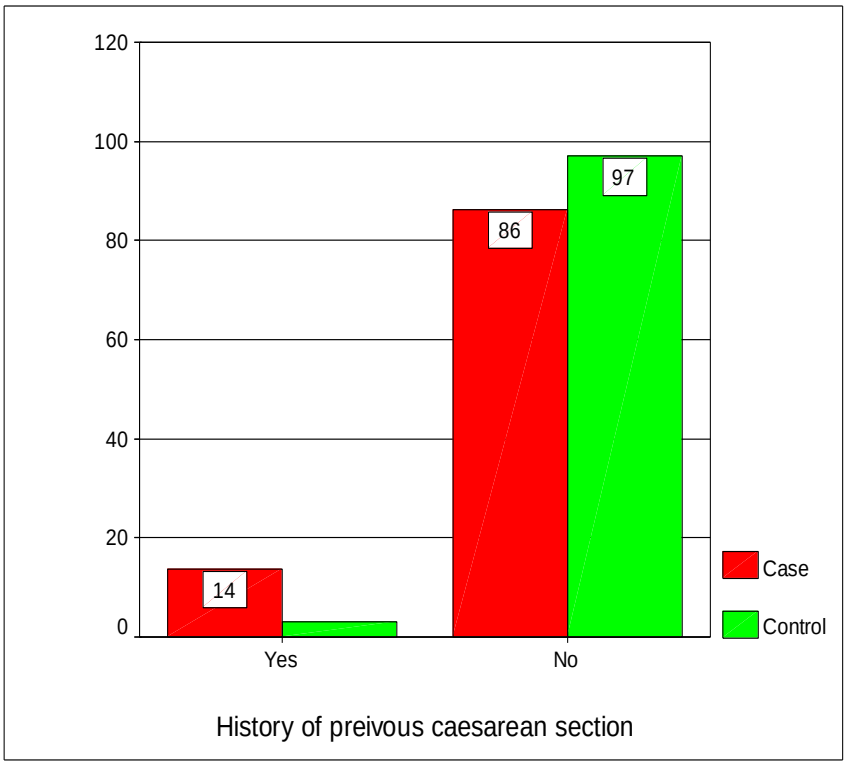

Figure (10): History of previous one caesarean section among cases and controls of primary PPH, Benghazi/2009**.**

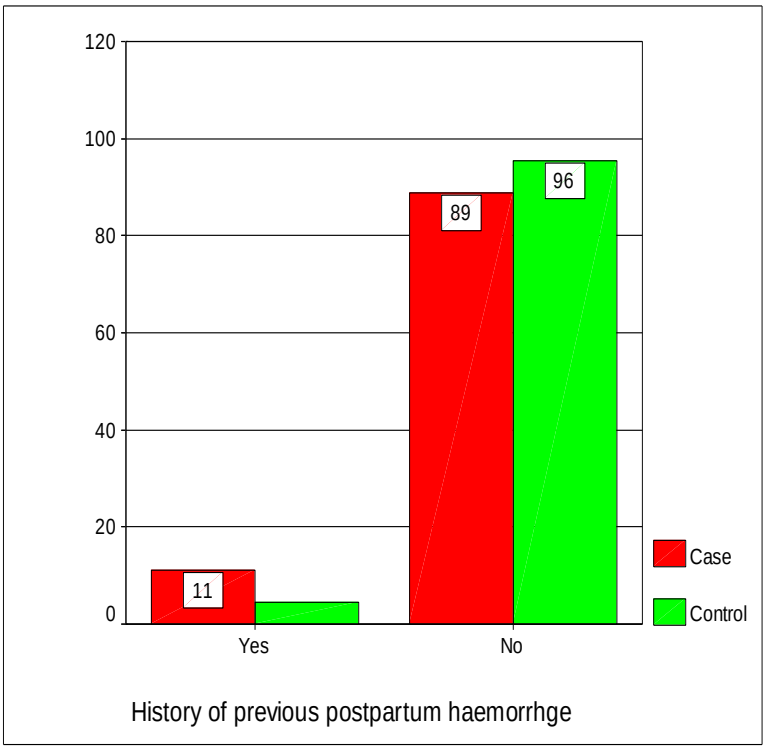

Figure (11): Frequency distribution of history of previous postpartum hemorrhage among cases and controls of primary PPH, Benghazi/2009**.**

Table (5) Frequency distributions of cases and control group of primary post partum hemorrhage according to general surgery and blood transfusion, Benghazi/ 2009.

	Case N=153	(%)	Control N=200	(%)	Total N	X^2	P-value	OR^+ (95% CI)	OR^{++} (95% CI)
General surgery									NA
Yes	15	(9.80)	17	(8.50)	32			1(0.6-2.4)	
No	138	(90.2)	183	(91.5)	321	0.18	0.7	R	
Blood transfusion after delivery									
Yes	43	(28.1)	3	(1.50)	46	54.14	.000	25.6(7.7 -84)	25.3(7.7-87)
No	110	(71.9)	197	(98.5)	307			R	

$^+$ ***Unadjusted Odds Ratio,*** $^{++}$ ***Adjusted Odds Ratio for*** *age, Residence, occupation, education.*
NA*=Not applicable.****R****=reference.*

Table(4): Represent history of general surgery and blood transfusion shows that 8.5% of controls had general surgery compared to 9.8% of cases without significance difference Furthermore,1.5% of controls had **blood transfusion after delivery** compared to 28% of cases with significance difference**,($\times^2$ =54.5) and OR =26, 95%CI (7.8-85) .**

Table (6) Frequency distributions of cases and control group of primary f post partum hemorrhage according Antenatal Care, Benghazi/2009.

	Case N=153	(%)	Control N=200	(%)	Total N	X^2	P-value	OR+ (95% CI)	OR++ (95% CI)
First antenatal visits:									
Early	**122**	**(79.7)**	**164**	**(82.0)**	**286**	**0.3**	**0.6**	**R**	**NA**
Late	**31**	**(20.3)**	**36**	**(18.0)**	**67**			**0.86 (.5 -1.5)**	
Regularity of antenatal visits:									
Irregular	**34**	**(22.2)**	**24**	**(12.0)**	**58**	**6.6**	**0.01**	**2.1(1.18-3.7)**	**2(1.16-3.7)**
Regular	**119**	**(77.8)**	**176**	**(88.0)**	**295**			**R**	
Drugs in antenatal visit:									
Yes	**132**	**(86.3)**	**181**	**(90.5)**	**313**	**1.5**	**.22**	**R**	**NA**
No	**21**	**(13.7)**	**19**	**(9.50)**	**40**			**0.65 (0.8-2.9)**	

+ ***Unadjusted Odds Ratio,*** ++ ***Adjusted Odds Ratio for*** *age, Residence, occupation, education.* ***NA****=Not applicable****.R=reference.***
Drugs in antenatal visit: like, *folic acid, ferrous tablets and vitamins.*

Table (6): demonstrates that 18% of control had late visit compared to20.3 of cases without significance difference. Furthermore 22.2%of cases had **irregular of antenatal visit** compared to12% of controls with significance difference **($\times^2$=6.6) and OR=2 ,95%CI (1.16-3.7) ,** On other hand 90.5% of controls were taking drugs at visit compared to 86.3 %of cases without significance difference.

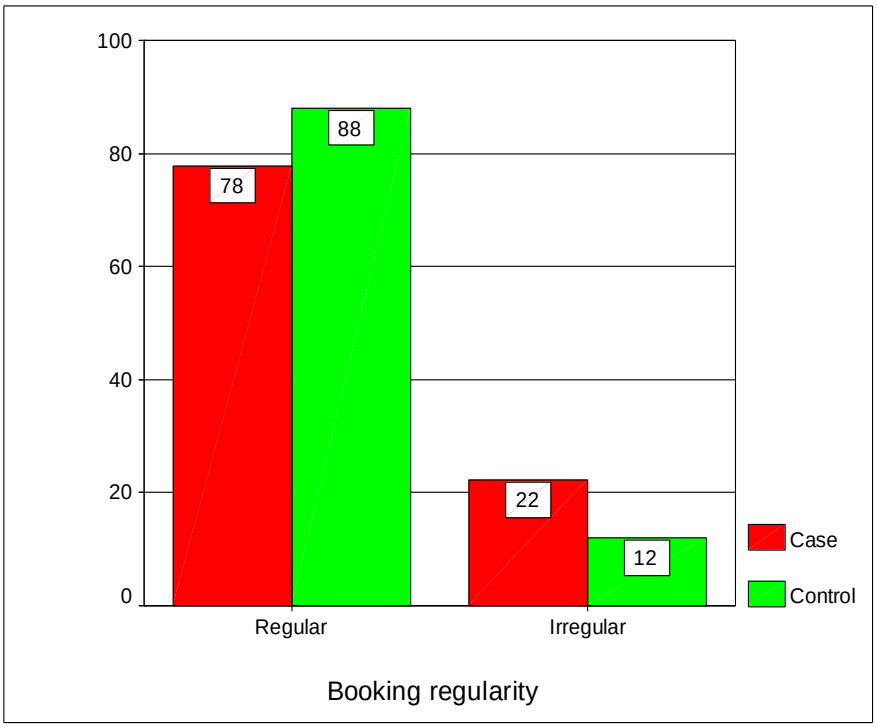

Figure (12): Regularity of antenatal visit among cases and controls of primary PPH, Benghazi/2009**.**

Table (7) Frequency distributions of cases and controls of primary post partum hemorrhage according to obstetric complication, Benghazi/ 2009.

	Case N=153	(%)	Control N=200	(%)	Total N	X^2	P-value	OR^+ (95% CI)	OR^{++} (95% CI)
Pregnancy Induced hypertension(PIH)									
Yes	**21**	**(13.7)**	**7**	**(3.50)**	**28**			**4(1.8 -10.6)**	
No	**132**	**(86.3)**	**193**	**(96.5)**	**325**	**12.4**	**.000**	**R**	**4(1.7-10.9)**
Anemia before delivery									
Yes	**47**	**(30.7)**	**25**	**(12.5)**	**72**			**3(1.8 -5.3)**	**3.1(1.7-5.4)**
No	**106**	**(69.3)**	**175**	**(87.5)**	**281**	**17.7**	**.000**	**R**	
Premature rupture membrane									
Yes	**1**	**(0.70)**	**2**	**(1.00)**	**3**			**0.65(.04-7.3)**	**NA**
No	**152**	**(99.3)**	**198**	**(99.0)**	**350**	**.59**	**.44**	**R**	
Poly hydramions									
Yes	**3**	**(2.00)**	**1**	**(0.50)**	**4**			**3.9(.41-38.6)**	**NA**
No	**150**	**(98.0)**	**199**	**(99.5)**	**349**	**1.7**	**.19**	**R**	

$^+$ ***Unadjusted Odds Ratio***, $^{++}$ ***Adjusted Odds Ratio for*** *age, Residence, occupation, education.* ***NA****=Not applicable* .***R*****=***reference.*

Table (7): Represent obstetric complication for both controls and cases,shown that 3.5% of controls had **pregnancy Induced hypertension** compared to 13.7% of cases with significance difference **($\times^2$=12.4) and OR=4, 95%CI (1.8-10.6)** .

Anemia represent 12.5% of controls compared to 30.7% of cases with significance difference **($\times^2$=17.7) and OR=3 , 95% CI (1.8-5.3)**. Premature rupture membrane and polyhydromnios for both groups not statistically significant.

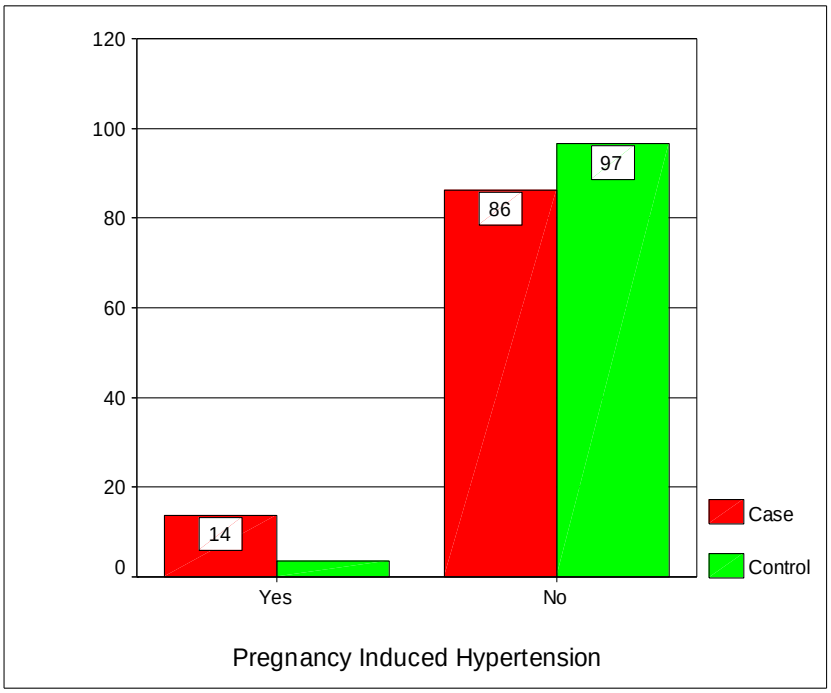

Figure (13): Distribution of pregnancy induced hypertension among cases and controls of primary PPH, Benghazi/2009**.**

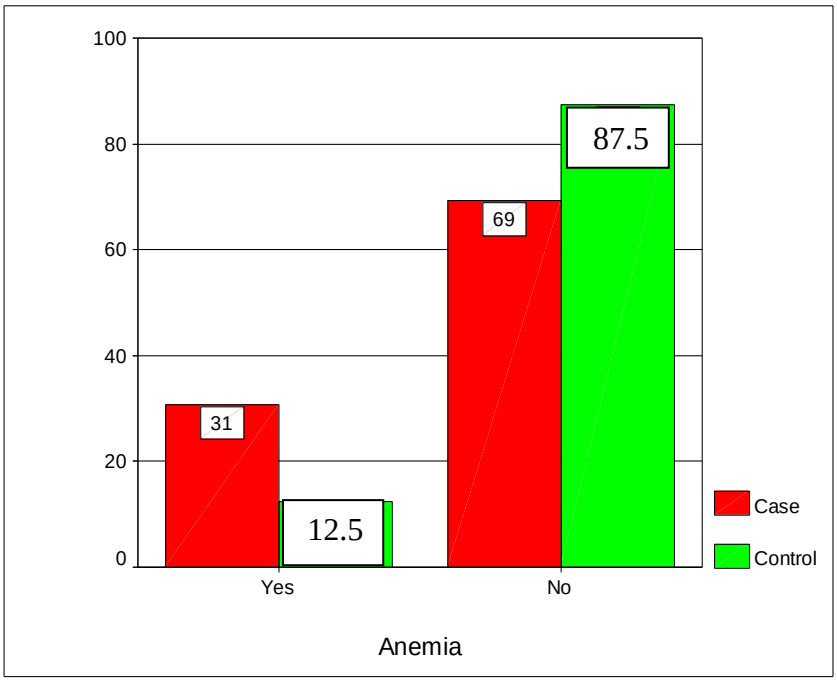

Figure (14): Distribution of anemia among cases and controls of primary PPH, Benghazi/2009**.**

Table (8) Frequency distributions of cases and controls of primary post partum hemorrhage according placenta characteristics, Benghazi/ 2009.

	Case		Control		Total	X^2	P-value	OR+ (95% CI)
	N=153	(%)	N=200	(%)	N			
Placenta Preiva								
Yes	**6**	**(3.90)**	**0**	**(0.00)**	**6**			
No	**147**	**(96.1)**	**200**	**(100.)**	**347**	**FET**	**0.006**	**NA**
Abruption Placenta								
Yes	**10**	**(6.50)**	**0**	**(0.00)**	**10**	**FET**	**0.000**	**NA**
No	**143**	**(93.5)**	**200**	**(100.)**	**343**			

+ *Unadjusted Odds Ratio**, FET=**Fisher exact test**. NA=**Not applicable*..

Table (8): No control had placenta preivea compared to 3.9% of cases with significance difference **FET=0.006.**
Likewise, abruption placenta represent 6.5% of cases with significance difference **FET=0.000.**

Table (9) Frequency distributions of cases and controls of primary post partum hemorrhage according to Intra partum characteristics, Benghazi/2009.

	Case N=153	(%)	Control N=200	(%)	Total N	X^2	P-value	OR+ (95% CI)
Presentation								
Cephalic	**149**	**(97.4)**	**199**	**(99.5)**	**348**			**R**
Breech	**4**	**(2.60)**	**1**	**(0.50)**	**5**	**2.8**	**0.09**	**0.18 (.02-1.7)**
Number of fetus								
Single								**R**
Twins	**151** **2**	**(98.7)** **(1 .30)**	**196** **4**	**(98.0)** **(2.00)**	**347** **6**	**0.25**	**0.6**	**1.5(.27 -8.52)**
Status of fetus								
Alive	**146**	**(95.4)**	**199**	**(99.5)**	**345**			**R**
Dead	**7**	**(4.60)**	**1**	**(0.50)**	**8**	**6.5**	**0.01**	**0.1(0.01-0.86)**
Normal delivery								
Yes	**105**	**(68.6)**	**200**	**(100)**	**305**	**FET**	**0.000**	
No	**48**	**(31.4)**	**0**	**(0.00)**	**48**			
Instrumental								
Yes	**10**	**(6.50)**	**0**	**(0.00)**	**10**	**FET**	**0.000**	
No	**143**	**(93.5)**	**200**	**(100)**	**343**			
Caesarean section								
Yes	**38**	**(24.8)**	**0**	**(0.00)**	**38**	**FET**	**0.000**	
No	**115**	**(75.2)**	**200**	**(100)**	**315**			
Birth weight								
≤ 3.5 Kg	**96**	**(62.7)**	**140**	**(70.0)**	**236**			**R**
> 3.5 Kg	**57**	**(37.3)**	**60**	**(30.0)**	**117**	**2.05**	**0.15**	**0.7(.46 -1.13)**

Table (9) Represent Intra partum characteristics of controls and cases ,shows that 0.5% of controls had breech presentation compared to 2.6% of cases. Similarly, 2% of controls were twins pregnancy compared to 1.3% of cases without significance difference. Likewise 0.5% of controls has dead fetus compared to 4.6% of cases. All controls were normal delivery compared to 68.6% of case with significance difference FET=0.000, no controls with instrumental or caesarean delivery compared to 6.5% and 24.8 % of cases was instrumental and caesarean delivery respectively with significance difference FET=0.000 .Likewise, 30% of controls had birth weight more than 3.5Kg compared to 37.3% of cases without significance difference.

CHAPTER 6

DISCUSSION

Discussion:

Among 153 cases of primary postpartum hemorrhage, the present study initially found the most reported causes of PPH was uterine atony which represented 50 .3% of cases followed by genital trauma in 32.7%, Retained placenta in 15% and 2% represented coagulation deficit, hysterectomy was performed in 2.6% of cases.

This was comparable to a study done in Pakistan among 118 patients uterine atony was reported in 64.4% and genital trauma in 34.7%, retained placenta in 7.6% and 3.3 % had coagulation deficit, hysterectomy represented 3.3 % of cases (Farhana,Gulfareen.2009) [49].

Likewise approximate findings were reported from Ayub Teaching Hospital which included 50 cases showed that the major causes of postpartum hemorrhage were uterine atony found in 58% of cases, followed by cervical, vaginal and perineal tears in 24% of cases, while hysterectomy was performed in 20% of cases (Humaira etal.2008)[50].

Furthermore, a study was conducted in Peshawar , reported that most causes of postpartum hemorrhage were uterine atony in 41.3 %, genital tract injuries in 32 % , retained Placenta in10.6% and 4 % due to coagulation abnormality(Shaheen,Hassan.2007)[51].

Consistent finding from retrospective study done in Canada, reported that recent increase in hysterectomy and blood transfusion, this can be explained by increase frequency and severity of atonic postpartum hemorrhage (Joseph etal.2007)[52].

Similar finding was approved by study carried out in United state reported that postpartum hemorrhage has higher rate among obstetrical trauma and no associated risk factors for postpartum hemorrhage in relation to patient characteristics in agreement with our finding (Michael etal.2005)[53].

Study was conducted in the United States reported that postpartum hemorrhage is relatively common complication of delivery , uterine atony resulting in transfusion often occurs in the absence of recognized risk factors and accounted for 79% of the cases of PPH, the overall rate of PPH increased, primarily because of an increase in the incidence of uterine atony; the rates of PPH from other causes including retained placenta and coagulopathy remained relatively stable , others risk factor for postpartum hemorrhage was cesarean delivery, hypertensive diseases of pregnancy and antepartum hemorrhage (Bateman etal.2010)[54] .

The present study showed that no association risk between gravidity, parity, gestational age and birth weight in relation to postpartum hemorrhage.

Comparable finding was approved by case control study done in university of California, San Francisco (Combs etal.1999) [55].

The present study also reported that primipara and multipara was not associated with increased risk of postpartum hemorrhage ,in agreement with study done in Jordan University (Abu-Heija,Chalabi.1998) [56].

This observation was also confirmed in Australian study which reported that no association between grand multiparty and postpartum hemorrhage (Humphrey.2003)[57].

Recent study done in a Latin-Americans reported that multiparity and a low birth weight baby, were found to be protective factors for postpartum hemorrhage, multiparity has been cited in many studies as an important risk factor and it has been used as an important clinical marker for primary postpartum hemorrhage by practitioners. Effect of this variable could not be confirmed because the difference may be due to the cut off level for parity or grand multiparity (Sosa etal.2009) [58].

In contrast to this study ,a case control study was performed in Nigeria , demonstrated that postpartum hemorrhage occurred more in the primipara and grand-multipara compared with the control. (Adetoro.1992) [59].

In the present study, 13.7% of cases had pregnancy induced hypertension (PIH) compared to 3.5% of the controls, with significant association increased risk of postpartum hemorrhage .This was comparable with study performed in California(Combs etal.1991)[60].

Consistent finding also with study done in Thailand reported that pregnancy induced hypertension was significant risk factor for primary postpartum hemorrhage(Wibool etal.2009)[61].

Furthermore,similar finding were also approved by study in birth registry of Norway reported that pregnancy induced hypertension is important significant risk factor for postpartum hemorrhage (Eskild,Vatten.2009) [62].

The present study demonstrated that no associated risk of postpartum hemorrhage in relation to medical diseases ,this on controversy with study done in Canada reported that increased risk of postpartum hemorrhage in asthmatic women, independent of medication usage this could be explained by complications of steroid use that lead to pregnancy-induced hypertension (Alexander etal.1998)[63].

In present study, 30.7% of cases presented with anemia before delivery compared to 12.5% of control, with significant association increased risk of postpartum hemorrhage.

A study conducted in France demonstrated that anemia before delivery increase risk of postpartum hemorrhage (Descargues etal.2001)[64].

Comparable result with study done in Mulago, Uganda reported that anemia important risk factor for postpartum hemorrhage (Wandabwa etal.2008) [65].

Likewise, similar finding also approved by retrospective study done in Nigeria (Ijaiy etal.2003) [66].

The present study, reported that 22% of cases were_irregular visits during antenatal care compared to12% of control, with significant association increased risk of postpartum hemorrhage.Cases with irregular visit during antenatal care carries more risk to developed postpartum hemorrhage, this

could be explained by poor management of anemia, pregnancy induced hypertension and delay of antenatal diagnosis of many complication occur during pregnancy. Comparable finding with study done in Nigeria reported that postpartum hemorrhage more common in unbooked patients than in booked patients (Owolabi etal.2008)[67].

Consistent finding with study provided by the WHO reported that antenatal care could be predicted risk factors for postpartum hemorrhage such as preeclampsia ,previous postpartum hemorrhage and multiple gestation (Carroli etal.2001)[68].

A study done in Pakistan reported that lack of antenatal care and anemia during pregnancy increase risk of postpartum hemorrhage (Siddique etal.2010) [69].

In present study, 11% of cases had previous postpartum hemorrhage compared to 4.5% of controls, women with previous PPH had 2.6 times to Developed primary postpartum hemorrhage.

This was comparable with study done in Sydney demonstrated that previous postpartum hemorrhage increase risk of recurrence of PPH in subsequent pregnancy (Fordetal.2007)[70]

Postpartum hemorrhage in a previous pregnancy is one of the greatest risk factors for recurrent PPH. A physiologic explanation for this association is not known, but recurrent risk factors such as a retained placenta or underlying medical disorders may account for the majority of recurrent PPH cases (Kominiarek, Kilpatrick.2007)[71].

In present study, 13.7% of cases had previous caesarean section compared to 3% of controls with significant association with postpartum hemorrhage

Retrospective study in Pakistan identified the most common risk factor for primary postpartum hemorrhage was previous postpartum hemorrhage and previous delivery by caesarean section (Shamshad etal.2007) [72].

A study done in Saudi Arabia reported that previous caesarean section Frequently associated with significant blood loss, this can be explained by High incidence of placenta previa and accrete due to abnormal placentation in patient with repeat cesarean delivery (Tarik,Yamani.2003) [73].

Similar finding with study done in United states demonstrated that previous caesarean section increase recurrence of placenta previa and placental abruption in subsequent pregnancies lead to increase risk of postpartum hemorrhage (Lydon-Rochelle etal .2001)[74].

Comparable finding with study done in Norway (Daltvit etal.2008) [75].

The present study approved that there is a significant relationship between placenta previa ,abruption placenta , uterine fibroid and increased risk of postpartum hemorrhage .This was comparable with study done in Australia reported that placenta previa ,abruption placenta and uterine fibroid as independent risk factors for PPH (Magann etal.2005)[76].

Data from the present study demonstrated their no association found between multiple pregnancies (twins) and increase risk of postpartum hemorrhage, were study done in Norway reported that multiple pregnancy associated with increased risk of postpartum hemorrhage and observed rise in postpartum hemorrhage may contribute to increasing the rate of multiple pregnancy (Al-Zirqi etal.2008)[77].

The present study demonstrated that increased in blood transfusions, 28% of cases compared to 1.5% of controls. Recent study done in the United States 2009, showed that positive relationship between severe obstetric morbidity and the use of blood transfusions and procedures to control bleeding have been used as markers of the severity of postpartum hemorrhage and to identify women with severe pregnancy morbidity (Kuklina etal.2009)[78].

In Australia, Scotland and the USA, increases in the reported rates of blood transfusions have been almost entirely due to reported increases in complications of childbirth and severe obstetric hemorrhage.

In these countries it appears that, not only postpartum hemorrhage rates increasing but so is the hemorrhage severity. In contrast, study done in Canada shown rates of severe maternal morbidity remained constant between (1991 – 2000) and stable rates of transfusion.

International differences may reflect differing attitudes among obstetricians about blood transfusions (Roberts etal.2009) [79].

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CHAPTER 7

CONCULSION

Conclusion:

From the present study the most frequent characteristic of primary postpartum hemorrhage found were: Atonic uterus in 50.3% of cases, genital trauma in 32.7% of cases, retained placenta in 15% of cases and coagulation deficit in 2 % of cases.

The main potential significant risk factors for primary postpartum hemorrhage are: history of previous caesarean OR (5), pregnancy induced hypertension OR (4), anemia before delivery OR (3.1), previous post partum hemorrhage OR (2.5) and irregularity of antenatal visit OR (2.1). All are modifiable risk factors that allow minimize of primary postpartum hemorrhage except previous caesarean and previous PPH

Others potential significant risk factors found in the present study were: fibroid uterus , placenta preiva and abruption placenta.

Others risk factors like gravidity, parity, post term pregnancy,brith weight were not proved as significant risk factors in the present study.

CHAPTER 8
RECOMMENDATION

RECOMMENDATION*:*

This study created the following recommendations:

1. National well designed ,large, multi centric studies are recommended for broader interpretation.

2. Education programmes focusing on the modifiable risk factors are required in particular about improvements of maternal child health services (MCH) including health education and promotion of regular visit during antenatal care, management of anemia before delivery, management of pregnancy-induced hypertension, this requires short time and little costs.

3. Guidelines and protocols for early diagnosis of patients at risk for postpartum hemorrhage.

4.Active management of third stage of labour should be offered by skilled birth attendants to all women.

5.Available Safety team from obstetrics, anesthesiology, neonatology and the blood Bank.

6.Estimation of blood loss should use standardized method to allow diagnosis of PPH and blood loss must be routinely quantified during management of third stage of labour with training courses on accurate and standardized of estimating blood loss for all birth attendants.

7.Equipped operating room for patients with suspected placenta previa, accrete and caesarean delivery under the direction of senior gynecologic surgeons are necessary.

8.Decision of hysterectomy should be critically analyzed in younger females, newer surgical procedures like uterine temponade, uterine compression suture are effective in patients who desire future fertility.

9.Blood transfusions are essential and are restricted to those in real need.

10.Psychological support is very important to minimize fear and anxiety.

CHAPTER 9

LIMITATION

Limitation:

1. Incomplete medical files.
2. Visual estimation of blood loss was the most frequent method used to diagnosis of PPH.
3. Disorganization of PPH cases in hospital word (no separate unit for management of PPH cases).

CHAPTER 10

SUMMARY

Risk Factors for Post partum Hemorrhage : A case control study at Aljamhoria Hospital Benghazi /2009

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Introduction: Primary post partum hemorrhage, PPH is defined as blood loss of 500 ml blood from the genital tract within the first 24hours following vaginal delivery.

Post partum hemorrhage is one the most important medical condition that is responsible for considerable morbidity and mortality among women at the reproductive age.

Objective: to identify and quantify risk factors for primary post partum hemorrhage in Benghazi during 2009.

Material and Methods: A hospital based case control was conducted included 353 subjects; 153 cases and 200 controls matched by age to nearest five years.

Results: The most frequent characteristic of PPH were: Atonic uterus reported in 50.3% of cases, genital trauma in 32.7% of cases, retained placenta in 15% of cases and coagulation deficit in 2 % of cases. Significant risk factors for PPH were: previous caesarean section with OR 5, pregnancy induced hypertension with OR 4, anemia before delivery with OR 3, previous PPH OR 2.6, and irregularity of antenatal visit with OR 2.

Discussion and conclusion: in this study the significant risk factors are comparable with other studies conducted in different centers from different countries in spite of the innate limitations of hospital based case control studies and it is concluded that larger studies are recommended for more elaboration of the magnitude of risk factors proved by this data set as well as broader clarification of potential significance of other risk factors with subsequent writing done guideline for a unified protocol a unified steps to control postpartum hemorrhage in our local community.

CHAPTER 11

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APPENDIX

QUESTIONAIRE ON RISK FACTORS FOR PRIMARY POSTPARTUM HAEMORRHAGE

1) Socio-demographic characteristics:

- Age:
- Residence:
- Occupation:
- Education:

Low education **(A**. Illiterate ☐ **B**. Primary ☐ **C**. Preparatory ☐ **)**

High education **(D**.Secondary☐ **E**. University ☐ **F**. Higher ☐ **)**

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2) Obstetric history:

Last menstrual period……..expected date of delivery……date of delivery……

Gravid:…….Para:…….Abortion:……..

Gestational age…..…Last child birth:……

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3)Gynecological history:

- History of curettage Yes ☐ , No ☐
- History of myomectomy Yes ☐ , No ☐
- History previous caesarean section Yes ☐ , No ☐
- History of previous postpartum hemorrhage Yes ☐ , No ☐
- Fibroid uterus Yes ☐ , No ☐

4) General surgery: Yes ☐ , No ☐

5) blood transfusion: Yes ☐ , No ☐

6) Antenatal care:

- Registration at:…….. Weeks. (early…….late……..)
- Regularity of visit: (regular…….irregular……)
- Tonic supplement during antenatal visit: Yes ☐ , No ☐

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7) Obstetrics complications:

- Pregnancy induced hypertension Yes ☐ , No ☐
- Placenta preivea Yes ☐ , No ☐
- Abruption palcenta Yes ☐ , No ☐
- Polyhydramnios Yes ☐ , No ☐
- Gestational diabetes Yes ☐ , No ☐
- Pre mature rupture of membrane Yes ☐ , No ☐
- Post term pregnancy (more > 42weeks gestation) Yes ☐ , No ☐
- Anemia before delivery Yes ☐ , No ☐

8) Medical diseases:

- Hypertension Yes ☐, No ☐
- Heart disease. Yes ☐ , No ☐
- Diabetes Yes ☐ , No ☐
- Bronchial Asthma Yes ☐ , No ☐
- Anemia Yes ☐ , No ☐
- Urinary Tract Infection Yes ☐ No ☐
- Epilepsy Yes ☐ No ☐
- Rheumatic diseases Yes ☐ No ☐
- Thyroid diseases Yes ☐ No ☐

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9) Placental characteristics:

- Placenta previea Yes ☐ No ☐
- Abrruption placenta Yes ☐ No ☐

10) Intra partum characteristics:

- Presentation of fetus (cephalic……breech……..).
- Number of fetus (single.....twins……).
- Status of fetus
- (alive……dead……).
- Mode of delivery:

Normal vaginal delivery Yes □, No □

Instrumental delivery Yes □, No □

Caesarean section Yes□, No □

- Birth weight……

11) Characteristics of postpartum hemorrhage:

- Atonic uterus □
- Gential trauma □
- Retained placenta □
- Coagulation deficit□

12) Hysterectomy Yes □ No □

الملخص العربى :عوامل الاحتطار لنزيف مابعد الولادة

المقدمة : يعتبر نزيف مابعد الولادة من أهم أسباب الوفاة عند الحوامل أثناء الولادة

أهداف الدراسة:

يتركز هدف الدراسة حول معرفة نوع وكمية عوامل الاختطار بين حالات الولادة ومقارنتها مع الضابطه .

المواد والطرق:أجريت دراسة الحاله الضابطة،فى بنغازى خلال فترة ستة أشهر سنة 2009.وتم أخد البيانات من مستشفى الجمهورية (قسم النساء و الولادة) –

وشمل العدد الكلى لعينة الدراسة 353 حالة.

وتم أخذ عينة للحالآت نزيف مابعد الولا دة شملت 153 حالة .وتم أخد الضابطة من نفس المستشفى بعد المطابقة بالعمر مع الحالات وشملت العدد 200من الضابطة.

النتائج:بعد دراسة الحالات وتحليل بياناتها إحصائياً وتطبيق الاختيارت اللازمة تم التوصيل للنتائج التالية:

أهم أسباب نزيف مابعد الولادة هى:

- عدم أنقباض الرحم بنسبة 50.3 %.
- التمزقات القناة التناسيلية بنسبة 32.7%.
- بقاء المشيمة داخل الرحم بنسبة 15% .
- نتيجة خلل فى التجلط بنسبة 2%.

أهم عوامل الاختطارفى الدراسة هى:

1. أجراء عمليات قيصرية سابقة لدى الام يزيد خطر5 مرات مقارنة بعدم أجراها .
2. أرتفاع ضغط الحمل لدى الام يزيد الخطر 4 مرات مقارنة بعدمأرتفاع الضغط.
3. الحوامل التى تعانى من فقر الدم يزيد لديها الخطر 3 مرات مقارنة بعدم وجود فقر الدم .
4. عدم أنتظام المتابعة أثناء فترة الحمل يشكل زيادة الخطر مرتين بمقارنة بأنتظام المتابعة.
5. عوامل الاختطار أخرى وجدت فى الدراسة وهى تاريخ سابق للنزيف مابعد الولادة ، وجود المشيمة فى أسفل الرحم، أنفصال فى المشيمة، وجود ورم ليفى داخل الرحم.

التوصيات : توصى الدراسة بالآتى

1. عمل برنامج تثقيفي عام في مؤسسات الرعاية الصحية الأولية يتوكز على عوامل الاختطار التي يمكن تغييرها مثل انتظام المتابعة أثناء فترة الحمل ، علاج حالات فقر الدم ، علاج حالات أرتفاع ضغط الدم أثناء الحمل .
2. تكوين فريق عمل للعلاج حالات نزيف ما بعد الولادة وتوحيد الآدوار بين العاملين في القسم .
3. تحسين عملية تشخيص نزيف ما بعد الولادة بتحديد كمية الدم المفقودة بطريقة القياس الكمى الدقيق باستحدام الادوات الخاصة بذلك وعدم الاعتماد على القياس بالنظر فقط.
4. تجهيز غرفة عمليات خاصة بحالات النزيف و التعامل مع ما يستجد من مضاعفات مع توفير بنك الدم داخل القسم.

عوامل الاختطار لنزيف ما بعد الولادة: مستشفى الجمهورية بنغازى 2009.

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