

**MAGNITUDE, RISK FACTORS AND OUTCOMES OF POSTPARTUM
HEMORRHAGE AT NEKEMTE REFERRAL HOSPITAL OROMIA
REGIONAL STATE, WEST ETHIOPIA.**



BY:

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JIMMA, ETHIOPIA

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Abstract

Background: Postpartum Hemorrhage (PPH) is among the leading cause of maternal death in developing countries and result from problems during the immediate after birth of the neonate. Postpartum Hemorrhage is unpredictable and rapid cause of maternal death worldwide. Seventy to ninety percent of immediate Postpartum Hemorrhage is attributed to uterine atony.

Objective: To determine the magnitude, risk factors and management outcome of Postpartum Hemorrhage at Nekemte referral Hospital, 2014/15

Method: Hospital based case control study design was used to include 3,400 mothers who gave birth during the study period. Data was collected using data collection checklists from logbook and patient folder by trained data collectors. The collected data was cleaned and entered and analyzed using SPSS Version 22 computer software. The results were presented by tables, diagrams, charts and text as appropriate.

Result: About 93.6% of mothers were gave birth at the health facility. The magnitude of PPH was 2.5%. Factors like age (AOR, 7.83; 95%CI: 1.78-34.57), parity (AOR, 0.37; 95%CI: 0.17-0.8) , place of delivery (AOR, 39 ; 95%CI10.10-146.94:), route of delivery(AOR, 2.00; 95%CI: 0.84-4.60) and presence of antenatal and intra-partum risk factors(AOR, 2.53 ;95%CI:1.16-5.50) and (AOR, 0.20 ; 95%CI: 0.07-0.60), respectively, are associated with PPH. From the total, about 4.7% of cases were died in the courses of their treatment.

Conclusion: Majority of deliveries were done in health facility. The prevalence of PPH was 2.5%. Multiparity was the major antenatal risk factor that contributes to PPH while, prolonged labor was the major intra-natal risk factor and 4.7% of mothers who were admitted with PPH were died during the study period.

Recommendations: Risk factors for developing PPH found in this study are all preventable and urgent attention should given for improving the quality of maternal health service; scaling up evidence based interventions; and measuring progress.

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Abbreviation

AMTSL	Active Management of the Third Stage of Labor
APH	Ante partum Hemorrhage
CCT	Controlled Cord Traction
C/S	Caesarean Section
ICAP	International Centers for AIDS Care and Treatment programme.
IESO	Integrated Emergency Surgery and Obstetrics
MDG	Millennium Development Goal
MOH	Ministry Of Health
PPH	Postpartum Hemorrhage
SVD	Spontaneous Vaginal Delivery
TAH	Total Abdominal Hysterectomy
VD	Vaginal Delivery
WHO	World Health Organization

CHAPTER ONE

Introduction

Globally it is estimated that half a million women die annually from cause related to pregnancy and childbirth and that half of these deaths are related to obstetrics hemorrhage [1]. In 2015, the maternal mortality ratio (MMR) –defined as the number of maternal deaths per 100 000 live births – was estimated at 216 globally. This translates into approximately 830 women dying every single day due to the complications of pregnancy and childbirth. Almost all of these deaths occurred in low-resource settings, and most could have been prevented. The WHO African Region bore the highest burden with almost two thirds of global maternal deaths occurring in the region [2].

Death as a result of pregnancy remains the chief cause of premature mortality worldwide. Every year, 536,000 women and girls die as a result of complications during pregnancy, childbirth or puerperal period. This amounts to one death every minute with an estimated quarter of these deaths occurring as a consequence of hemorrhage [3].

Postpartum hemorrhage (PPH) is a major cause of maternal morbidity and mortality worldwide. The traditional definition of PPH used in most textbooks is sequence of hemorrhage (World Health Organization, excessive bleeding from the genital tract after delivery of a child and it could be primary or secondary. It is primary when there is a blood loss of 500 ml or more within the first twenty four hours after child birth and secondary if the excessive loss of blood occurred at any time after first day to 42 days of puerperium [4].

A population-based research study conducted in Bangladesh reported PPH as 6% of total maternal morbidities. [5] In a two-year longitudinal census in West Africa, the estimated postpartum morbidities through PPH were 28%. [6] A community-based survey in India has estimated that of the 560/100,000 live births PPH accounted for 35–56% of the deaths [7]. A study conducted in Pakistan revealed prevalence of PPH as 34% [8].

During the course of the MDG era the global MMR declined by 44% – equating to an average annual reduction of 2.3% between 1990 and 2015. Accelerated progress is now needed as achieving the SDG Target 3.1 will require a global annual rate of reduction of at least 7.3%.

Countries with an MMR of less than 432 deaths per 100 000 live births in 2015 will need to achieve an annual continuous rate of reduction of 7.5% [2].

Statement of the problem

In low-income countries, postpartum hemorrhage is a major cause of maternal death and arguably the most preventable. Management strategies in developed countries involve crystalloid fluid replacement, blood transfusions, and surgery. These definitive therapies are often not accessible in developing countries. Long transports from home or primary health care facilities, lack of skilled providers, and lack of intravenous fluids and/or a safe blood supply often create long delays in instituting appropriate treatment.

The lack of skilled attendants at delivery who can provide even the minimum of care, long transport times to facilities that can manage uterine atony or severe lacerations of the genital tract and unattended obstructed labor leading to a ruptured uterus conspire to elevate PPH to its position as the number one killer of women during child birth.

These structural factors are exacerbated by the prevalence of anemia, which is estimated to affect half of all pregnant women in the world, with that figure rising to 94% in Papua New Guinea, 88% in India, and 86% in Tanzania. Anemia is rarely detected or treated during pregnancy and often exacerbated by malarial and other parasitic diseases. Severe anemia may weaken uterine muscular strength or lower resistance to infectious disease, contributing to PPH and subsequent maternal mortality [10].

Addressing PPH requires a combination of approaches to expand access to skilled care and, at the same time, extend life-saving interventions along a continuum of care from community to hospital. The different settings where women deliver along this continuum require different approaches to PPH prevention and treatment. Therefore, the major objective of this study is to determine the magnitude outcome of PPH at Nekemte referral Hospital.

CHAPTER TWO:

Literature Review

Postpartum Hemorrhage (PPH) is caused by many reasons, the commonest being uterine atony, which is responsible for 80% of the cases. Risk factors for uterine atony includes: prolonged first and/or 2nd stage of labor, augmented labor, retained placenta, placental accrete, multiple pregnancy, polyhydramnios and uterine fibroids. Multiparty and precipitate labor also promotes uterine atony [14].

The other causes of PPH include uterine rupture, lower genital tract trauma, uterine inversion, and consumptive coagulopathy.⁶ Other reasons reported such as having delivery by unskilled personnel can be a contributing factor of death from PPH [15]. A longitudinal study conducted from 1994 to 1997 in one of the tertiary care teaching Hospitals of Abbott bad Pakistan, reported Maternal Mortality Rate (MMR) of 9.46/1000 live births, where by PPH attributed to be 7.1% [16].

A cohort/clinical trial conducted, where two groups were enrolled, one received active management, and the other did not. The group who received active management and reported PPH prevalence of more than 1,000 ml was only 1% while another group who did receive active management reported 3% of PPH [15]. Another recent study conducted in Karachi, Pakistan reported, hemorrhage (51%), and anemia(21.2%), and dystocia (14.8%) as the causes of maternal mortality. Among these causes hemorrhage was identified in late pregnancy period (44.6%), while the rest were followed by severe hypertensive disorders and abruption placenta [16].

Retained placenta is one of the major causes of primary and secondary PPH, associated with increased risk of maternal morbidity and mortality. A retained placenta is often accompanied by heavy bleeding. A study conducted in Liqueate University of Medical & Health Sciences, Jamshoro Pakistan reported the frequency of retained placenta as 37.7% in women of age group 26 to 30 years, 26.6% up to age of 35 years, 22.2% in age 20–25 years, and it was low between 36– 40 years of age, while the frequency was high in women of low parity (44.4%). ⁵Causes included augmentation by oxytocin in 38.8% [17].

A hospital-based study in the US, reported the risk factors for postpartum reproductive tract infection include: maternal age less than 17 years, postpartum anemia, manual removal of placenta and prolonged labor. Practices such as use of warm clothes pressed against the vagina for six weeks were also associated with vaginal infections [18]. Data from around the world show great disparity between maternal morbidity and mortality of the developing and developed world. Identification of all these factors would benefit the mothers, the locality, and the society in general [19].

Hospital delivery is not a panacea as evidenced by a report from the Pan American Health Organization (PAHO), which documented the fact that 79% of deliveries in the Region of the Americas take place in institutional settings, with only a few countries in the Region reporting institutional deliveries below 50% [20]. Unfortunately, this trend was not accompanied by a corresponding decrease in maternal and perinatal mortality. Rather, even greater variations in neonatal and maternal mortality were seen in countries with high rates of institutional delivery. According to some authors, this may be due to unnecessary interventions, such as cesarean section and episiotomy, which may lead to increased morbidity and even mortality [21]. Efforts are being made to promote the use of evidence-based interventions in these countries.

Out-of-hospital deliveries can be divided into planned and unplanned. The former generally occur in a prepared setting and are attended by medical personnel; the latter generally occur when the woman is entering the active phase of labor rapidly and may take place en route to the hospital or at the home itself. In either event, unplanned out-of-hospital delivery can be a stressful and sometimes even hazardous experience. Unplanned out-of-hospital deliveries carry an increased risk for adverse maternal and perinatal outcomes, specifically hemorrhage and prenatal mortality [22].

Out-of-hospital deliveries are not confined to countries with low resources and where home deliveries are the rule rather than the exception. In countries with high resources, specific groups are more likely to experience out-of-hospital deliveries than the general population. For example, Bateman *ET al.* reported that patients who delivered out-of-hospital in the USA were more likely to be African-American, multigravida and to have had little or no prenatal care. Similarly,

other ethnic minorities such as Asians living a long way from the hospital in Europe are also at risk for out-of-hospital deliveries and for adverse pregnancy outcome [23].

In one often-quoted article, albeit written almost 50 years ago and not repeated to our knowledge, approximately 5% of all women who underwent vaginal delivery without complications lost more than 1000 ml of blood [24]. Assuming that this is correct, it has enormous implications for any woman who undergoes an out-of-hospital delivery because the objective evaluation of bleeding after delivery may be difficult in the absence of trained health care providers, especially if bleeding is slow and steady or in the presence of concomitant intra-abdominal bleeding[25]. Of equal importance, the clinical signs of blood loss, such as decrease in blood pressure and increased heart rate, tend to appear late, and only when the amount of blood loss reaches 1500 ml, mainly due to the high blood volume of pregnant women. Here again, a woman delivering out of hospital would appear to be at greater risk should this occur and not be noticed or monitored.

In The Netherlands, approximately one-third of births are planned home deliveries, attended by midwives. In this cross-sectional study, maternal demographics associated with home birth included multiparity, age above 25 years and living in small as opposed to large cities [26]. In conclusion, the number of out-of-hospital deliveries in the world is not well documented. Although it is widely accepted that the quality of maternity care is a main determinant of maternal and fetal morbidity and mortality rates [28], the lack of statistical information on out-of-hospital deliveries is a severe limitation for further evaluation of the relationship between out-of-hospital deliveries and maternal morbidity and mortality in general and specifically PPH. On the other hand, encouraging data now show that simple interventions in community settings can make a change in maternal morbidity, neonatal mortality, stillbirths and prenatal mortality [29].

PPH due to uterine atony is the primary direct cause of maternal mortality globally and this statement is equally true for those who deliver out-of hospital and those who deliver at the most well equipped institute for obstetric care. Management strategies in developed countries involve crystalloid fluid replacement, blood transfusions and surgery. Such definitive therapies are often not accessible in developing countries, particularly in cases of out-of hospital deliveries. The lack of skilled attendants at delivery who can provide even the minimum of care, long transport

times to facilities that can manage uterine atony or severe lacerations of the genital tract, and unattended obstructed labor leading to a ruptured uterus, elevate PPH to its position as the number one killer of women during childbirth. The factors are exacerbated by the prevalence of anemia, estimated to affect half of all pregnant women in the world [30].

Conceptual frameworks

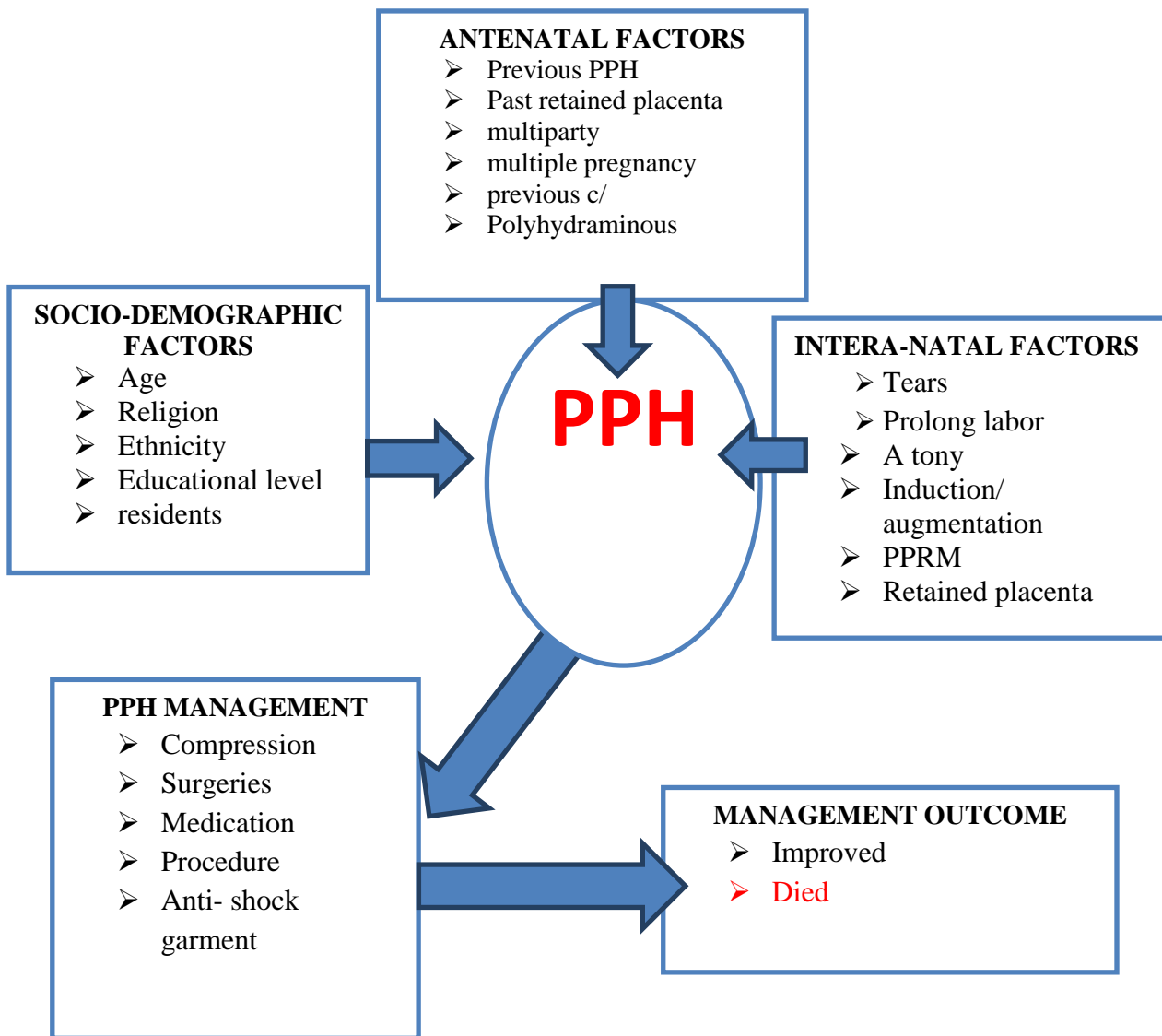


Figure 1: Conceptual framework of the study adopted from World Health Organization, 2009

Significance of the study

One of the sustainable development goals was to reduce maternal mortality 70 per 100,000 live births by 2030. If this is to be achieved, maternal deaths related to PPH must be significantly reduced. In support of this, health workers in developing countries need to have access to appropriate information to ensure identification of risk, early diagnosis and provision of appropriate management. The overall aim of this study is to determine the magnitude, risk factor, management and outcome of PPH. Exploring the magnitude, management and outcome of PPH will provide health care providers with information for prompt decision making in the care of women and provide a premise for improved care during pregnancy, labor and after delivery.

CHAPTER THREE: Objective

3.1 General Objective

- To determine the magnitude, risk factors and management outcome of PPH at Nekemte referral Hospital, from December 2014 up to November 2015.

3.2 Specific Objectives

- To assess the magnitude of PPH at Nekemte referral Hospital.
- To describe the risk factors of PPH at Nekemte referral Hospital , and
- To identify the management outcome of PPH at Nekemte referral Hospital.

CHAPTER FOUR: Methodology

4.1 Study area and period

The study was conducted in Nekemte referral hospital. Nekemte referral Hospital is found in Nekemte town 331 km. from the capital Addis Ababa to the west .The hospital has serving about 2.1 million peoples of Nekemte town, East wollega zone, parts of west wollega zone, Horoguduru zone and west shoa zone .Currently Nekemte Referral hospital had 178 beds used for the inpatient services, as to the human resource there were total number of workers [113 health professionals and 78 administrative staffs].

The Hospital provides Medical treatment, ophthalmic treatment, Phsyatric treatment, major and minor operation, inpatient services, MCH, control of HIV, laboratory, X-ray and ultrasound, drug and pharmacy, training services and physiotherapy.(HMIS department of the hospital)The study was conducted from December2014 up to November 2015.

4.2 Study design

A Hospital based retrospective case control study design was used.

4.3 Source population

All mothers who gave birth in the catchment area of Nekemte referral Hospital during the study period.

4.4 Study population

All mothers who gave birth in the health institution and home who managed at Nekemte referral Hospital during the study period.

4.4.1 Inclusion criteria

All mothers

- ✓ With primary and secondary PPH.
- ✓ Who gave birth both at Hospital and home

4.4.2 Exclusion criteria

All mothers who gave birth

- ✓ Before December 2014 and after November 2015.
- ✓ With lack adequate documentation of the necessary information.

4.5 Study units

Individual mothers interviewed for this particular research.

4.6 Sample size determination

All mothers who were gave birth both in Hospital and home from December2014 up to November 2015 and develop PPH and those mother who do not develop PPH were taken by 1:3[case to control ratio] by simple random sampling technique were my total sample size which were taken from the logbook.

4.7 Sampling technique

All mothers who gave birth during the study period were included.

4.8 Variables of the study

4.8.1 Independent variables

Socio-demographic variables: - age, parity.

Antenatal and intranatal risk factors:-polyhydramnios, multiple pregnancy, fibroids, APH, multiparity, Hypertensive disorder, Induction/ augmentation of labour, Instrumental delivery, Prolonged labour.

4.8.2 Dependent variables

- ✓ PPH
- ✓ Management outcome

4.9 Data collection instrument and technique

Semi-structured questionnaire was adopted from different literatures and the necessary adjustments were made to fit the local condition. The main content of the questionnaire were socio-demographic characteristics, Antenatal and intranatal risk factors and management outcomes.

Pre- test

Before the actual data collection, the questionnaire was tested on 5% of the total study population [All mothers who gave birth in the health institution and home who managed at Nekemte referral Hospital during the study period] before study period. Then possible modifications were made on the check lists using the findings of the pre-test.

Data collection procedure

Data was collected from patient record cards, registration books and anaesthesia charts available in the hospital by check list questionnaires using trained data collectors.

First card numbers of women in the study period were identified from registration books (logbooks), and then their charts have been retrieved from card office.

Finally documents from patient cards were entered in to a structured format by two pre trained BSc Nurse and four midwife.

4.10 Data processing and management

The collected data was reviewed checked for completeness before data entry. Complete data was entering in to SPSS version 22. Descriptive analysis; frequency and percentage, Univariate, bivariate, multivariate, logistic regression analysis were used and the analysed data was presented using tables, diagrams and written paragraph forms.

4.11 Data quality assurance

The qualities of data were controlled starting the time of data collection table preparation. Then, collected data was cleaned, checked and cross checked for their completeness and internal consistency by the data collectors followed by data entry.

To maintain the quality of the study, expert advice of data collection, data clearing and editing, strict supervision of data investigators and commenting the problems at spot were made by the academic supervisors.

4.12 Ethical consideration

Permission letter to carry out the study was taken from Nekemte referral Hospital administrative staff. The information gathered from registration was treated confidentially and norm of the Hospital was considered and respected in the process of data collection.

4.13 Limitations of the study

Since the study is based on secondary data, some information's may not be complete.

The study will not show long term complications.

4.14 Dissemination of results

The result of the study will be submitted to: -

- ✓ East Wollega Zonal health office
- ✓ Nekemte Referral Hospital
- ✓ GYN/ OBS department office
- ✓ The school research and publication office.

Operational definitions:

- Post partum haemorrhage: Blood loss in excess of
 - 500ml following vaginal delivery
 - 1000ml following cesarean section
 - Clinically change in vital signs, pallor and/ or the need for blood transfusion and for this particular study it will be obtained from record.
- Uterine atony: lack of effective contraction of the uterus after delivery and will be obtained from record.
- Maternal mortality: Death of mother related to PPH and its complication.
- Maternal outcome -Maternal condition after PPH which can be dead or discharged improved.
- Uterine inversion: when the uterine fundus collapses into the endometrial cavity, turning the uterus partially or completely inside out.
- Rural: the mothers who come from out of capital town of their respective woreda.
- Urban: the mothers who come from at least capital town of their respective woreda.

CHAPTER FIVE: RESULTS

5.1. Socio-Demographic Characteristics

During the study period a total of 3,600 study subjects were registered, however, for 200 study subjects their registration were incomplete. There for, the compliance rate was 94% the majority of the subjects were rural (62.8%). The vast majority 89% were above 20 years with the mean age of 27 years.

TABLE1: Socio-demographic characteristics of the study participants at Nekemte Referral Hospital, December 2014-November2015.

variables	Categories	Frequency	Percent
Age.	≤19	37	10.8
	20-34	257	74.7
	≥35	50	14.5
	Total	344	100.0
address	urban	128	37.2
	rural	216	62.8
	Total	344	100.0

5.2. Magnitude of PPH and Medical information and risk factors of the study participants

From the total mothers (3,400) who were visited Nekemte referral hospital 86 (2.5%) had developed post partum haemorrhage (PPH). Among the study subjects, the majority, 60.5% had history of one to three births (Parity), while 39.5% had history of four and above births (parity). Of the selected subjects, 77.3% of them had history of vaginal delivery. Of these 48.8% were delivered through SVD, 14.2% delivered by induction, 14.2% by the use of instrument, and Caesarean sections was 22.7%. Also, 86% of women were delivered at Nekemte Referral Hospital. While, 6.4% and 7.6% of women were delivered at home and health centres, respectively. Among the study subjects, the majority, 54.9% had history of blood loose <500ml, 35.5% loose500-1000ml. Among the study subjects, 136(39.5%) of mothers medical record shows that their blood pressure were 71/51-100/60mmhg. Concerning respondents pulse rate for the majority, 188(54.7%) of subjects recorded 86-100bpm (Table 2).

Table 2: Medical information and risk factors among study *participants* at Nekemte Referral Hospital, December 2014-November2015.

<i>variables</i>	<i>categories</i>	<i>Frequency</i>	<i>Percent</i>
Postpartum haemorrhage	no	258	75.0
	yes	86	25.0
	Total	344	100.0
parity	1-3	208	60.5
	>3	136	39.5
	Total	344	100.0
route of delivery	VD	266	77.3
	CS	78	22.7
	Total	344	100.0
place of delivery	hospital	296	86.0
	home	22	6.4
	health centre	26	7.6
	Total	344	100.0
blood pressure	40/20-70/50mmhg	8	2.3
	71/51-100/60mmhg	136	39.5
	>100/60mmhg	200	58.1
	Total	344	100.0
pulse rate	60-85	117	34.0
	86-100bpm	188	54.7
	101-116bpm	26	7.6
	>116bpm	13	3.8
	Total	344	100.0

Concerning risk factors during pregnancy, 159 (46.2%) of subjects multi parity was the major antenatal risk factor followed by past history of PPH with a proportion of 37 (10.8%), previous c/s accounted for 35(10.2%), multiple pregnancy, 33 (9.6%), hypertensive disorder with a proportion of 28(8.1%), antepartum haemorrhage 24(7%) polyhydraminios and previous retained placenta 20(5.8%), (figure1)

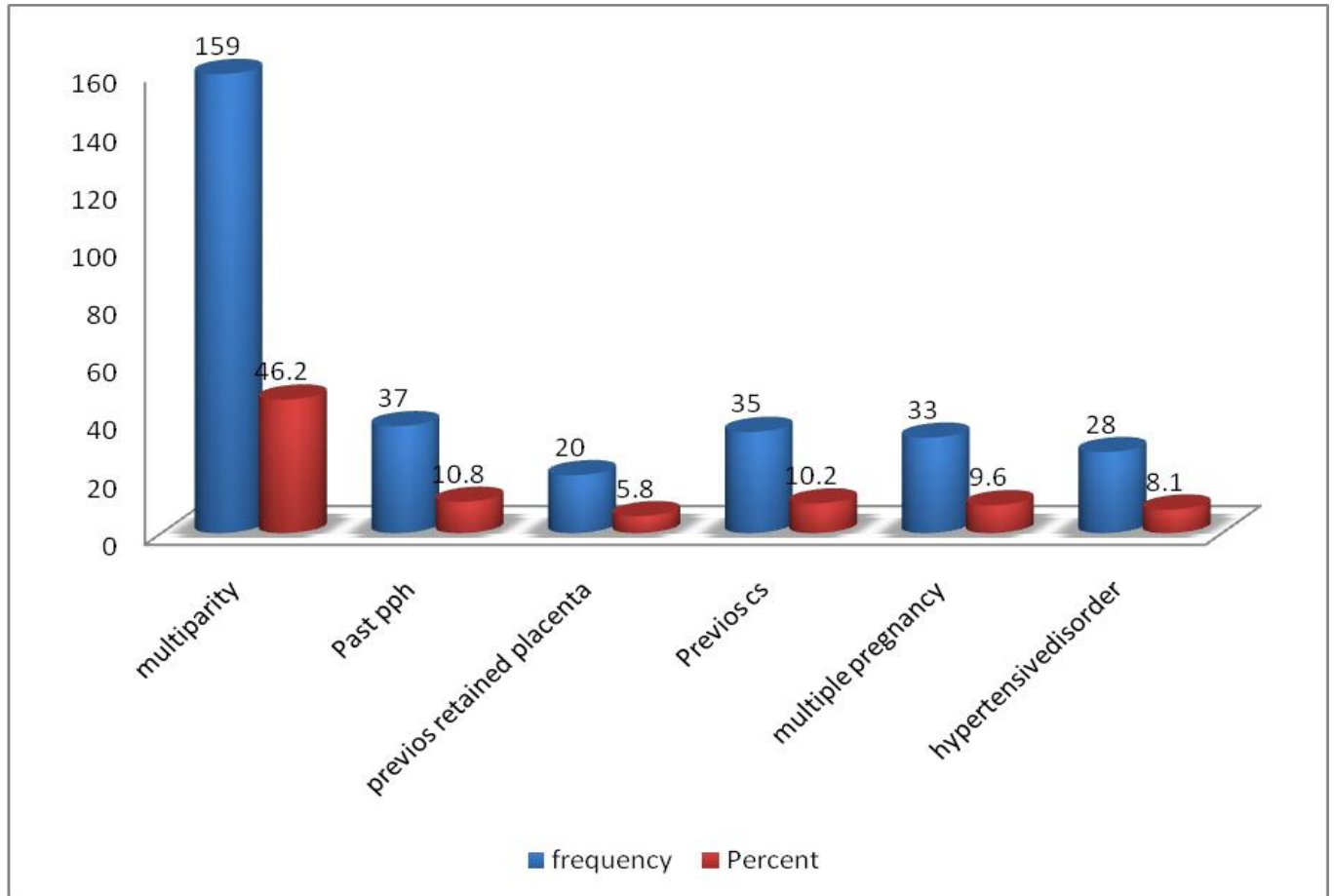


Figure 1: Antenatal risk factors among study *participants* at Nekemte Referral Hospital, December 2014-November2015.

Also, as indicated below during their delivery, prolonged labour was the major intra-natal risk factor with a proportion of 122 (35.5%). Instrumental delivery and induction became the second major factor with a proportion of 49(14.2%), foetal demise in utero and prolonged rupture of

membrane 22(6.4%), drugs 31(9%), retained placenta 27 (7.8%) and abruption 15(4.4%) (Figure 2)

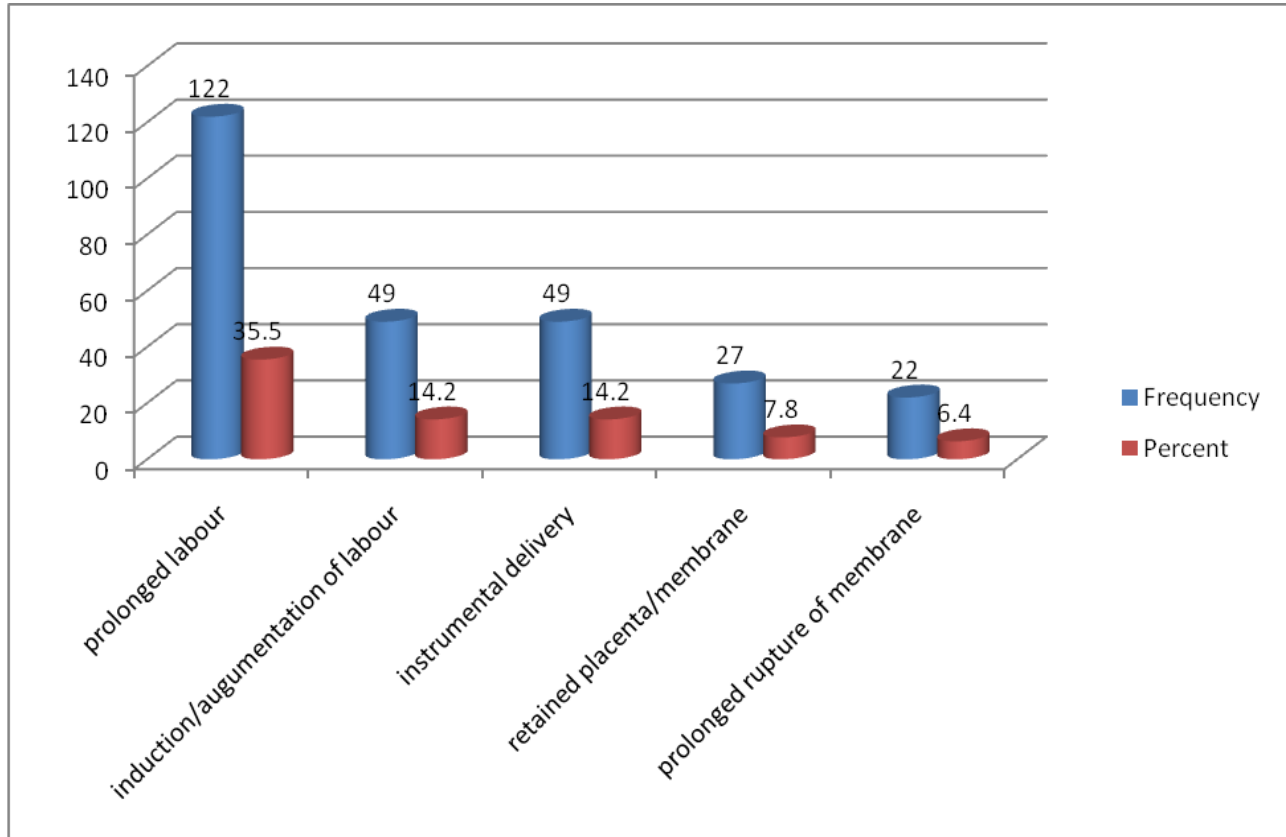


Figure 2: Intranatal risk factors of the study participants at Nekemte Referral Hospital, December 2014-November 2015.

5.3. Management outcomes and statuses of mothers who had PPH

Concerning the management outcome of patients, 85(98.8%) used medication, among them 51 (59.3%) were treated by the use of oxytocin and the rest were treated by the use of both oxytocin and misoprostol. About, 43 (50%) used blood and fluid; among these, 45.3% used resuscitation while the rest were transfused. Moreover, 44 (51.2%) were not passed through any procedure, 25 (29.1%) were managed with manual placental removal, 51 (59.3%) with external uterine massage with evacuation and curettage, while, 6 (7%) were managed by operation. Regarding the status of mothers, nearly all, 68 (79%) of them were discharged with improvement, while very few, 4(4.7%) were died (Table 3).

Table 3: Management outcomes of mothers who had PPH at Nekemte Referral Hospital, December 2014-November2015.

Variables	Categories	Frequency	Percent
Compression techniques	No	19	22.1
	External uterine massage	51	59.3
	Bimanual aortic compression	16	18.6
	Total	86	100.0
Medications	No	1	1.2
	Oxytocin	51	59.3
	Both	34	39.5
	Total	86	100.0
Procedure	No	44	51.2
	Manual removal of placenta	25	29.1
	Manual evacuation of clot	12	14.0
	Laceration repair	5	5.8
	Total	86	100.0
Surgeries	No	75	87.2
	Curettage	5	5.8
	Uterine artery ligation	4	4.7
	Uterine haemostatic compression suturing	1	1.2
	Hysterectomy	1	1.2
	Total	86	100.0
Blood and fluid products	No	2	2.3
	Transfusion	2	2.3
	Resuscitation	39	45.3
	Both	43	50.0
	Total	86	100.0

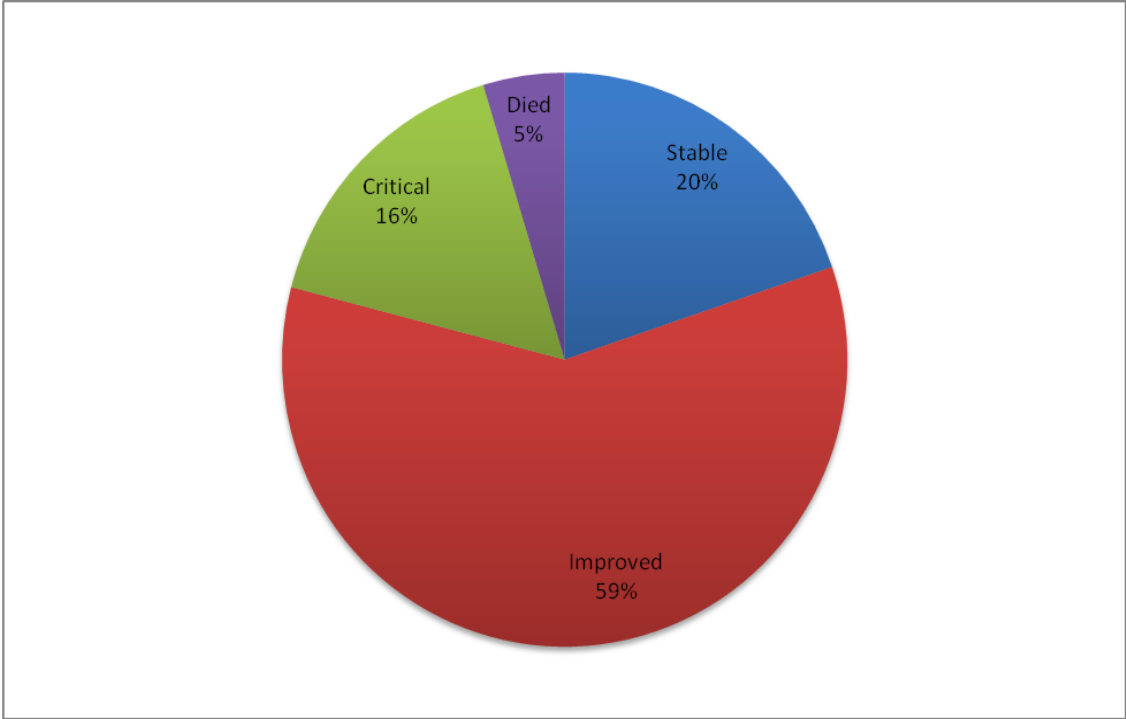


Figure 3: status of mothers who had PPH at Nekemte Referral Hospital, December 2014- November2015.

5.4. Factors associated with PPH

To assess the association between variables of interest and the occurrences of PPH, binary logistic regression model was used. At bivariate analysis, age (COR, 2.57; 95%CI: 1.11-5.99), parity (COR, 1.5; 95%CI: 0.89 -2.49), Antenatal risk factors (COR, 1.54; 95%CI: 0.86-2.75), Intra-natal risk factors (COR, 0.30; 95%CI 0.12-0.73 :), and place of delivery (COR, 0.05; 95%CI: 0.02-0.15), were factors significantly associated with the occurrences of PPH.

In multiple logistic regression after it was adjusted for the variables in the model, those study subjects aged 20 to 34 years were more (AOR, 7.83 ; 95%CI: 1.78-34.57) likely to develop PPH when compared to those age group of 35 years and above. Similarly, those study subjects having history of four and above delivery were more likely (AOR, 0.37; 95%CI: 0.17-0.8) to develop PPH compared to those who gave births for one to three. Taking hospital delivery as a risk, those who were delivered at home and Health centres were more likely (AOR, 39; 95%CI10.10-146.94 :) and (AOR. 31.29; 95%CI 9.54-102.63 :) to develop PPH, respectively. Presence of antenatal and intra-partum risk factors are more than two times (AOR 2.53; 95%CI: 1.16-5.50) and nearly twenty percent times (AOR, 0.20; 95%CI: 0.07-0.60) as likely to develop PPH compared to their counterparts, respectively (Table 4).

Table 4: Factors associated with Post Partum Haemorrhage (PPH) of the study participants at Nekemte Referral Hospital, December 2014-November2015.

<i>Variables</i>		<i>post partum haemorrhage</i>				COR 95% CI	AOR 95% CI
		<i>No</i>		<i>yes</i>			
		<i>no.</i>	<i>%</i>	<i>no</i>	<i>%</i>		
<i>parity</i>	1-3	150	72.1%	58	27.9%	1.00	1.00
	>3	108	79.4%	28	20.6%	1.5(0.89-2.49)*	0.37(0.17-0.8)*
<i>route of delivery</i>	VD	188	70.7%	78	29.3%	0.27(0.12-0.59)*	2.00(0.84-4.60)*
	CS	70	89.7%	8	10.3%	1.00	1.00
<i>place of delivery</i>	hospital	248	83.8%	48	16.2%	1.00	1.00
	home	4	18.2%	18	81.8%	0.05(0.02-0.15)*	39(10.10-146.94)**
	health canter	6	23.1%	20	76.9%	1.35(0.32-5.56)*	31.29(9.54-102.63)**
<i>age</i>	≤19	34	91.9%	3	8.1%	1.00	1.00
	20-34	181	70.4%	76	29.6%	0.54(0.13-2.25)*	7.83(1.78-34.57)*
	≥35	43	86.0%	7	14.0%	2.57(1.11-5.99)**	5.49(0.92-32.54)*
<i>presence of antenatal risk factors</i>	no		68.1%	22	31.9%	1.00	1.00
	yes	47	76.7%	64	23.3%	1.54(0.86-2.75)*	2.53(1.16-5.50)*
<i>presence of intranasal risk factors</i>	no		89.5%	6	10.5%	1.00	1.00
	yes	51	72.1%	80	27.9%	0.30(0.12-0.73)*	0.20(0.07-0.60)*

**** - strong association**

5.5: DISCUSSION

The study tried to assess the magnitude of PPH and identify the associated factor for its occurrences. From all study subjects, the vast majority, 86% of mothers were delivered at Hospital, while, 6.4% were delivered in their home, and the rest 7.6% were delivered at health centre. According to this study, PPH was occurring in any of the birth setting; Hospital, health centres or at home. Indeed, Hospital delivery is not a panacea as evidenced by a report from the Pan American Health organization which documented the fact that 79% in the region of the American takes place in institutional settings, with only a few countries in the region reporting institutional deliveries of 50% and below had a probability of developing PPH [20].

Furthermore, on the previous studies conducted in Southern Ethiopia indicated, over 90% of births take place at home in the presence of unskilled attendants [32]. However according to Ethiopian Demographic and Health survey (EDHS) 2014 report, 15% of births in Ethiopia are delivered at a health facility; 14% in a public facility and 1% in private facility [33]. Even though the percentage of facility births continuous to be low in Ethiopia there has been remarkable progress in the last three years. The percentage of births delivered in a health facility is 50% higher from 10% reported in 2011 and the percentage of births delivered in a health facility ranges from 6% in Afar to 87% in Addis Ababa, while Oromia accounts only 15% [33].

Therefore, comparing with South Ethiopia (10%) and Oromia region (15%), the result of the current study showed improvement, since 93.6% of mothers were delivered in a health facility; this may be due to health extension workers, awareness of people, effective way of transportation to health centres as well as growing number of private health centre in the area. Moreover, the present study is institutional based and attributed for those who come to the hospital and the majority came as referral cases.

This study showed the magnitude of PPH in Nekemte Referral Hospital during the study period was found to be 2.5%. This is consistent with other studies in which PPH in developed world accounts less than 10% and it was 2.9% in the United States, worldwide the magnitude of PPH was 6-11% [32]; however, in Australia the magnitude of PPH was 17% [8]. The present finding is much less than the findings of 3rd world countries in which the prevalence of PPH exceeds up to 60% [34]. Also in Africa it reaches an average of 34%; [32].

In this study, prolonged labour 122 (35.5%) was the major intra-natal risk factor that contributes to PPH, and the most common cause of PPH was uterine atony. In other studies also PPH due to uterine atony is the primary direct cause of maternal mortality globally [20] and this statement is equally true for those who delivered out of hospital and those who delivered at the most well equipped institute for obstetric care [30]. In 2004 nationwide PPH complicated 2.9% of all deliveries; of which uterine atony accounts for 79% of the case of PPH [41]. In the same manner, in this study, uterine atony 217 (63%) was the major cause of PPH.

About 4.7 Percent of maternal deaths in the present study are attributed to PPH. However, this figure is much lower than the African average, 33.9% and could be due to under diagnosis or under reporting, given the poor infrastructure and very low ratio of health professionals to the public prevailing in Ethiopia [35].

The result of this study implies that among mothers who were admitted with PPH, 79% of them were discharged with improved health status, while the rest 4.7% were died. This is less than similar study conducted at Dar-as-Salaam Tanzania during 2010, in which 12.2% were died during the course of their treatment [42]. Similarly compared with the present finding, in a study conducted in Honduras mortality rate due to PPH were 3.6% that is slightly lower.

5.6: STRENGTH AND LIMITATION

5.6.1. Strength

- Appropriate data collection and interpretation was employed.
- The study tried to use standardized and pretested check lists to collect the information
- The study tried to identify the associated factors using the appropriate models

5.6.2. Limitations

- The delivery registration logbook lacks some basic information's and some of the data were incomplete, so that it was not possible to determine other necessary variables like income, education and current marital statuses.

CHAPTER Six: CONCLUSION AND RECOMMENDATION

6.1. Conclusion

The vast majority of deliveries (more than 93%) were conducted in health institute either in Hospital or health centres. The Magnitude of PPH in this study is 2.5%. Factors like age, route of delivery, number of births, place of delivery, and presence of antenatal and intra-natal risk factors were significantly associated with the occurrences of PPH. From mothers admitted to the hospital for PPH cases about 4.7% were died during the study period.

6.2. Recommendations

Based on the above findings the following recommendations were made

- More attention should be given by all concerned bodies to address these associated risk factors especially in giving awareness for all pregnant women
- Additional improvement in the collection of data concerning PPH is required, especially including a measurement of severity
- Possible care has to be taken by every medical professional in the obstetrics and gynaecology ward to avoid both over diagnosis and under diagnosis of indications.
- Risk factors for developing PPH found in this study are all preventable only if more efforts are directed to these problems
- More research is recommended to explore more on the issues.

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APPENDICES

COLLEGE OF HEALTH SCIENCE, JIMMA UNIVERSITY

Department of Integrated Emergency Surgery

Questionnaire prepared to study the magnitude, risk factors and management outcomes of postpartum hemorrhage at Nekemte Referral Hospital, Oromia regional state, west Ethiopia.

Consent: - My name is Tolasa Raga, a final year IESO student in Master's program at Jimma University. I brought these questions to you in order to find out magnitude, risk factors and management outcomes of postpartum hemorrhage. The purpose of this study is to assess magnitude, risk factors and management outcomes of postpartum hemorrhage in Nekemte Referral Hospital, which can be used to ensure in identification of risk factors, early diagnosis and provision of appropriate management, it can be also used to design appropriate intervention so as to address the problem related with PPH. Therefore, your honest and genuine participation by responding to the questions prepared is highly appreciated and helpful to attain the objective of the study.

Your name will not be written on this form and no individual response will be reported to anybody. Hence, your answers are completely confidential. You don't has to answer any question that you don't want to answer and you may refuse to answer all of the questions.

Please, if you cooperate by responding to the questions it means that you have your own contribution to the success of this study.

Would you willing to answer?

If **yes**, proceed to the next page.

If **No**, please stop here.

Thank you!!!

ANNEX - II: Questionnaire

JIMMA UNIVERSITY

Department of Integrated Emergency Surgery

Please read each questions carefully and genuinely. I want to remind you that

Medical information`s

S/N	Questions	Coding categories	Skip
1	Parity	_____	
2	Route of delivery	_____	
3	Place of delivery	A. Hospital B. Health centre C. Home D. Others (specify)_____	
4	Expected blood loss	_____	
5	B/P	_____	
6	P/R	_____	

Socio-Demographic Variables

7	Age		
8	Address		

ANTENATAL AND INTRANATAL RISK FACTORS

Please put `X` mark on your answer in the box provided

S/N	Questions	Alternatives	
		Yes	No
9	Poly hydraminious		
10	Multiple pregnancy		
11	Fibroids		
12	Past PPH		
13	Previous retained placenta		
14	Previous C/S		
15	Other uterine surgery		
16	Ante partum hemorrhage		

17	Multy parity		
18	Hypertensive disorder		

Please put `X` mark on your answer in the box provided			
S/N	Questions	Alternatives	
		Yes	No
19	Foetal demise in utero		
20	Abruption		
21	Induction/ augmentation of labour		
22	Prolonged labour		
23	Pyrexia		
24	Prolonged rupture of membrane		
25	Instrumental delivery		
26	Retained placenta / membrane		
27	Drugs (E.g. inhaled anaesthetics)		
28	Therapeutic anticoagulants		

MANAGEMENT OUTCOMES
Please circle the letter of your answer

29. What was the management of the case?

- A. Compression techniques (external uterine massage, bimanual compression aortic compression)
- B. Medications (oxytocin, misoprostol)
- C. Procedure (manual removal of placenta, manual evacuation of clot, uterine tamponed, uterine artery embolization and laceration repair)
- D. Surgeries (curettage, uterine artery ligation, uterine haemostatic compression suturing, hysterectomy)
- E. Blood and fluid products (transfusion and resuscitate)
- F. Anti-shock garment

30. Status of mother

- A. Stable
- B. Improved
- C. Critical
- D. Died

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 ^a	parity(1)	1.007	.402	6.280	1	.012	2.737	1.245	6.016
	routeD(1)	.674	.436	2.389	1	.122	1.961	.835	4.607
	piaceofD			52.695	2	.000			
	piaceofD(1)	-3.443	.606	32.280	1	.000	.032	.010	.105
	piaceofD(2)	.208	.840	.062	1	.804	1.232	.238	6.384
	age			7.694	2	.021			
	age(1)	-1.703	.908	3.518	1	.061	.182	.031	1.080
	age(2)	.355	.533	.445	1	.505	1.427	.502	4.053
	preofantnlrisk (1)	.928	.396	5.490	1	.019	2.530	1.164	5.501
	presofintrnlris k(1)	-1.589	.552	8.306	1	.004	.204	.069	.601
	Constant	.356	.749	.226	1	.634	1.428		

a. Variable(s) entered on step 1: parity, routeD, piaceofD, age, preofantnlrisk, presofintrnlrisk.

Declaration

I, the undersigned, declare that the thesis is my original work, and has not been presented for a degree in any other university and that all sources of material used for the thesis have been duly acknowledged.

Declared by, Candidate

Name **TOLASA RAGA (BSc)**

Signature _____

Date _____

This thesis has been declared for final submission with my internal examiner and advisors approval as university.

Name of the internal examiner _____

Signature _____

Date _____

Confirmed by, Advisor

1. **Mr. LAMESSA DUBE (MPHE)**

Signature _____

Date _____

2. **Dr. DEJENE ASEFA (OBSTETRICIAN AND GYNACOLOGIST)**

Signature _____

Date _____