MAGNITUDE, MATERNAL AND PERINATAL OUTCOMES OF HYPERTENSIVE DISORDERS OF PREGNANCY AT SAINT LUKE CATHOLIC HOSPITAL, WOLISSO, ETHIOPIA.

BY

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A THESIS TO BE SUBMITTED TO JIMMA UNIVERSITY, COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES, COORDINATOR OF INTEGRATED EMERGENCY OBSTETRICS, GYNECOLOGY AND SURGERY; IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN INTEGRATED EMERGENCY OBSTETRICS, GYNACOLOGY AND EMERGENCY GENERAL SURGERY

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ABSTRACT

Background: Hypertensive disorders complicating pregnancy seriously affect the safety of the mother and fetus during pregnancy. Very few studies have explored hypertensive disorders of pregnancy in Ethiopia, even though this disease has been associated with adverse maternal and perinatal outcomes.

Objectives: The study was to determine the prevalence, maternal complications, perinatal outcomes and risk factors associated with the Hypertensive Disorders of Pregnancy (HDP) who were seen at St Luke Catholic Hospital from 01 January 2011 to 31 December 2013.

Methods: Facility based cross-sectional retrospective study was conducted by reviewing available data or hospital records of pregnant mothers who were admitted to the labor and maternity wards from 01 January 2011 to 31 December 2013, of Wolisso St Luke catholic hospital. The data were collected using a structured check list from March 2014 to April 2014 and analyzed using SPSS for windows version 16.0, OR and 95% CI were calculated. P-value <0.05 was considered statistically significant.

Results: From a total of 9327 deliveries during the reference time period, 345 Hypertensive cases were identified, of which only 260 (75.4%) booked for antenatal care. The overall prevalence was 37 per 1000 deliveries. The maximum age was 41years, with a median of 26 years and a mean of 26.90±5.49 (±SD) years. Among the cases 307(89%) were younger women of the age group 18-35 years. Hundred seventy four (50.4%) of the 345 cases were Primigravida. There was great difference between in the distribution of HDP amongst the residential areas with higher number of rural cases compared to urban cases (p=0.05). Along the spectrum of the condition, 107(31%) mild pre-eclampsia, 138(40%) sever pre-eclampsia, 70(20.3%) eclampsia, and 12(3.5%) superimposed pre-eclampsia, 15(4.4%) and 3(0.9%) cases who had pregnancy induced hypertension (PIH) and chronic hypertension in their previous pregnancies respectively.

Maternal complications included abruption placenta 13(12.5%), multiple organ failure 1(0.96%), Post partum hemorrhage 30(28.8%), 1(0.96%) acute renal failure (ARF); pulmonary edema 2(1.9%), infection 18(17.3%), HEELP syndrome 38(36.5%), Premature rupture of membrane 1(0.96%) and maternal death 5(1.4%). Perinatal outcomes included 181(52.5%) preterm deliveries, 161(46.7%) low birth weight babies, 37(10.7%) stillbirths and 21(6.1%) neonatal death.

Parity, molar pregnancy and multiple fetal gestations are detected as associated factor of Hypertensive disorder of pregnancy ($p<0.05$), but maternal age and residence is not associated with HDP ($p>0.05$).

Conclusion and recommendations: - The prevalence rate of hypertensive disorder of pregnancy is lower in Wolisso hospital. This finding may be attributed to underutilization of maternity services (delivery services). Hypertensive disorder of pregnancy was one of the five direct causes of maternal death. Almost all prenatal deaths were the result of prematurity and severity of the diseases and all maternal death from eclamptic group. According to this study, most of the severe preeclampsia and eclamptic women were from rural area. Primigravidae were the more affected group in this study (50.4%). Better to start mgso4 prophylaxis for every sever preeclamptic and eclamptic mothers, strengthening the primary health care units near to the rural community help to detect preeclampsia/eclampsia early. High urine protein (+3) level were found to be associated with poor perinatal outcome, therefore there is a need to conduct nationwide multi center study. Morbidity and mortality associated with hypertensive disorders of pregnancy are the most difficult to prevent. A well structured research work is needed to determine the Preconception risk factors.

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Finally, Above all, my dedication is to my sovereign God, for His mercies, love and provisions.

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ABBREVIATIONS AND ACRONYMS

ANC	Antenatal Care
BP	Blood pressure
CFR	Case fatality rate
DHS	Demographic health surveys
DIC	Disseminated intravascular coagulation
DM	Diabetes mellitus
EmONC	Emergency Obstetrics and Neonatal Care
EOC	Emergency Obstetric Care
GYN	Gynecology
HDP	Hypertensive Disorders of Pregnancy
HELLP	Hemolysis elevated liver enzymes and low platelet
HTN	Hypertension
IEOS	Integrated emergency Obstetrics and Surgery
ISSHP	International Society for the Study of Hypertension in Pregnancy
IUFD	Intrauterine fetal death
IUGR	Intrauterine growth retardation
JUSH	Jimma University Specialized Hospital
LBW	Low Birth Weight
MDG	Millennium development goal
MMR	Maternal Mortality Ratio
MOH	Ministry of Health
NICU	Neonate intensive care unit
OBS	Obstetrics
PE	Preeclampsia
PIH	Pregnancy Induced Hypertension
PNMR	Prenatal mortality rate
SGOT	serum glutamic oxaloacetic transaminase
SLCH	Saint Luke Catholic Hospital
UGH	Umtata general hospital
W H O	World Health Organization

CHAPTER ONE: INTRODUCTION

1.1. Background

The term hypertension in pregnancy is commonly used to describe a wide spectrum of patients who may have only mild elevations in Blood Pressure (BP) or severe hypertension with various organ dysfunctions. The manifestations in these patients may be clinically similar (e.g., Hypertension, Proteinuria); however, they may result from different underlying causes such as Chronic Hypertension, renal disease, or pure Preeclampsia. The three most common forms of hypertension are acute gestational hypertension, preeclampsia, and chronic essential hypertension (1-2).

Hypertension is the most common medical disorder of pregnancy and is reported to complicate up to 1 in 10 gestations and affects an estimated 240,000 women in the United States every year. (3)Although physicians for millennia have recognized preeclampsia, relatively little is known about its pathogenesis and prevention. The primary concern about elevated blood pressure relates to the potential harmful effects on both mother and fetus. These potential adverse effects range in severity from trivial to life threatening. (4)

Five classes of hypertensive disorders were identified according to the latest classification system described by the National High Blood Pressure Education Working Group including Preeclampsia, Eclampsia, Transient Hypertension of pregnancy, Chronic Hypertension and Preeclampsia superimposed on Chronic Hypertension (5). In a multicenter study, approximately 30% of hypertensive disorders of pregnancy were due to chronic hypertension while 70% of the cases were diagnosed as gestational hypertension/preeclampsia (6).

Risk factors associated with preeclampsia include chronic hypertension, multifetal gestation, and maternal age over 35 years, obesity, and African- American ethnicity (7-9).

Preeclampsia is a pregnancy-related hypertensive disorder occurring usually after 20 weeks of gestation. If left untreated, it progresses to eclampsia (10). Preeclampsia and eclampsia are not distinct disorders but the manifestation of the spectrum of clinical symptoms of the same condition. The mildest disorder in this continuum is pregnancy-induced hypertension (11-12).

In preeclampsia, hypertension and proteinuria are present, and when convulsions occur in addition to these signs, the condition is referred to as eclampsia (13).

Gestational hypertension is also called as pregnancy induced hypertension. In gestational hypertension there is appearance of hypertension after 20 weeks gestation without proteinuria (14). The hypertension subsides after delivery within 12 weeks (15). The term gestational hypertension or pregnancy induced hypertension (PIH) and pre-eclampsia are clinically more often considered as same with reference to management. The transition from pregnancy induced hypertension to pre-eclampsia is ill defined so both are considered as one for management (16). But prognosis for pregnancy induced hypertension is better than pre-eclampsia (17). The incidence of pregnancy induced hypertension in India is about 7-10% of all antenatal admission (18).

Pre-eclampsia may develop at any time after 20 weeks of gestation. Pre-eclampsia before 32 weeks is considered early onset, and is associated with increased morbidity. Its progress differs among patients; most cases are diagnosed before labor typically would begin. Pre-eclampsia may also occur up to six weeks after delivery. Apart from Caesarean section and induction of labor (and therefore delivery of the placenta), there is no known cure. It is the most common of the dangerous pregnancy complications; it may affect both the mother and fetus (19).

Pre-eclampsia as per ISSHP classification is defined as new onset hypertension of more than 140/90 mm of Hg after 20 weeks gestation, proteinuria more than 300mg/day (20). This definition is for the purpose of research. But when there is evidence of fetal growth restriction or end organ damage without proteinuria, the said clinical condition is branded clinically as pre-eclampsia as per ISSHP. This syndrome occurs in 5 to 8% of all pregnancy (21).

Chronic hypertension is defined as BP > 140/90 mm of Hg before pregnancy or before 20 weeks gestation, complicates 3% of pregnancies. When there is proteinuria of more than 300 mg/day or evidence of fetal growth restriction in cases of chronic hypertension this condition is termed as pre-eclampsia superimposed on chronic hypertension (22).

Eclampsia is defined as new onset, grandmal seizures in pregnant women with preeclampsia. Some women presenting with eclampsia do not have pre-diagnosed preeclampsia, and some women may present with eclampsia in the postpartum period (23).

Preeclampsia has remained a significant public health threat in both developed and developing countries contributing to maternal and perinatal morbidity and mortality globally. (27) However, the impact of the disease is felt more severely in developing countries (25), where, unlike other more prevalent causes of maternal mortality (such as hemorrhage and sepsis), medical interventions may be ineffective due to late presentation of cases (26).

The tragedy is that these women die not from disease but during the normal, life-enhancing process of procreation (27). Most of these deaths could be avoided if preventive measures were taken and adequate care was available. Maternal death is an indicator of disparity and inequity between men and women and its extent a sign of women's place in society and their access to social, health, and nutrition services and to economic opportunities (28).

Even though there are few studies exploring HDP in Ethiopia, there has not been a single study in the study area. Based on the limited data available, in JUSH 8.5%, in Black Lion specialized hospital, 5.3% (2, 36). HDP has been found to be common and has been associated with poor maternal and perinatal outcomes.

1.2. Statement of the problems

Hypertensive disorders occur in approximately ten percent of all pregnancies, and are identified as a significant health issue. Hypertension in pregnancy is associated with fetal/infant morbidity and mortality and is a leading cause of maternal death in Canada. Although hypertensive disorders in pregnancy have different etiologies with diagnosis either predating or occurring during the pregnancy, clinical management tends to be similar and related to type and/or worsening of symptoms, and time of onset(29).

When blood pressure remains above 160/110mmHg, it is considered severe. PE is defined as the presence of proteinuria (≥300mg/24hours) in pregnant women with hypertension. The hypertensive syndromes of pregnancy are among the leading causes of maternal and fetal morbidity and mortality and anti-hypertensive treatment is part of the therapeutic arsenal used to prevent serious complications. Although the role of utero-placental insufficiency due to deficient migration of trophoblasts to the spiral arteries is universally accepted, the pathphysiology of PE remains largely unknown and is the subject of debate. No effective ways of predicting or preventing PE have been found, which highlights the need for further research in this field (30). This review aims primarily to evaluate recent advances in our understanding of the pathophysiology of gestational hypertension and especially PE, and new ways of predicting PE. Hypertensive syndromes are also a cause of perinatal morbidity and mortality, mainly from intrauterine growth restriction due to utero-placental insufficiency and complications related to prematurity. Even mild hypertension is associated with greater risk for prematurity and newborns that are small for gestational age (31).

Hypertensive disorders of pregnancy especially preeclampsia occurs more frequently in young Primigravidae, first pregnancy from a new partner, in mothers of over 35 years of age, preexisting hypertension, hyaditiform mole, multiple pregnancy(twin pregnancy), and in maternal diabetes (1,7,10,21). Long inter-pregnancy interval (11), familial history (44) and obesity (11, 19, 31) are also associated risk factors for HDP (32).

Globally half a million women die each year as a result of pregnancy and childbirth. Of these deaths, 50% occur in Africa, about 42% in Asia, about 4% in Latin America and Caribbean and less than 1% in the developed countries (33).

According to WHO World Health Statistics, every year some 536,000 women die of complications during pregnancy or childbirth, 99% of them in developing countries like Ethiopia.

By region, the Maternal Mortality Ratio (MMR) is highest in Africa, followed by Asia, Oceania, Latin America and the Caribbean, and then the developed countries (34).

According to a population based study in South Africa the incidence of hypertensive disorders of pregnancy (HDP) was 12%. Other hospital based studies showed the HDP was the commonest cause of maternal death which contributed for 20.7% of maternal deaths in the country. Studies in Ethiopia show that the incidence of HDP is around 5% of which majority were due to severe preeclampsia; according to one study eclampsia complicates 0.7% of the pregnancies. These disorders are major causes of maternal and perinatal morbidities and mortalities (2, 36, 37, 47-49).

Ethiopia's MMR continues at an unacceptably high level (50). While maternal mortality figures vary widely by source and are highly controversial, the best estimates for Ethiopia suggest that over 25,000 women and girls die each year due to pregnancy-related complications. More than 500,000 Ethiopian women and girls will also suffer from disabilities caused by complications during pregnancy and childbirth each year (48).

The fifth Millennium Development Goal (MDG) aims at improving maternal health and targets reducing maternal mortality ratio (MMR) by 75% between 1990 and 2015 that is, it seeks to achieve an expected 5.5% annual decline in MMR from 1990(49). However, MMR has decreased at the global level at an average of less than 1% annually between 1990 and 2005(8).

To make the achievement of the fifth MDG a reality, MMR will have to decrease at a much faster rate especially in sub-Saharan Africa (including Ethiopia), where the annual decline is staggering behind (8).

Based on the 2011 Ethiopian DHS findings the maternal mortality ratio was 676 maternal deaths per 100,000 live births for the seven year period preceding the survey. This ratio is not significantly different from those reported in the 2005 EDHS and the 2000 EDHS. The persistent high maternal mortality has for many years been a neglected tragedy (50).

In view of the importance of early detection of mother on high risk to develop HDP through increase the coverage of ANC follow up in reducing maternal and perinatal morbidity and mortality in our country (35).

Every Ethiopia Hospitals should have base line study on prevalence of HDP, maternal complication and Perinatal outcome in order to assess the progress through time for further study and intervention(2). The problem is confounded by the continued mystery of the etiology and the unpredictable nature of the disease (27).

Therefore there is no study conducted at St Luke catholic Hospital to see the prevalence of HDP, maternal complication and perinatal outcome. Therefore, it is important to do this research to provide background data for further study and explore the pattern and outcomes of pregnancies complicated by hypertensive disorders, factors associated with the disorder and forward relevant recommendations based on the findings.

CHAPTER TWO: REVIEW OF LITERATURE

Hypertensive disorders of pregnancy

Worldwide an estimated 600,000 women die each year of pregnancy-related causes, with 99% of these deaths in developing countries (51).

Hypertensive disorders of pregnancy affect 5-10% of all pregnancies worldwide and cause a substantial maternal and perinatal morbidity and mortality. The second commonest cause of perinatal mortality in industrialized countries it is believed that 10-15% of maternal mortality in developing countries is due to HDP (37).

The incidence and prevalence of PIH vary from one country to another and might have genetic predisposition. Among African-Americans it is 6.4% of deliveries; in Sweden 1.5% of pregnancies; in West-Africa 0.64 per 100; in South Africa HDP is number one cause of maternal deaths {20%}. In the United Kingdom hypertension in pregnancy is the most frequent cited cause of death (38).

Pre-eclampsia continues to be one of the most common causes of maternal mortality and a significant contributor to perinatal morbidity and mortality world-wide (39).

Preeclampsia complicates 2-8% of pregnancies world-wide. In developed countries eclampsia is rare, affecting 1 in 2000 deliveries, while in developing countries estimates vary from 1 in 100 to 1 in 1700(40).

A study in Saudi Arabia between May 1992 and December 1993 showed that 30.3% were Primigravidae and 46% were grandmultipara. While a similar study at Umtata General Hospital (UGH) between January 1993 and December 1994 indicated 27.3% of the hypertensive patients were teenagers, 18.3% were mothers of over 35years and 42.9% were Primigravidae (41).

In Afghanistan where the maternal mortality ratio is high at 327 deaths per 100,000 live births and hypertensive disorders of pregnancy account for 20% of maternal deaths reducing morbidity and mortality from severe PE/E will require systematic changes in women health seeking behaviors and access to health care, as well as an increase in the capacity of the health system to offer ANC and EmONC services. In a recent national survey, just 48% of Afghan women (77% in urban areas and 41% in rural areas) reported receiving ANC from a skilled provider and only 15% made at least four ANC visits, as recommended by WHO (42).

According to women's reports, ANC providers were not likely to measure blood pressure or take urine samples (35% and 24%, respectively. Only one-third of Afghan women delivered in health

facilities (66% urban, 25% rural), and 39% were attended by skilled providers (74% urban, 31% rural) (43).

The reported incidence of hypertensive disorders of pregnancy in India was 5.38% while preeclampsia, eclampsia and HEELP syndrome accounted for 44%, 40% and 7%, respectively. The rate of maternal mortality was 5.55% and Perinatal deaths occurred in 37.5% of the deliveries (44).

In Zimbabwe, hypertension complicates about 15% of pregnancies delivered at Harare Maternity Hospital (45).

Of the 16,376 deliveries at Umtata general hospital in South Africa, during this period, 760 (4.6%) were complicated by hypertension. The median age of the hypertensive women was 25 years. Teenagers comprised 27.3% of the cases and Primigravidae accounted for 42.9% of all the cases. Proteinuric hypertension was present in 66% of the hypertensive women at admission and in 53.8% at delivery. Eclampsia occurred in 15% of the hypertensive, and the incidence of eclampsia in the general obstetric population at Umtata general hospital was high at 7 per 1000 deliveries (46). Other maternal complications of hypertension included, pulmonary edema (3.9%), abruptio placenta (1.7%), HELLP syndrome (1.2%), maternal death (1.0%), acute renal failure (0.9%), coma with cerebral pathology (0.5%), and DIC (0.5%). Hypertension accounted for 33% of all maternal deaths during this period, and almost all were eclamptic. The Perinatal complications which occurred included preterm delivery (34%), low birth weight (19.9%), IUFD (11.2%), IUGR (6.6%), and neonatal deaths (3.8%). In general, eclamptic patients had significantly more maternal and fetal complications than non-eclamptic hypertensive women (47).

In Ethiopia, pre-eclampsia/eclampsia was reported to be uncommon. A clinical analysis study done in 6766 patients deliver at Yekatit 12 Hospital, Addis Ababa; Out of 327 pre-eclamptic, there were 52 (15.9%) cases of mild, 142 (43.4%) cases of moderate and 133 (40.7%) cases of severe pre-eclampsia. (49)

A one-year longitudinal study was conducted at Tikur Anbessa central referral Hospital to assess the prevalence of hypertensive disorders of pregnancy (HDP), to see the socio-demographic and clinical parameters and pregnancy outcome of pregnancies afflicted by these complications. Out of 3424 deliveries conducted during the study period, 183 (5.3%) mothers were found to have one form of hypertensive disorders of pregnancy, 85.2% were cases of pregnancy induced hypertension (PIH),the majority (78.2%) were severe pre eclampsia and eclampsia; the remaining 14.8% had pregnancy

aggravated hypertension (PAH) or chronic hypertension(48). Preterm delivery rate was 48.6% for all cases of HDP. Intervention rate was high with 44.3% induction of labor and 44.3% caesarian section, which is much higher than the overall intervention rate in the hospital's obstetric population during the studied period. Prenatal mortality rate (PNMR), case fatality rate (CFR) and intra uterine growth restriction (IUGR) were 300/1000 deliveries, 27/1000 deliveries and 41.6% respectively in mothers with HDP. Severe hypertension, high urine protein and high uric acid level were found to be associated with higher CFR, and poor prenatal outcome (48).

One study done in Jimma University, among mothers with HDP, majority (52.5%) of the mothers were in the age group of 25 - 34 years. The overall prevalence of hypertensive disorders of pregnancy was 8.5%. Severe preeclampsia accounted for 51.9% of the cases followed by eclampsia (23.4%). Residential area of the mothers (urban/rural) was found to have statistically significant association with severity of the disorder (36). Most (66.5% and 74.7%) of the mothers were nulliparous and had antenatal care follow-up during the index pregnancy, respectively. Antenatal care follow-up and parity had no statistically significant association with severity of the disease (36). The case fatality rate of hypertensive disorders of pregnancy was 1.3% with perinatal mortality of 317.1/1000 births (36).

Conceptual Framework

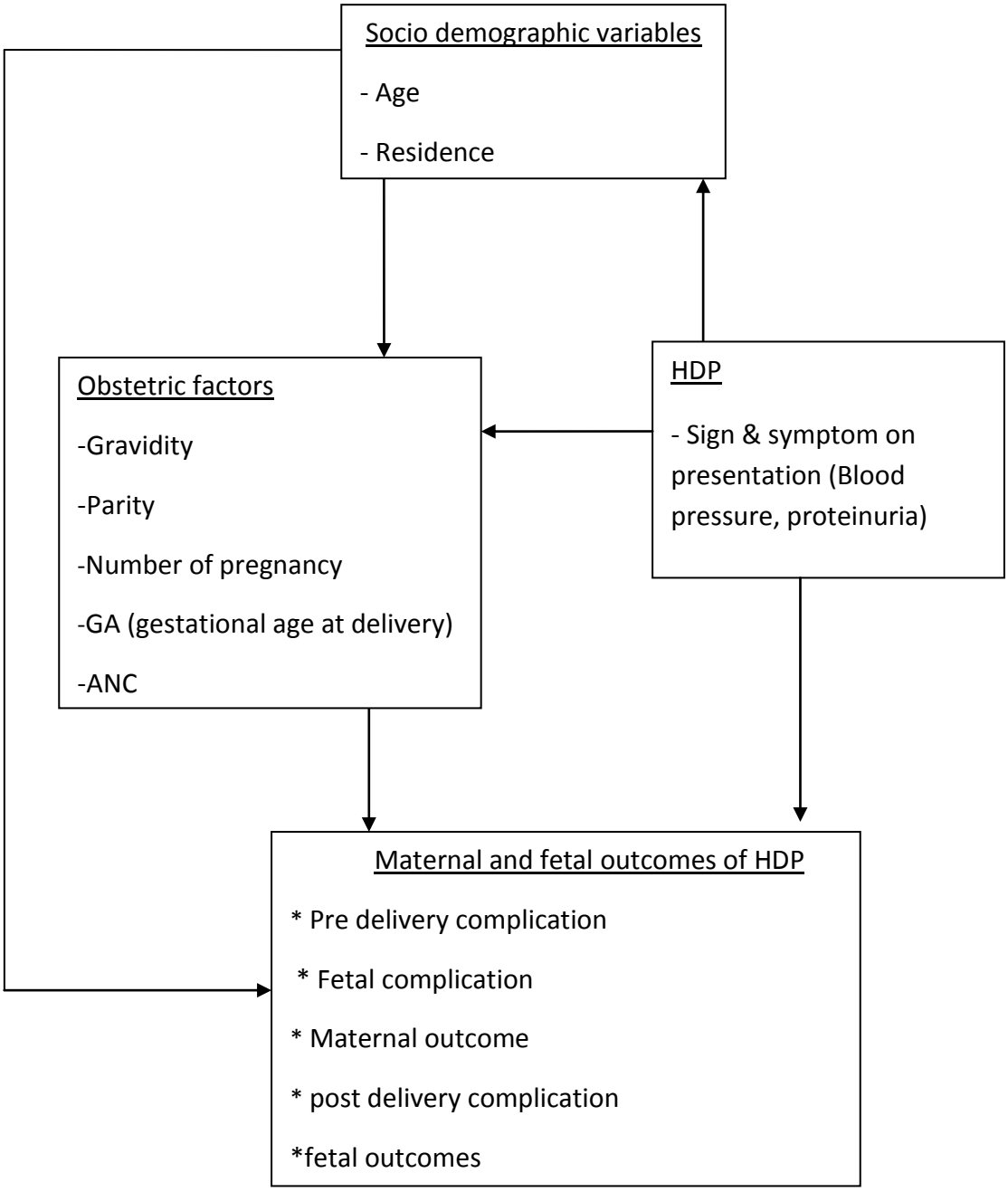

Figure 1: Conceptual frame work on prevalence, maternal complication and perinatal outcome of hypertensive disorder of pregnancy and related factors at SLCH, Wolisso, from 01 January 2011 to 31 December 2013.

Significance of the study

Generally the problem is more common in the developing countries than it is in the developed countries. There is a significant risk of both maternal and perinatal morbidity and mortality in pregnancies affected by the disorder. The complications are more common and worse in the underdeveloped countries; poor pregnancy outcomes are also associated with lack of ANC follow up which is associated with delayed recognition and intervention in the affected mothers (53)

More than 50% of all maternal deaths were recorded in only six countries namely India, Nigeria, Pakistan, Afghanistan, Ethiopia and Democratic Republic of Congo (50). Among five leading cause of maternal death HDP had great contribution. Therefore the significance of this study are:

- To determine current prevalence of hypertensive disorder of pregnancy at the study area.
- To know maternal, perinatal complication and outcome of HDP.
- To improve the health professional knowledge on HDP. This will further have great significance in preventing maternal and perinatal morbidity and mortality due to HDP, thereby to achieve MDGs, by improving access to appropriate obstetric care, particularly during ANC follow up, delivery and better screening and treatment of preeclampsia in the study area.
- To provide scientific knowledge for anybody who wants to conduct further research.
- Contributes some benefit to the mothers for decrease the complication of HDP and improve the outcome by addressing obstacle for quality care.

CHAPTER THREE: OBJECTIVES OF THE STUDY

3.1. General objective

To determine the Magnitude, maternal and perinatal outcomes and factor associated with hypertensive disorder of pregnancy (HDP) among pregnant mothers who were admitted to the labor and maternity wards of Wolisso St Luke catholic hospital from 01 January 2011 to 31 December 2013.

3.2. Specific objectives

1. To determine the magnitude of HDP in the study setting.
2. To determine maternal outcome of HDP in the study setting.
3. To determine the perinatal outcome of HDP in the study setting.
4. To identify factors associated with HDP of the pregnant mothers.

CHAPTER FOUR: METHODS AND MATERIALS

4.1. Study area

The study was conducted in the department of Obstetrics and Gynecology at Wolisso St Luke catholic hospital which is found in Wolisso Town in Southwest Shoa zone of Oromiya region, Ethiopia, which is serving over 1.2million peoples of Wolisso town, Goro, Wonchi woreda and wolikite town. It is located to the 114 km southwest of Addis Ababa. The hospital provides almost all major types of medical, surgical and OBS/GYN services; it has total 200 beds of which 24 are found in the maternity ward and; 14 are in the gynecology ward. The first and second stage rooms of the labor ward has five and three beds respectively; The Neonatal unit contains six beds. The labor ward, maternity ward and Gyn. wards are run by midwives, clinical nurses, HO, tropical Doctors, IEOS students and gynecologist. The hospital serves as a referral hospital for the nearby health center and hospitals. Most of the laboring mothers came from rural areas.

4.2. Study period

The study was conducted in April 2014 by reviewing the data available from 01 January 2011 to 31 December 2013.

4.3. Study design

Hospital based cross-sectional study design with retrospective record review was employed.

4.4. Source and study populations

The source was the records of all mothers who were admitted to the labor and maternity wards of Wolisso St Luke catholic hospital from 01 January 2011 to 31 December 2013.

The study population was the records of mothers who admitted to the labor and maternity wards from 01 January 2011 to 31 December 2013 of Wolisso St Luke catholic that fulfill inclusion criteria.

Inclusion criteria

All records of pregnant mothers who were admitted to the labor and maternity wards of Wolisso St Luke catholic hospital from 01 January 2011 to 31 December 2013 were included in the study.

Exclusion criteria

Records of mothers who were admitted in the ward for reasons other than pregnancy, labor and Patients whose records were not available were not included in the study.

4.5. Sample size and sampling procedure

The records of all pregnant mothers who were admitted to the labor and maternity wards of Wolisso St Luke catholic hospital from 01 January 2011 to 31 December 2013 and who full fill the inclusion criteria was included in the study and sampling technique was not used.

4.6. Data collection procedure

Data collectors were selected from midwives and clinical nurses working in Wolisso hospital. A Check list consisting of socio-demographic variables, obstetric history, medical history, signs and symptoms at presentation, family history, maternal outcome and neonatal outcome, the check list adapted from HMIS registration book and modified for the purpose of the study and designed in English language to meet the requirement of the study.

4.7. Quality control measure

The patients' records of this period were chosen because it was very close to the time the review was done. This was to consider loss of charts especially if patients delivered long time before the time of review and to ensure that the information was reliable. The sample selection criteria provided equal opportunity for all eligible cases. Data collectors was trained to the data collection format and continuously coached by the principal investigator until the end of the data collection. Also, the advisor was closely consulted; data was edited, entered and cleaned with SPSS.

Pre- test

Before the actual data collection, the Check list was tested on 5% of records of similar mothers of the study setting on days which are not included in the actual study in March 2014.

4.8. Study variables

Dependent variable

Hypertensive Disorders of Pregnancy

Independent variable

Maternal age, residence, gravidity, parity, ANC follow up, number of fetus (single tone, twin), teenage pregnancy (age<18 years), molar pregnancy; advanced maternal age >35 years), maternal outcome, perinatal outcome, History of DM, History of Hypertension ,APGAR score, fetal weight and Gestational age.

4.9. Data processing and analysis

Data collection was done using a compilation form. Information about patients' demographic data, past medical history, past obstetric history and laboratory investigations was collected. The collected data was checked for its completeness, and exported to SPSS database program for analysis after edition. Frequency distributions of both dependent and independent variables were worked out and the association between independent and dependent variables were measured and tested using chi square. To determine hypertensive disorder of pregnancy, maternal complication and perinatal outcome, multivariable logistic regressions were used. A 95 % confidence interval and 5% level of precision were utilized to check for association between variables. Finally the data was described and presented using tables and charts and interpreted by looking at proportion in percent and odd ratios with 95% confidence intervals.

4.10. Ethical consideration

An Ethical clearance was obtained from the institutional ethics committee of the university, and provided to the hospital. The procedure and purposes of the study was explained to the hospital manager and to the hospital medical director. The patient's name is not included in the Check list, after finishing the data collection the patients' document return to card room, the information was used for study purpose only. The patients were benefit from this research is that improve the quality of life by addressing the obstacle for quality care.

4.11. Plan for dissemination of findings

The result of the study was presented to Jimma university community as part of IEOS thesis; and it was disseminated to JU College of public health and medical science, coordinating office of Integrated Emergency OBS/GNY and Surgery, Regional health bureau, Zonal health offices, to the targeted health facility and to NGOs working on this area. Further attempt was made to publish it a reputable peer reviewed scientific journal.

4.12. Limitations

- The research outcome generates only from patients registrations.
- This research was not be representative for the total hospital in Ethiopia but it may show some data base description of the service and it is out come at Saint Luke catholic hospital, Wolisso.
- The patient document handling was poor so that difficult to obtain full history of the patient, and the OPD card and inpatient card put in different place after patient discharge to home so that difficult to collect card.
- The patient card was not contains full information of the patient.
- The sitting of study is far from advisors so that it is difficult to easily contact to the advisors.

4.13. Operational definition of terms

Hypertensive Disorders of Pregnancy: Includes chronic hypertension and pregnancy induced hypertension (45).

Chronic hypertension: A Diastolic Blood pressure of 90mmHg or more that either predates pregnancy or develops before 20 weeks gestation (4, 9).

Superimposed preeclampsia: preeclampsia may develop on those with chronic hypertension.

Pregnancy induced hypertension (PIH): Hypertension without proteinuria or edema two readings of diastolic blood pressure 90-110 mmHg, 4-6 hours apart which develops after 20 weeks of gestation (4, 9).

Mild Pre-eclampsia: Two readings of diastolic blood pressure 90-109mmHg, 4-6 hours apart, after 20 weeks of gestation and with proteinuria of >300mg/l in 24 hours or up to 2+ and with/without edema.

Severe Pre-eclampsia: Diastolic blood pressure is equal or greater than 110mmHg after 20 weeks of gestation. There may be severe headache, blurred vision, epigastric pain, hyper-reflexia, oliguria (urinary output equal or less than 400mls/24hours), proteinuria (protein equal or greater than 5g/24 hours; dipstick +++), increased weight (equal or more than 1000g/week, and the patient is conscious (9, 14, 34, 35, 39, 44, 45).

Eclampsia: Mother is with signs and symptoms of severe preeclampsia and convulsions or coma. Oligohydrouria or Anuria is present. (16,34, 35).

Korotkoff phase V: Disappearance of heart sound during the examination of the blood pressure (38).

HELLP Syndrome: A syndrome of haemolysis (H) elevated liver enzymes (ELE) and low platelet count (LP).

Gestational age: The duration of gestation. It is measured from the first day of the last menstrual period and is expressed in completed weeks (45).

Term period: The period from 37 completed weeks up to the end of 42nd week (36).

Preterm period: refers to less than 37 completed weeks of gestation (36).

Post-term: The period greater than 42 completed weeks of gestation.

Preterm Delivery: Birth of baby before 37 completed weeks of gestation.

Neonatal Death: The death of a baby that occur at less than 28 days of age with birth weight of 500gms and more.

Early neonatal death: The death of a live born during the first 7 days of life (36).

Late neonatal death: The death of a live born infant after 7 completed days, but before 28 completed days after birth (37).

Perinatal death: Perinatal deaths comprises the sum of all still births and early neonatal death (43).

Perinatal mortality rate: The sum of all perinatal deaths in relation to the sum of all still born and live born infant (36).

Maternal death: The death of a woman while pregnant or within 42 completed days of termination of pregnancy irrespective of duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or by its management but not due to accidental or incidental causes (33).

Birth Weight: The weight of a new born infant obtained preferably within one hour of birth (36).

Maternal mortality ratio: The number of maternal deaths per 1000 total births (36).

Low birth weight: birth weight of less than 2500 grammas (40).

Live birth: Live birth has occurred when the new born infant breathes or shows any sign of life such as, heartbeat, pulsation in the umbilical cord or movements of voluntary muscles (38).

Still birth: The birth of a dead fetus at 28 weeks or more and birth weight equal or more than 500gms (42).

Still birth rate: The number of still born infants per 1000 total births [live born + still born infants](41).

Prevalence: Quantifies the proportion of individuals in a population who have a disease at a specific time and provides an estimate of the probability (risk). The formula for calculating prevalence is number of existing cases of a disease at a given point in time × 1000 divided by total population (30)

CHAPTER FIVE: RESULT

Among 9327 deliveries at Wolisso hospital, 345 women had hypertensive disorder of pregnancy with the prevalence rate was 37 per 1000 deliveries based the data from a retrospective chart review of patients with Hypertensive Disorders of Pregnancy (HDP) who delivered at Wolisso catholic hospital between 01 January 2011 to 31 December 2013 with chart retrieval rate of 99.8 % (Table-1)

Table 1: Socio demographic characteristics of study participants, SLCH, Wolisso, from 01 January 2011 to 31 December 2013

Variables	Total mothers admitted to delivery & maternity ward **(n=9327)**		Mothers admitted with the diagnosis of HDP **(n=345)**		Mothers admitted to labor & maternity ward without HDP **(n=8982)**	
	Frequency	**%**	**Frequency**	**%**	**Frequency**	**%**
Age						
<18	516	5.5	19	5.5	497	5.5
18-35	8264	88.6	307	89.0	7957	88.6
>35	547	5.9	19	5.5	528	5.9
Residence						
Urban	3273	35.1	121	35.1	3152	35.1
Rural	6054	64.9	224	64.9	5830	64.9
Parity						
Primigravidae	2816	30.2	174	50.4	2642	29.4
Multigravidae	6511	69.8	171	49.6	6340	70.6

Demographic profile of hypertensive disorder of pregnancy

The most common age group HDP was seen between 18-35 years while the maximum age was 41years, with a median of 26 years and a mean of 26.90±5.49 (SD) years. Teenagers formed 19 (5.5%) of HDP cases. Mothers over 35 years formed 19(5.5%) of HDP cases while the bulk of the mothers were those in the age group of 18 to 35 years which formed 307(89%), followed by those in the age group >35 years, 19(5.5%) and 19(5.5%) cases in the age group <18 years.(Table-2) When categorized into Teenagers (<18yrs) and young (18-35yrs), among 138 sever preeclamptic mothers, 124(89.9%) had young patients as compared to 10(7.2%) of the Teenagers and 4(2.9%) of advanced maternal age (age>35years). And from the eclampsia 62(88.6%) was found age between 18-35yrs.

Gravidity ranged from 1 to 9. HDP cases comprised of 174 (50.4%) Primigravidae,171(49.6%) gravid two and above. (Table-2)

Among the HDP mothers 121(35.1%) was from urban area and 224(64.9%) from the rural area. There were significant difference in the distribution of pre-eclampsia and eclampsia in relation to the residential area 70(20.3%) of the eclamptic cases 14(20%) were from the urban areas and 56(80%) were from the rural areas. Mild Pre-eclamptic mothers (107) comprised of 43(40.2%) from the urban areas and 64(59.8%) from the rural areas and from sever pre-eclamptic mothers (138) comprised of 55(39.9%) from the urban area and 83(60.1%) from the rural area (p=0.05).

Out of total delivery admissions, 345 had HDP 70 (20.3%) of those with HDP were eclamptic, 107(31%) had mild preeclampsia and 138(40%) had severe preeclampsia. Of the n=307 young mothers (18–35 years) 124(40.4%) had sever pre-eclampsia, 62(20.2%) had eclamptic form of HDP. Primigravidae were the more affected during the period of study 174 (50.4%) of all patients with HDP 45(25.9%) of eclamptic patients were Primigravidae. (Table-2) 24(28.2%) of the eclamptic patients and 36(42.4%) Sever pre-eclamptic mother did not attend antenatal care services. (Table-6) Caesarian section was done on 30 (42.9%) of the 70 eclamptic mothers and on 22(20.6%) of the mild pre-eclamptic and 43(31.2%) of sever pre-eclamptic mothers. Preterm deliveries were common, of the 181 mothers who had preterm neonates, 74(40.9%) were sever pre-eclamptic mothers and 46(25.4%) of the eclamptic mothers.

Table 2: Demographic profile of hypertensive disorder of pregnancy, SLCH, Wolisso, from 01 January 2011 to 31 December 2013

Demographic profile of hypertensive disorder of pregnancy (n=345)							
Variables	Mild PE (n=107)	Severe PE (n=138)	Eclampsia (n=70)	PIH (n=15)	Chronic HTN(n=3)	Superimposed PE(n=12)	**Total (n=345)**
Age							
<18	3(0.9%)	10(2.9%)	5(1.4%)	1(0.3%)	0	0	19(5.5%)
18-35	95(27.5%)	124(35.9%)	62(18%)	14(4%)	2(0.6%	10(2.9%)	307(89%)
>35	9(2.6%)	4(1.2%)	3(0.9%)	0	1(0.3%)	2(0.6%)	19(5.5%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
Residence							
Urban	43(12.5%)	55(16%)	14(4.1%)	5(1.5%)	1(0.3%)	3(0.9%)	121(35.1%)
Rural	64(18.5%)	83(24%)	56(16.2%)	10(2.9%	2(0.6%)	9(2.6%)	224(64.9%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
Parity							
Primigravida	52(15.1%)	74(21.3%)	45(13%)	3(0.9%)	0	0	174(50.4%)
Multigravidae	55(16%)	64(18.5%)	25(7.3%)	12(3.5%)	3(0.9%)	12(3.5%)	171(49.6%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**

Medical and Pregnancy History of the study participants

Past Medical History

There were 15 cases that had chronic HTN and 4 cases that had DM in their previous pregnancies. (Table-6)

Booking status

Those who booked for antenatal care were three times greater than non booked,260(75.4%) and 85(24.6%) respectively. From those unbooked the majority 36(42.4%) develops sever pre-eclampsia and 24(28.2%) was develops eclampsia, lack of antenatal care might be attributed to the occurrence of the severe forms of HDP. Among booked 260 mothers, 114(43.8%) attain ANC follow up less than 4 times, which is not fulfill WHO recommendation, and 146 (56.2%) were greater than or equal to 4 times. Those mothers who did not follow ANC follow up the majority of rural area which contains 70(82.4%) followed by urban 15(17.6%). (Table-5)

Clinical Features:

Blood Pressure: The diastolic pressure ranged from 90 to 140 mmHg with a mean of 106.67mmHg. The systolic pressure ranged from 140 to 210mmHg with a mean of 163.3mmHg.

Characteristics of eclamptic patients

- Most eclamptic and pre-eclamptic patients were younger which found age between 18-35 years. Sever Pre-eclampsia occur in 124(40.4%) and Eclampsia occurred in 62 (20.2%) of the young age (18-35 years) mothers.
- Of the 174 Primigravida, 74(42.5%) had sever pre-eclampsia and 45 (25.9%) cases had eclampsia.
- Lack of Antenatal Care: A total of 85 HDP patients didn't attend ANC. Of the 70 eclamptic patients, 24(34.3%) did not attend ANC. This means that they were not monitored and therefore no timely interventions to avoid progressing in to eclamptic stage.(Table-5)

Table 3: Shows Laboratory Investigation and $Mgso_4$ treatment of HDP in SLCH, Wolisso from 01 January 2011 to 31 December 2013.

Variable	Type of HDP						
	Mild PE n (%)	Sever PE n (%)	Eclampsia n(%)	PIH n (%)	Chronic HTN n (%)	Superimposed PE n (%)	**Total N (%)**
Proteinuria							
+1	20(5.8%)	0	0	0	0	0	20(5.8%)
+2	87(25.2%)	0	0	0	0	12(3.5%)	99(28.7%)
+3	0	138(36.3%)	70(20.3%)	0	0	0	208(60.3%)
Negative	0	0	0	15(4.3%)	3(0.9%)	0	18(5.2%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
Platelet							
<100,000	0	26(7.5%)	33(9.4%)	0	0	0	59(17.1%)
100-150,000	34(9.8%)	51(14.8%)	25(7.1%)	0	0	9(2.6%)	119(34.5%)
>150,000	65(18.8%)	67(19.4%)	12(3.5%)	7(2%)	2(0.6%)	3(0.9%)	156(45.2%)
Not done	2(0.6%)	0	0	8(2.3%)	1(0.3%)	0	11(3.2%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
SGOT							
<=70U/L	106(30.7%)	117(33.9%)	43(12.5%)	0	0	12(3.5%)	278(80.6%)
>70U/L	0	21(6.1%)	27(7.8%)	0	0	0	48(13.9%)
Not done	1(0.3%)	0	0	15(4.3%)	3(0.9%)	0	19(5.5%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
Creatinine							
<=1.2gm/dl	106(30.7%)	130(37.7%)	60(17.4%)	0	0	12(3.5%)	308(89.3%)
>1.2gm/dl	0	8(2.3%)	10(2.9%)	0	0	0	18(5.2%)
Not done	1(0.3%)	0	0	15(4.3%0	3(0.9%)	0	19(5.5%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
Magnesium sulphate Rx							
Yes	53(15.4%)	108(31%)	66(19%)	0	0	11(3.2%)	238(69%)
No	54(16.6%)	30(8.7%)	4(1.2%)	15(4.3%)	3(0.9%)	1(0.3%)	107(31%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**

Laboratory Investigation of HDP

Overall Proteinuric hypertension was seen in 327(94.8%) of mothers, the bulk of the patients had 3 + proteinuria taken on two separate occasions by dipstick on random samples of urine taken 4 to 6 hours apart. Heavy proteinuria defined as 3+ or more, was seen in 208 (60.3%) of the patients. The

rest had moderate proteinuria, defined as 2+ on dipstick was seen in 99(28.7) cases and mild proeinuria seen in 20 (5.8%) cases.

Severe hypertension and high urine protein level were found to be associated with poor perinatal outcome. Among 37 still births 23 (62.2%) the mother urine protein was 3^{+} and also from 21 neonatal death 17(80.9%) was 3+ proteinuria, as shows in (Table-4). But there was no statistically significant association between proteinuria and poor perinatal outcome. ($p>0.05$) The study provides base line data on HDP in a hospital obstetric population in Wolisso, Important findings in this study is that there is a poor prenatal outcome among those who had proteinuria 3+. There is a need to conduct nationwide multi center study on HDP in order to have national base line data on this important pregnancy complication. Among 345 mothers admitted with the diagnosis of HDP Investigations of these were carried out in laboratory, Serum Creatinine, SGOT, platelet and urinary protein was determined from those 18(5.2%) mothers Serum Creatinine level >1.2gm/dl, 48(13.9%) mothers their SGOT level >70U/L and 59(17.1%) mothers platelet count was <100,000 and the majority of mothers 208(60.3%) urinary protein was +3.The most investigation deraignment seen in severe form of HDP(sever preeclampsia & eclampsia).(Table-3)

Table 4: Shows relationship between proteinuria and perinatal outcome in SLCH, Wolisso from 01 January 2011 to 31 December 2013.

	Fetal outcome				Total
Proteinuria	**Alive**	**Alive but admitted to NICU**	**Still birth**	**Neontal death**	
+1	9(2.6%)	11(3.2%)	0	0	20(5.8%)
+2	62(18%)	19(5.5%)	14(4%)	4(1.2%)	99(28.7%)
+3	104(30.1%)	64(18.6%)	23(6.7%)	17(4.9%)	208(60.3%)
Negative	14(4%)	4(1.2%)	0	0	18(5.2%)
Total	**189(54.8%)**	**98(28.4%)**	**37(10.7%)**	**21(6.1%)**	**345(100%)**

Table 5: Shows booking status and mode of delivery of HDP, SLCH, Wolisso, from 01 January 2011 to 31 December 2013

Variable	Type of HDP						
	Mild PE (n=107)	Sever PE (n=138)	Eclampsia (n=70)	PIH (n=15)	Chronic HTN (n=3)	Superimposed PE (n=12)	**Total (N=345)**
Booking							
No	22(6.4%)	36(10.4%)	24(6.9%)	2(0.6%)	1(0.3%)	0	85(24.6%)
Yes	85(24.7%)	102(29.6%)	46(13.3%)	13(3.8%)	2(0.6%)	12(3.5%)	260(75.4%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
<4 times	35(10%)	47(13.6%)	24(6.9%)	3(0.9%)	1(0.3%)	4(1.2%)	114(33.1%)
>4times	50(14.5%)	55(15.9%)	22(6.4%)	10(2.9%)	1(0.3%)	8(2.3%)	146(42.3%)
Total	**85(24.6%)**	**102(29.6%)**	**46(13.3%)**	**13(3.8%)**	**2(0.6%)**	**12(3.5%)**	**260(75.4%)**
Mode of delivery							
SVD	83(24%)	94(27.2%)	39(11.3%)	15(4.3%)	3(0.9%)	6(1.7%)	240(69.6%)
Instrumental	2(0.6%)	1(0.3%)	1(0.3%)	0	0	0	4(1.2%)
CS	22(6.4%)	43(12.5%)	30(8.7%)	0	0	6(1.7%)	101(29.3%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.4%)**	**345(100%)**

Mode of delivery and maternal complication

Maternal outcome was measured in terms of various maternal complications, mode of delivery, and maternal mortality. The management of pre-eclampsia and eclampsia is mainly to deliver the baby by the most suitable method. A total of 231(66.6%) patients was induced, among them the majority was sever pre-eclamptic mothers which comprises 103(44.6%) followed by eclamptic mother 60(26%), the remain 114(33%) mothers the labour start spontaneously. Among induced labour 133(57.6%) was preterm neonate.

Induction of labour was more common at Wolisso hospital where 67% (n=231) of cases were induced; from 181 preterm neonates 133(73.5%) was due to induction of labour. My findings show that this could be due to high rate of induction of labour, severe cases of HDP such as severe pre-eclampsia and eclampsia result into preterm deliveries. (Table-8)

Overall caesarian section rate at Wolisso hospital was 101(29.3%), this is much higher than the overall intervention rate in the hospital's obstetric population during the studied period. 240 (69.6%)

had spontaneous vaginal delivery and 4 (1.2%) had vacuum extraction done. Caesarean section was done on 30(42.9%) of the 70 eclamptic mothers and 43(31.2%) sever preeclamptic mothers. Among the mild pre-eclamptic mothers (n=107), 22(20.6%) had caesarean section, 83(77.6%) mothers delivered though SVD and vacuum extraction was done for 2(1.9%) mothers. (Table-5)

Indication for C/S was failed induction and augmentation 33(32.7%), uncontrolled eclampsia 18(17.8%), uncontrolled pre-eclampsia 17(16.8%), IUGR 9(8.9%), CPD 8(7.9%), malpresentation 7(6.9%), oligohydraminosis 3(2.97%), abruptio placenta 3(2.97%), fetal distresses 2(1.98%) and previous two scar 1(0.99%).

Table 6: Medical and pregnancy History of the study participants on HDP in SLCH, Wolisso from 01 January 2011 to 31 December 2013.

Variable	**Type of HDP**						
	Mild PE	Sever PE	Eclampsia	PIH	Chronic HTN	Superimposed PE	**Total N (%)**
Number of pregnancy							
Single tone	94(27.2%)	122(35.4%)	62(18%)	15(4.3%)	3(0.9%)	12(3.5%)	314(91%)
Twin	8(2.3%)	14(4.1%)	2(0.6%)	0	0	0	24(7%)
>= 3	2(0.6%)	0	0	0	0	0	2(0.6%)
Molar pregnancy	3(0.9%)	2(0.6%)	0	0	0	0	5(1.4)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
Onset of Labor							
Spontaneous	50(14.5%)	35(10%)	10(2.9%)	13(3.8%)	3(0.9%)	3(0.9%)	114(33%)
Induced	57(16.5%)	103(29.9%)	60(17.4%)	2(0.6%)	0	9(2.6%)	231(67%)
Total	**107(31%0**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
Hx of HTN							
Yes	0	0	0	0	3(0.9%)	12(3.5%)	15(4.3%)
No	107(31%)	138(40%)	70(20.3%)	15(4.1%)	0	0	329(95.4%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
Hx of DM							
Yes	0	2(0.6%)	1(0.3%)	0	1(0.3%)	0	4(1.2%)
No	107(31%)	132(39.4%)	69(20%)	15(4.3%)	2(0.6%)	12(3.5%)	341(98.8%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**

Table 7: Maternal complication and outcomes of HDP, SLCH, Wolisso, from 01 January 2011 to 31 December 2013

Variables	Mild PE (n=107)	Severe PE (n=138)	Eclampsia (n=70)	PIH (n=15)	Chronic HTN (n=3)	Superimpose PE(n=12)	**Total (N=345)**
Maternal complication							
Abruptio placenta	1(0.3%)	6(1.8%)	5(1.5%)	0	0	1(0.3%)	13(3.8%)
PPH	10(2.9%)	14(4.1%)	4(1.2%)	0	0	2(0.6%)	30(8.7%)
HEELP syndrome	0	17(4.9%)	21(6.1%)	0	0	0	38(11%)
Infection	3(0.9%)	11(3.2%)	3(0.9%)	0	0	1(0.3%)	18(5.2%)
PROM	1(0.3%)	0	0	0	0	0	1(0.3%)
Acute renal failure	0	0	1(0.3%)	0	0	0	1(0.3%)
Pulmonary edema	0	0	2(0.6%)	0	0	0	2(0.6%)
Multiple organ failure	0	0	1(0.3%)	0	0	0	1(0.3%)
No complication	88(25.2%)	94(27.3%)	33(9.6%)	15(4.4%)	3(0.9%)	8(2.3%)	241(69.9%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
BP on discharge							
<=140/90	107(31%)	137(39.7%)	64(18.6%)	15(4.3%)	2(0.6%)	10(2.9%)	335(97.1%)
>140/90	0	1(0.3%)	1(0.3%)	0	1(0.3%)	2(0.6%)	5(1.4%)
Not recorded(death)	0	0	5(1.4%)	0	0	0	5(1.4%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
Maternal outcome							
Alive	107(31%)	138(40%)	65(18.9%)	15(4.3%)	3(0.9%)	12(3.5%)	340(98.6%)
Maternal death	0	0	5(1.4%)	0	0	0	5(1.4%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**

Maternal Complications

The following complications were observed:

- Severe preeclampsia occurred in 138 (40%) of the 345 HDP mothers.
- Eclampsia occurred in 70 (20.3%) of the 345 HDP cases. Of the eclamptic mothers 31(44.3%) were brought by family to hospital from home with history of coma & convulsion, 25(35.7%) with convulsion only and 14(20%) of eclamptic mothers presented with coma only, HEELP syndrome occurred in 38(11%) of the cases. Among them sever pre-eclampsia comprises 17(44.7%) and eclampsia contains 21(55.3%). More than half of HEELP syndrome occurs in eclamptic mothers it means that when the severity of the disease increases the chance to develop the complications (DIC) also increase. Fetal

complications include abruptio placenta, intrauterine growth restriction, premature delivery, and intrauterine fetal death. In this study almost all complications like abruption, HELLP syndrome, premature delivery and intrauterine death were seen among severe category of HDP. Even though complications are likely in any category this study has shown a clear occurrence of complications in severe hypertension than in other categories.(Table-7)

- Acute renal failure (oliguria or Anuria) was present in 1(0.96%) cases of HDP.
- Abruptio placenta occurred in 13(12.5%) cases of HDP, the majority occurs in severe form of HDP, sever pre-eclampsia and eclampsia 6(1.8%) and 5(1.5%) respectively.
- Pulmonary edema occurs in 2(1.9%) of cases both were seen in eclamptic form of HDP.
- PPH occurs in 30(28.8%) cases of HDP, the majority seen in sever pre-eclampsia 14(4.1%)
- Infections occurs in 18(17.3%) of HDP.
- PROM occurs in 1(0.96%) of HDP.
- Multiple organ failure occurs in 1(0.96%) of HDP.
- Maternal death-There was 5(1.4%) maternal deaths, all in patients in the eclampsia group, comprising 7.1% of that group (Table-7).The overall maternal mortality rate was 1.4% of all study cases. This case had a combination of the following complications: acute renal failure, pulmonary edema and then eventual death. Among 340(98.6%) alive mothers during discharge to home 335(97.1%) there B/P were<= 140/90 mmHg and 5(1.4%) were > 140/90mmHg.(Table-7)

Management of Preeclampsia/eclampsia

The primary objective of treatment in women with preeclampsia is to prevent eclampsia by keeping the diastolic blood pressure between 90 mmHg and 100 mmHg. Based on the severity of the disease process, the status of mother and fetus, and the length of gestation a decision is made regarding hospitalization, expectant management, or delivery (24). The predominant mode for treating preeclampsia includes anti-hypertensive, anticonvulsant and interruption of pregnancy (25).

Regarding anti-hypertensive drug treatment, there were no standardized regimens in hospitals. Monotherapy with Methyldopa was commonly used for mild pre-eclampsia and in case of sever pre-eclampsia and eclampsia add hydralizine and nifedepin according to severity of the disease.

Magnesium sulphate anticonvulsant treatment was started according to national guideline for 66(94.3%) of eclamptic mother and 108(78.3%) of sever pre-eclamptic mother, but 4(5.7%) eclamptic and 30(21.7%) of sever pre-eclamptic mother not start the prophylaxis. (Table-3)

Management of eclampsia

Initial management of eclampsia includes protecting the airways and minimizing the risk of aspiration by placing the patient on her left side. It is also important to prevent trauma from falls or violent seizure activity. A plan for delivery should be made for women with ante- or intrapartum eclampsia when the condition is stabilized.

Table 8: Prenatal outcome and mode of delivery of HDP, SLCH, Wolisso, from 01 January 2011 to 31 December 2013

Variables	Mild PE (n=107)	Severe PE (n=138)	Eclampsia (n=70)	PIH (n=15)	Chronic HTN (n=3)	Superimposed PE (n=12)	**Total (N=345)**
Perinatal outcome							
Stillbirth	15(4.4%)	9(2.6%)	12(3.5%)	0	0	1(0.3%)	37(10.7%)
Neonatal death	7(2%)	7(2%)	6(1.7%)	0	0	1(0.3%)	21(6.1%)
Admitted to NICU	21(6.1%)	45(13%)	23(6.7%)	1(0.3%)	3(0.9%)	5(1.4%)	98(28.4%)
Alive	64(18.5%)	77(22.3%)	29(8.4%)	14(4%)	0	5(1.4%)	189(54.8)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
Preterm	51(14.8%)	74(21.4%)	46(13.3%)	3(0.9%)	2(0.6%)	5(1.4%)	181(52.4%)
Term	55(16%)	62(18%)	24(7%)	12(3.5%)	1(0.3%)	7(2%)	161(46.7%)
Post term	1(0.3%)	2(0.6%)	0	0	0	0	3(0.9%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**
Birth weight(BW)							
Extremely LBW<1500gm	7(2%)	13(3.8%)	7(2%)	0	0	2(0.6%)	29(8.4%)
LBW (wt 1500-2500gm)	40(11.6%	53(15.4%)	33(9.6%)	1(0.3%)	3(0.9%)	2(0.6%)	132(38.3%)
BWt B/n 2500-4000gm	55(16%)	68(19.7%)	27(7.8%)	14(4%)	0	7(2%)	171(49.6%)
BWt > 4000gm	5(1.4%)	4(1.2%)	2(0.6%)	0	0	1(0.3%)	12(3.5%)
Total	**107(31%)**	**138(40%)**	**69(20%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**344(99.7%)**
APGAR Score							
< 7	12(3.5%)	35(10.1%)	25(7.2%)	0	1(0.3%)	4(1.2%)	77(22.2%)
>= 7	73(21.2%)	87(25.2%)	27(7.8%)	15(4.3%)	2(0.6%)	6(1.7%)	210(60.9%)
0	22(6.4%)	16(4.6%)	18(5.2%)	0	0	2(0.6%)	58(16.8%)
Total	**107(31%)**	**138(40%)**	**70(20.3%)**	**15(4.3%)**	**3(0.9%)**	**12(3.5%)**	**345(100%)**

Birth Weight and Perinatal Outcomes

Perinatal Outcomes: Fetal and neonatal outcomes were measured in terms of prevalence, low birth weight, Apgar score, the need for resuscitation and/or admission to a neonatal intensive care unit, and stillbirths and neonatal deaths. In this study 77(22.3%) of babies were born with an Apgar score < 7 for fifth minutes, the majority was sever pre-eclampsia which contains 35(45.5%) followed by eclampsia 25(32.5%) and 210(60.9%) were born with Apgar score >= 7 for fifth minutes. Among the 70 eclamptic mothers, 52(74.3%) had live births, 12(17.1%) had stillbirths and 6(8.6%) had neonatal death.(Table-8) The mild pre-eclamptic had a different pattern with 85(79.3%) live births, 15(14%) still births, and 7(6.5%) neonatal death, In case of sever pre-eclampsia live birth was 122(88.4%) with 9(6.5%) still birth and 7(5%) neonatal death. Overall NICU admission of 98(28.4%) neonates the majority 45(45.9%) was comprised by sever pre-eclampsia followed by eclampsia 23(23.5%). Preterm delivery (birth before 37 weeks of gestation) was prominent among sever pre-eclampsia with 74(40.9%) preterm deliveries and while eclampsia had 46(25.4%) preterm deliveries. 161(46.7%) neonates had low birth weight (birth weight below 2500grammes) from this 29(8.4%) was extremely low birth weight (birth weight <1500grammes) while 171(49.6%) had normal birth weights (birth weight between 2500grammes-4000grammes) and 12(3.5%) had birth weight > 4000grammes. There was no information about one baby his mother died. Among LBW neonates 66(41%) were contributed by sever pre-eclampsia and 40(24.8%) by eclampsia. There was no association between severe form of HDP and low birth weight. (P=0.05)

It is apparent from this result that there are a significant number of babies who needed special care, ventilation and NICU admission following the delivery (Table-8). This is most probably due to early termination of pregnancy due to sever hypertension (sever pre-eclampsia and eclampsia).

Table 9: Association of factors with HDP in pregnant mothers admitted to the labor and maternity wards of Wolisso SLCH from 01 January 2011 to 31 December 2013.

Variables		HDP			COR (95%CI)	AOR (95%CI)
		Yes	No	Total		
Residence	Urban	121	3152	3273	**0.99 (0.9-1.1)**	**1.001 (0.79-1.25)**
	Rural	224	5830	6054	**1**	**1**
	Total	**345**	**8982**	**9327**		
Teenage pregnancy (age < 18 years)	Yes	19	497	516	**0.99 (0.9-1)**	**0.94 (0.49-1.79)**
	No	326	8485	8811	**1**	**1**
	Total	**345**	**8982**	**9327**		
Maternal age >35years	Yes	19	528	547	**0.9 (0. 8-1.2)**	**0.9 (0.9-1)**
	No	326	8454	8780	**1**	**1**
	Total	**345**	**8982**	**9327**		
Primigravidae	Yes	174	2642	2816	**2.44 (1.7-4.3)**	**0.410* (0.30-0.508)**
	No	171	6340	6511	**1**	**1**
	Total	**345**	**8982**	**9327**		
Number of fetus	Single	319	8356	8675	**1**	**1**
	Twin	24	603	627	**0.9 (0.7-1)**	**2.54* (1.009-6.410)**
	>= 3	2	23	25		
	Total	**345**	**8982**	**9327**		
Molar pregnancy	Yes	5	52	57	**2.53 (1.5-4.5)**	**2.525* (1.002-6.363)**
	No	340	8930	9270	**1**	**1**
	Total	**345**	**8982**	**9327**		

***Significant association at p<0.05**

Predictors for hypertensive disorders

There was no significant association between hypertensive disorders of pregnancy, residence and maternal age but there is significantly association between hypertensive disorder of pregnancy and number of fetus, (Multifetal gestation), (AOR=2.543, 95% CI=1.009-6.410; P=0.048), mother who has multiple fetal gestation has 2.54 times higher risk to develops HDP than mother who has single tone gestations.

Premigravidity was associated with hypertensive disorder of pregnancy (AOR= 0.410, 95% CI=0.30─0.508; P=0.001. There was significances of HDP among the Primigravidae than in the

Multigravidae, Multiparous women had a lower risk of HDP than those who were primipara (adjusted OR =0.410, 95% CI=0.30─0.508; P=0.001.)

Molar pregnancy was significantly associated with HDP (AOR=2.4, 95%CI=1.002-6.363; p=0.049).Mother who had molar pregnancy has 2.4 times higher risk to develops HDP than normal pregnancy. (Table-9)

CHAPTER SIX: DISCUSSION

Socio demography and the Magnitude of the Disease

Hypertensive disorders represent the most common medical complications of pregnancy with a reported incidence between 5 and 10%. The disorders are major causes of maternal and perinatal morbidities and mortalities. This study was conducted to determine the pattern and outcomes of pregnancies complicated by hypertensive disorders.

This paper describes data from a retrospective chart review of patients with pre-eclampsia and eclampsia who delivered at Wolisso catholic hospital between01 January 2011 to 31 December 2013. The main objective was to determine the magnitude, maternal and prenatal outcomes in women with hypertensive disorders of pregnancy and to compare the findings. Data collection was done using a compilation form. Information about patients' demographic data, past medical history, past obstetric history and laboratory investigations was collected.

The most common age group HDP was seen between 18-35 years while the maximum age was 41years, with a median of 26 years and a mean of 26.90±5.49 (SD) years. Teenagers formed 19(5.5%) of HDP cases. Mothers over 35 years formed 19(5.5%) of HDP cases while the bulk of the cases were those in the age group of 18 to 35 years which formed 307(89%) followed by those in the age group >35 years 19(5.5%) and19(5.5%) mothers in the age group <18 years. When categorized into Teenagers (<18yrs) and young (18-35yrs), 124(89.9%) of the young patients had a severe preeclampsia as compared to 10 (7.2%) of the Teenagers and 4(2.9%) of advanced maternal age (age>35years). One study done in Jimma university, among mothers with HDP, majority (52.5%) of the mothers were in the age group of 25 - 34 years and Severe preeclampsia accounted for 51.9% of the cases followed by eclampsia (23.4%), While a similar study at Umtata General Hospital (UGH) in South Africa indicated 27.3% of the hypertensive patients were teenagers, 18.3% were mothers of over 35years and 42.9% were Primigravida (19). Paul Gibson et al 2005 have clearly shown a significant relationship between severe pre-eclampsia with advancing maternal age (51). But in this study no a significant relationship between severe pre-eclampsia with advancing maternal age (p=0.26).This also corresponds to the findings of Hall et al where younger women are at higher risk for developing eclampsia (33).

Majority (50.4%) of the mothers affected by the disorder were Primigravida which is similar with the finding of a study conducted in JUSH (66.5%). More severe forms of HDP were found to be more

common in Primigravidae ladies, in this study there was statistically significant association between parity and severity of HDP.(p=0.00) However, the proportion of mothers from rural area was 224(64.9%) and there was no statistically significant association between place of residence and the severity of HDP.(p=0.05)

Among the HDP mothers 121(35.1%) was from urban area and 224(64.9%) from the rural area. There were significant difference in the distribution of pre-eclampsia and eclampsia in relation to the residential area 70(20.3%) of the eclamptic cases 14(20%) were from the urban and the majority 56(80%) were from the rural. Mild Pre-eclamptic mothers (107) comprised of 43(40.2%) from the urban and 64(59.8%) from the rural and from sever pre-eclamptic mothers (138) comprised of 55(39.9%) from the urban and 83(60.1%) from the rural area.

In this study the majority of sever pre-eclampsia 74(53.6%) and 45(64.3%) eclamptic lady was Primigravidae. There is statistically significant association between primigravidae and sever form of HDP. (P=0.00) Similar study in Saudi Arabia showed that 30.3% were Primigravidae and 46% were grandmultipara (13).These is in line with the study done in JUSH, which show 66.7% of the mothers who were admitted with HDP during the study period were nulliparous and majority of the mothers who were affected by HDP (56.9%) were from rural area (48).

There were 345 mothers admitted with HDP within the given period and 9327 deliveries making the incidence of preeclampsia/ eclampsia 37/1000 deli/veries of the 345 women with the diagnosis of HDP, 107(31%) had mild pre-eclampsia, 138(40%) severe pre-eclampsia and 70(20.3%) eclampsia. This corresponds to the study at JUSH, 12(7.6%) cases of mild preeclampsia, 51.9% severe preeclampsia and 23.4% eclampsia (36). Similar study was conducted at Tikur Anbessa central referral Hospital the majority (78.2%) were severe pre eclampsia and eclampsia (2). According to a population based study in South Africa the incidence of Preeclampsia was 12% (17). Studies in Ethiopia show that the incidence of Preeclampsia is around 5% of which majority were due to severe preeclampsia; eclampsia complicates 0.7% of the pregnancies (8).

Those who booked for antenatal care were three times greater than unbooked;260(75.4%) and 85(24.6%) respectively. There were similarities in antenatal care attendance of the hypertensive patients: 260(75.4%) at Wolisso hospital compared to 74.7% at Jimma university specialized hospital. From those unbooked the majority 36(42.4%) develops sever pre-eclampsia and 20(23.5%) was develops eclampsia, in JUSH 25.3% and in Addis 16%.Among booked 260 cases, 114(43.8%) attain ANC follow up less than 4 times, which is not fulfill WHO recommendation, and 146 (56.2%)

were greater than or equal to 4 times which is better than Afghan 48% of Afghan women (77% in urban areas and 41% in rural areas) reported receiving ANC and only 15% made at least four ANC visits (24) . Those mother who did not receiving ANC follow up the majority of rural which contains 70(82.4%) followed by urban 15(17.6%). Lack of antenatal care might be attributed to the occurrence of the severe forms of HDP. There was statistically significant association between ANC follow up and severity of HDP. (p=0.00). There were 15 cases that had chronic HTN and 4 cases that had DM in their previous pregnancies, in this study There was statistically significant association between history of chronic hypertension and HDP.(p=0.00) But there was no statistically significant association between history of DM and HDP.(p=0.135)

Laboratory Investigation Finding of HDP

Overall Proteinuric hypertension was seen in 327(94.8%) of mothers, the bulk of the patients had 3+ proteinuria; taken on two separate occasions by dipstick on random samples of urine taken 4 to 6 hours apart. Heavy proteinuria defined as 3+ or more, was seen in 208 (60.3%) of the patients. The rest had moderate proteinuria, defined as 2+ on dipstick was seen in 99(28.7) cases and mild proeinuria seen in 20(5.8%) cases. This result was higher than that of the study done in South Africa; Proteinuric hypertension was present in 66% of the hypertensive women at admission and 26.8% in North India. (19)

Severe hypertension and high urine protein level were found to be associated with poor prenatal outcome. Among 37 still births 23(62.2%) the mother urine protein was 3^{+} and also from 21 neontal deaths 17(80.9%) was 3+ proteinuria; as the same finding in black Lion hospital. The study provides base line data on HDP in a hospital obstetric population in Wolisso. An important finding in this study is that there is a poor prenatal outcome among those who had proteinuria 3+. (Table-4) But there was no statistically significant association between proteinuria and poor perinatal outcome. (p>0.05) There is a need to conduct nationwide multi center study on HDP in order to have national base line data on this important pregnancy complication. Among 345 mothers admitted with the diagnosis of HDP Investigations of these were carried out in laboratory, Serum Creatinine, SGOT, platelet and urinary protein was determined from those, 18(5.2%) mothers Serum Creatinine level >1.2gm/dl, 48(13.9%) mothers their SGOT level >70U/L and 59(17.1%) mothers platelet count was <100,000 and the majority of mothers 208(60.3%) urinary protein was +3.The most laboratory investigation deraignment seen in severe form of HDP(sever preeclampsia & eclampsia).(Table-3)

Management of mother with HDP

The primary objective of treatment in women with preeclampsia is to prevent eclampsia by keeping the diastolic blood pressure between 90 mmHg and 100 mmHg. While maternal diastolic blood pressure (DBP) greater than 110 mm Hg is associated with an increased risk for placental abruption and fetal growth restriction. Superimposed preeclampsia disorders cause most of the morbidity due to chronic hypertension during pregnancy (23).

Based on the severity of the disease process, the status of mother and fetus, and the length of gestation a decision is made regarding hospitalization, expectant management, or delivery (24). The predominant mode for treating preeclampsia includes anti-hypertensive, anticonvulsant and interruption of pregnancy (25).

Regarding antihypertensive drug treatment, there were no standardized regimens in hospitals. Monotherapy with Methyldopa was commonly used for mild pre-eclampsia and in case of sever pre-eclampsia and eclampsia add hydralizine and nifedepin according to severity of the disease. Based on the results of 10 randomized trials evaluating drug treatment in women with mild preeclampsia, Sibia BM also commented that there was no clear benefit to drug treatment in women with mild pre-eclampsia(23). Antihypertensive treatment is recommended to prevent cerebrovascular complications with blood pressure ≥160/110 mmHg (37; 38), but antihypertensive drugs do not prevent the progression of pre-eclampsia. To prevent eclampsia in patient with pre-eclampsia anticonvulsants are used. C. W. Redman writes in the text book "Obstetrics": "The commonest difficulty is to identify accurately which patients are likely to have fits" (39). In the" The Magpie Trial", Altman et al randomized 10,441 women with pre-eclampsia to magnesium sulphate ($MgSO_4$) versus placebo. The risk of eclampsia was more than halved amongst women with pre-eclampsia following $MgSO_4$ therapy (40).

In 14 trials (2777 women) magnesium sulphate anticonvulsant was associated with a reduction in maternal death and the risk of recurrence of further fits when compared to diazepam (27), therefore $MgSO_4$ is the therapy of choice to control and prevent recurrent seizures (42,45)

The Cochrane review by Duley et al included studies on $MgSO_4$ for women with preeclampsia and concluded (41); $MgSO_4$ more than halves the risk of eclampsia, and probably reduces the risk of maternal death. It does not improve (40, 42) short term outcome for the baby. A quarter of women treated with $MgSO_4$ have side effects, particularly flushing.

Magnesium sulphate treatment was started according to national guideline for 66(94.3%) of eclamptic mothers and 108(78.3%) of sever pre-eclamptic mothers but 4(5.7%) eclamptic and 30(21.7%) of sever pre-eclamptic mothers not start the prophylaxis.

Onset of Labour

A total of 231(66.9%) patients were induced, which is much higher than Black Lion 44.3%, 36.6% in JUSH (2,36). Among them the majority was sever pre-eclamptic mother which comprises 103(44.6%) followed by eclamptic mother 55(23.8%).The remain 114(33.1%) mothers the labor start spontaneously. Among induced labour 133(57.6%) was preterm neonate. This findings show that this could be due to high rate of induction of labour, severe cases of HDP such as severe pre-eclampsia and eclampsia result into preterm deliveries but there was no statistically significant association between of induction of labour, severe form of HDP and preterm deliveries (p=0.15)

Mode of Delivery in HDP

The management of pre-eclampsia and eclampsia is to recognize the disease and find the right timing of delivery and deliver the baby by the most suitable method, to prevent maternal or fetal complications from disease progression. Overall 29.3% of the women in this study were delivered by means of Caesarean section, 34% in JUSH and 44.3% in Black Lion hospital (36). This rate of caesarean delivery is lower than that reported by Hall et al where 81.5% of pre-eclamptic gave birth by means of caesarean section (33) and that of the epidemiological studies in a Srilankan population, where 77.8% women needed a Caesarean section for delivery (7). This was similar with Al-Mulhim et al's study that reported the spontaneous vaginal delivery to be less frequent (69%) among pre-eclamptic women compared to normotensive women (86.2%) implying that being pre-eclamptic predisposes to caesarean delivery (16).In this study, Caesarean section was done on 30(42.9%) of the 70 eclamptic mothers and 43(31.2%) sever preeclamptic mothers, 39(55.7%) eclamptic mothers and 94 (68.1%) of sever preeclamptic mothers delivered through spontaneous vaginal delivery (SVD).

Indication for C/S was failed induction and augmentation 33(32.7%), uncontrolled eclampsia 18(17.8%), uncontrolled pre-eclampsia 17(16.8%), IUGR 9(8.9%), CPD 8(7.9%), malpresentation 7(6.9%), oligohydraminosis 3(2.97%), abruptio placenta 3(2.97%), fetal distresses 2(1.98%) and previous two scar 1(0.99%)

Maternal outcome of HDP

The maternal complication rate that was observed in 104 (30.2%) of this study was the same that of Lee and his colleagues' report where 32% of the pre-eclamptic women in their study had major maternal complications.(18) The observed complications in this study were abruptio placenta in 13 (12.5%), HELLP syndrome in 38(36.5%), PPH in 30 (28.8%), Infection 18(17.3%), Acute renal failure 1(0.96%), pulmonary edema in 2(1.9%), PROM 1(0.96%) and multiple organ failure 1(0.96%). These complications were similar but less than that of the findings similar study done in South Africa, Umtata general hospital Eclampsia occurred in 15% of the HDP and the incidence of eclampsia in the general obstetric population was high at 7 per 1000 deliveries (27). Other maternal complications of hypertension included, pulmonary edema (3.9%), abruptio placenta (1.7%), HELLP syndrome (1.2%), maternal death (1.0%), acute renal failure (0.9%), coma with cerebral pathology (0.5%), and DIC (0.5%)(21). Hypertension accounted for 33% of all maternal deaths during this period, and almost all were eclamptic(23).In this study HEELP syndrome is the commonest complication observed during the study period but Abruptio placenta was the commonest maternal complication observed in the study of Al-Mulhim and his colleagues (12).

Maternal death occur in 5(1.4%) of eclamptic women during the study period. In comparison, only two eclamptic women were died in the study of JUSH and 8.9% HEELP syndrome. In the last two years, there were 15 deaths due to eclampsia/ preeclampsia accounting for 35.7% of the maternal deaths at Black lion hospital & Gandhi mimoral hospital (52). Maternal mortality is high in Sudan with pre-eclampsia/eclampsia which accounts for 4.2% of the obstetric complications in Kassala, Eastern Sudan and represents 18.1% of the direct causes of maternal deaths (53). My finding was less than 33% of maternal deaths observed between 1998 and 2000 in South Africa (12). According to the study done in Mayo hospital, the maternal mortality due to eclampsia was around 24% (21). In India, the rate of maternal mortality was 5.55% of the deliveries and HEELP syndrome is 7% (16).

Perinatal Outcome of HDP

161(46.7%) neonates had a birth weight of less than 2500gm (LBW), from this 29 (8.4%) was extremely low birth weight (birth weight <1500grammes).This figure is higher than one study done in JUSH which is the rates of low and very low birth weight infants among 146 deliveries in the study subjects were 35.6% and 12.3%, respectively (36), This result also higher than UGH, South Africa 19.9% was LBW during given study period. Among LBW the majority was comprised by sever pre-eclampsia 66(41%) and 40(24.8%) was by eclampsia. A significant association between HDP and

low birth weight was shown by earlier studies in Ethiopia and Portugal, in this study also there is statistically significant association between LBW and Eclampsia. (p=0.00) The observed trend of birth weight was also similar to those of other studies. The lower birth weight among the severe pre-eclampsia which was observed in this study corresponds to that of JUSH's study where the birth weights were significantly lower in women with severe preeclampsia (46)

Pre-eclampsia is responsible for the occurrence of more than 40% of premature deliveries around the globe (20). This was also observed in this study where 181 (52.5%) of the neonates were delivered prematurely. Preterm delivery (birth before 37 weeks of gestation) was prominent among sever pre-eclampsia with 74(40.9%) while eclampsia had 46(25.4%) preterm deliveries which is slightly higher as compared to Black Lion hospital Preterm delivery rate was 48.6%(2) Overall NICU admission of 98(28.4%) neonates the majority 45(45.9%) was comprised by sever pre-eclampsia followed by eclampsia 23(23.5%).Study in Portugal showed a statistically significant association between preterm delivery and severity of HDP.(32). In this study no association between preterm delivery and severity of HDP. (p=0.1)

Overall 37(10.7%) stillbirths and 21(6.1%) early neonatal deaths (ENND) occurred making the perinatal deaths 16.8% of the deliveries and the perinatal mortality rate 168/1000 deliveries. The majority of stillbirth comprises by mild pre-eclampsia 15(40.5%) still births, and 7(33.3%) neonatal death, followed by eclampsia 12(32.4%) had stillbirths and 6(28.6%) had neonatal death and sever pre-eclampsia 9(24.3%) still birth and 7(33.3%) neonatal death, Study done in UGH, South Africa had similar finding IUFD (11.2%) and neonatal deaths (3.8%)(24).These is higher than other studies in Ethiopia and that of the study done in JUSH which was 138.9/1000 deliveries (36). In India, perinatal deaths occurred in 37.5% of the deliveries (16).

In comparison, from 114 Sinhalese neonates delivered alive, 30 were died during the immediate postpartum period, before the mother was discharged. 7% of pregnancies resulted in stillbirths. Overall 25% babies died during the perinatal period. Of the 77 babies born to mothers developing pre-eclampsia before 34 weeks of gestation, 15.6% were stillbirths and only 46.7% survived to go home with the mother. There were only 2.9% confirmed perinatal deaths among babies of women who developed late onset pre-eclampsia. In comparison, perinatal mortality rates of 17% have been reported in Sri Lanka (7)

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATION

7.1. Conclusion

This study was done with the background of a high maternal mortality ratio of 676 per 100,000 live births in Ethiopia. The low prevalence of HDP in Wolisso (3.6%) contradicts the available literature which relates higher MMR with higher prevalence. According to this study, most of the severe preeclamptic and eclamptic women were from rural area. The majority was primigravidae; mortality was highest in the eclampsia group, possibly because of the severity of the disease itself and the associated systemic complications.

The high antenatal coverage (75.4% attendance) during the period of study might mean that more women were well informed about the health services. This (high ANC coverage) might have good opportunity to the utilization of the maternal services, might also mean high utilization rate of delivery services, and detect HDP early stage and it help to prevent further complication.

In current Ethiopia situation low coverage rate of ANC services it is difficult to detect HDP at early stage and the patient visit the health institution after the disease become advanced, acute stage of HDP was already elapsed and after the patient fall in complications (eclampsia/HEELP syndrome/multiple organ failure).

The institutional delivery rate of the delivery services in Ethiopia is 10%, which means that those who do not deliver in the hospital were not included in this hospital based study. This could explain the low prevalence rate of HDP in Wolisso. However, the hospital based study was favored since the diagnosis at the hospital is done by qualified personnel and usually true.

A higher frequency of adverse fetal outcomes was found in severe form of HDP womens and Proteinuric 3^{+} mothers. Overall maternal mortality was lower in this study than in previous similar studies, which might be due to the increased number of prompt deliveries, with magnesium sulfate therapy and good intensive care. However, there was a higher incidence of stillbirth and neonatal death in this study compared to in previous studies. There is need for much emphasis on the screening of the pregnant mothers for hypertension early at ANC before the disease becomes advanced and complicated. In this study some eclamptic and sever pre-eclamptic mothers were not started the $mgso_4$ prophylaxis this can affect the maternal and fetal outcome.

Parity, molar pregnancy and multiple fetal gestations are detected as associated factor of HDP but maternal age and residence is not associated with HDP.

Limitation of the Study

- The fact that there was no possibility to enquire more about individual cases from the patients or relatives was a great limitation of the study. In the area where study was conducted the patient document handling was poor so that difficult to obtain full information of the patient, this was because record keeping efficiency and the purpose for information documentation. The OPD card and inpatient card put in different place after patient discharge to home so that difficult to collect card even if the patient cannot got his inpatient card for re-visit.
- The research outcome generates only from patients registrations.
- The data collected was not represent the entire Ethiopia district since it was conducted at a referral hospital for the district (provide services to both rural and urban populations). The findings were a reflection of the town of Wolisso since all obstetric emergencies in the town are managed at this hospital and the prevalence was calculated basing on all pregnant women who delivered at Saint Luke catholic hospital, Wolisso.
- The sitting of study is far from advisors so that it is difficult to easily contact to the advisors.

7.2. Recommendation

Morbidity and mortality associated with hypertensive disorders of pregnancy are the most difficult to prevent. A well structured research work is needed to determine the Preconception risk factors e.g. partner risk factor, maternal-specific risk factor, Presence of specific underlying disorders and Pregnancy related risk factors and application of specific primary prevention in high risk population.

High urine protein level were found to be associated with poor prenatal outcome, therefore there is a need to conduct nationwide multi center study on HDP in order to have national base line data on this important pregnancy complication.

The population in Ethiopia should be sensitized through the already established primary health care about the importance of antenatal care attendance and importance of delivering in the health facility. Meaning strengthening the primary health care units near to the rural community help to detect preeclampsia/eclampsia early at the same time increase patients' awareness of the importance of antenatal checkups during early pregnancy and delivering in the health facility to prevent complications.

Responsible person at Wolisso hospital should be improved Patient document handling system.

Since the presence of magnesium sulphate decrease the maternal mortality from 5% to 0.2%, even if different researchers show that the chance of convulsion after $mgso_4$ treatment was increase than the control group but it decrease maternal mortality so that better to start prophylaxis for every sever preeclamptic and eclamptic mothers.

Every pregnant mother should be attain ANC follow up soon she was become pregnant.

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Appendix-1

Check list for data collection

Jimma university, college of public health, faculty of medical science, coordinating office of integrated emergency obstetrics and surgery, Check list format on prevalence of HDP, maternal complication and perinatal outcome at St Luke catholic Hospital, Wolisso, Ethiopia, A retrospective three year study from 01 January 2011 to 31 December 2013 G.C.

Part I: Socio-demographic Information

S.n	Questions	Coding categories	Code
Q101	Stated age in years	<18	1
		18-35	2
		>35	3
Q102	Residence	Urban	1
		Rural	2

Part II: Obstetric history

S.n	Questions	Coding categories	Code
Q201	Gravidity	Once	1
		Two or more	2
Q202	Parity	0	1
		1-4	2
		5-6	3
		More than 6	4
Q203	Did she remember her LNMP?	No	0
		Yes	1
		Not stated	2
Q204	If yes for Q203 her GA in weeks are	<37	1
		37-42	2
		>42	3
Q205	If No or not stated for Q203 her GA by fundal height	< 37	1
		37-42	2
		>42	3
Q206	Does the mother have ANC follow-up?	No	0
		Yes	1
		Not stated	2
Q207	If yes for Q206, how many times?	<4	0
		4+	1

S.n	Questions	Coding categories	Code
Q208	Does she had previous History of hypertension?	No	0
		Yes	1
Q209	If yes for Q208, she started treatment on ANC follow up?	No	0
		Yes	1
Q210	Does she has history of Diabetes Mallets	No	0
		Yes	1
Q211	Category of hypertension on admission.	no hypertension	0
		chronic hypertension	1
		PIH	2
		Pre-eclampsia	3
		Eclampsia	4
		pre-eclampsia superimposed on chronic hypertension	5
Q212	Sign & symptom during presentation	Edema	1
		Headache	2
		Blurring of vision	3
		Epigastric pain	4
		Other (specify)	
Q213	Blood pressure measurement on admission	<139/90	1
		≥140/90 & <159/109	2
		≥160/110	3
Q214	Number of Fetus	single tone	1
		Twin	2
		Triplet	3
		molar pregnancy	4
Q215	Condition of patient on presentation	Conscious	1
		semi-conscious	2
		Comatose	3
		Convulsion	4

S.n	Questions	Coding categories	Code
Q216	Proteinurea	+1	1
		+2	2
		+3	3
Q217	On set of labor	spontaneous	1
		Induction	2
Q218	Her platelet count	< 100,000	1
		100,000-150,000	2
		>150,000	3
		Not stated	4
Q219	Mode of delivery	SVD	1
		Instrumental	2
		C/S	3
		Other	4
Q220	If C/S done what is the indication of caesarean section?	Uncontrolled pre-eclampsia	1
		Eclampsia	2
		Failed induction and augmentation	3
		IUGR	4
		Oligohydrmnios	5
		Abruptio placenta	6
		Others obstetrics indication	7
Q221	Renal function test (creatinine)	≤1.2mg/dl	1
		>1.2mg/dl	2
Q222	Liver function test	SGOT	
		≤70U/L >70U/L	1 2
		SGPT	
		≤70U/L >70U/L	1 2
Q223	Magnesium sulphate treatment started	No	0
		Yes	1

Part III: Outcome of the mother and the neonate

S.n	Questions	Coding categories	Code
Q301	What Complication occurred before, during and after delivery? The complication is more than one, it is possible to use more than one options.	APH PPH Infection Death No stated complications Others specify.....	1 2 3 4 5 6
Q302	Fetal outcome of singleton or Twin-A is	Alive	1
		Alive but admitted to NICU	2
		Dead (still birth/neonatal death)	3
Q303	If your answer is 1 or 2 for Q302 the APGAR score of the neonate is	< 7	1
		≥ 7	2
Q304	If it is twin delivery, fetal outcome of Twin-B is	Alive	1
		Alive but admitted to NICU	2
		Dead (still birth/neonatal death)	3
Q305	If your answer is 1 or 2 for Q304 the APGAR score of Twin-B is.	<7	1
		≥7	2
Q306	Fetal weight for singleton or twin A is	<1.5 kg	1
		1.5-2.499 kg	2
		2.5-4 kg	3
		Above 4 kg	4
Q307	If fetal outcome is twin, weight of Twin-B is	<1.5kg	1
		1.5-2.499kg	2
		2.5-4kg	3
		Above 4kg	4
Q308	What is the maternal out come?	Dead	1
		Alive	2
Q309	Gestational age at delivery	Preterm	1
		Term	2
		post term	3
Q310	What is her Blood pressure after Delivery on discharge?	≤140/90	0
		>140/90	1

Name and signature of data collector _____

Date of data collection _____

Appendix-2

Check List for Data collection from registration book to mothers those admitted to delivery and maternity ward without hypertension (no HDP) at St Luke catholic Hospital, Wolisso, Ethiopia, and A retrospective three year study from 01 January 2011 to 31 December 2013 G.C.

S.n	Age			Residence		Gravidity		No. of fetus			Molar pregnancy	
	<18yrs	18-35yrs	>35yrs	Urban	Rural	Primi	Multi	Single	Twin	>-=3	Yes	No
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
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18												
19												
20												
21												

Assurance of Principal Investigator

I undersigned agrees to accept responsibility for the scientific, ethical and technical conduct of the research project and for provision of required progress reports as per terms and condition of the Faculty of Public Health in effect at the time of grant is forwarded as the result of this application.

Name of the student: Anagaw Melaku

Date……. Signature……..

APPROVAL OF ADVISORS

1. Mr. Chernet Hailu

Date……. Signature……..

1. Mr. Garuma Tulu

Date …….. Signature…….