

**MATERNAL AND PERINATAL OUTCOME OF  
MOTHERS AMONG ADMITTED IN MATERNAL  
WAITING HOMES IN ATTAT HOSPITAL SOUTHERN,  
ETHIOPIA 2018G.C**



**BY:-IBRAHIM SHEMSU (B.Sc.)**

**A RESEARCH THESIS SUBMITTED TO THE HEALTH RESEARCH AND GRADUATING STUDIES COORDINATING OFFICE, COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES, JIMMA UNIVERSITY; IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN INTEGRATED EMERGENCY OBSTETRICS AND GYNECOLOGY AND GENERAL SURGERY (OBSTETRICS, GYNECOLOGY AND GENERAL SURGERY).**

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**JIMMA, ETHIOPIA**

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By: - IBRAHIM SHEMSU (B.SC)

Cell phone +251915123795

Email; - lookatibro@gmail.com

Adviser 1, **Dr. DEMESSEW AMINU** (MD, Assistant Professor of Obstetrician and Gynecologist)

2, **LEMESSA DUBE** (B.Sc., M.Sc. in epidemiology.)

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## *Abstract*

**Introduction;** Maternity waiting homes (MWHs) are temporary shelters for pregnant women located near to health institutions and endorsed as one component of a comprehensive package to reduce maternal morbidity. Maternal health is one of the major worldwide health challenges. In Ethiopia, access to comprehensive emergency obstetric care is limited.

**Objectives:** The objective of the study was therefore to determine maternal and perinatal unfavorable outcomes among mothers admitted in to maternal waiting home in Attat hospital

**Method:** A hospital-based cross-sectional prospective study was conduct from january1 2018 up to June 30/2018 mothers will admit and delivered in the study time in Attat hospital. Data was collected by using pre-tested structured interviewer administered questionnaire and reviewing medical records of mothers and their newborns. The data was entered and analyzed using SPSS version 20.Binary logistic regression analysis was used to test associations between the independent and dependent variable Variables with P-value<25% during bivariate analysis were included to multivariable logistic regression model. Finally, variables with P-value < 5% were expressed as factors associated with maternal and perinatal out come delivered from MWH at 95% confidence interval (CI) was considered as statistically significant.

**Results:** During the study period a total of 2080 women gave birth in Attat primary hospital out of this156 from MWH which mean 7.5% of total delivery. Majorities 143 (91.7%) of the mothers were multipara and 139(89.1%) of new born were singleton birth. Majority of mother delivered by caesarean section 99 (63.5%). The unfavorable maternal and prenatal outcome counts 11(7.1%) and 20(12.8%) respectively. Grand multipara and above( AOR=7.83,95%CI:7.18,34.57),transvers lie (AOR=2.53, 95%CI:1.16,5.50), cesarean delivery ( AOR=0.056, 95%CI:0.003,0.979)and prewise Cs (AOR=0.198, 95%CI:0.047,0.843) was found factor associated with maternal outcome. On the other hand, multiple gestation (AOR=0.001, 95%CI: 0.00, 0.16) and birth weight >2500(AOR=0.006, 95%CI: 0.00, 0.080) were found factors associated with perinatal outcome.

**Conclusion:** MWHs statistically decreased maternal death, stillbirths and increased cesarean Delivery rates. Maternal mortality and stillbirth rates were substantially lower in women admitted in MWA. It is likely that at least part of this difference is accounted for by the timely and appropriate obstetric management of women using this facility.

**Keywords-** Maternity waiting homes, maternal and perinatal outcome, Attat Hospital, ETHIOPIA.

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## *Acronyms (list of abbreviations)*

AGA	Average gestational age
APGAR	Appearance, Pulse, Grimace, Activity, and Respiration
APH	Antepartum hemorrhage
ARM	Artificial rupture of membrane
C/S	Cesarean section
EDD	Expected date of delivery
EFW	Estimated fetal weight
ENND	Early neonatal death
FHB	Fetal heart beat
GDM	Gestational diabetes mellitus
HCG	Human chorionic gonadotropin
Hct	Hematocrit
IESO	Integrated Emergency surgery (Obstetrics, Gynecology and General Surgery)
IUFD	Intrauterine fetal death
IUGR	Intrauterine growth restriction
JU	Jimma University
LNMP	Last normal menstrual period
MCH	Maternal and child health
MWH	Maternal waiting homes (area)
NICU	Neonatal intensive care unit
NRFHRS	None reassuring fetal heart rate status
OPD	Outpatient department

PIH	Pregnancy induced hypertension
PND	Perinatal death
PPH	Postpartum hemorrhage
PROM	Premature (pre labor) rupture of membrane
RR	Relative risk
SSI	Surgical site infection
U/S	Ultrasound
UTI	Urinary tract infection
WHO	World health organization
SDGs	Sustainable Development Goals
EDHS	Ethiopian Demographic and Health Survey

## **1, INTRODACTION**

### **1.1. BACKGROUND**

World Health Organization (WHO) endorsed maternal waiting home as one of the component of a comprehensive package to reduce maternal morbidity and mortality. Maternal Waiting Home (MWH) provides skilled delivery and postnatal care, referrals in case of complications, counseling for maternal and newborn care including nutrition and early initiation of breastfeeding, family planning and increases institutional deliveries. As a result, reduces maternal mortality caused by the delay in reaching obstetric care [1, 2]

In areas with high maternal mortality ratios, utilization of maternal health services is low. This low utilization of maternal health services is mainly a result of barriers to access and leads to high maternal and perinatal mortality and morbidity. Differences in utilization between high- and low-income countries are enormous, but differences are also encountered within countries. Access to maternity health services is a key indicator of maternal mortality. Besides the per capita gross national product, access to maternal health services is the only other important predictor. Therefore, reaching a health facility that can provide emergency obstetric care is the best tool for reducing maternal mortality, and accessing that care will also lead to a significant reduction of perinatal morbidity and mortality. [3]

Since the 1960s, maternity waiting homes (MWH) have been advocated to bridge the geographical gap, which is the difference in care received by women living in remote areas compared to women living in urban areas. Women with high-risk pregnancies have been encouraged to go and stay close to the clinic at the end of their pregnancy. [4]

#### **What is a MWH?**

A MWH is a facility within easy reach of a hospital or health center which provides emergency obstetric care (EmOC). Women stay in the MWH at the end of their pregnancy and await labor. Once labor starts, women move to the health facility so they can be assisted by a skilled birth attendant. There are many ways in which this concept is being implemented. In Zimbabwe and Ethiopia traditional style huts are used but also modern houses with toilet, bathroom and kitchen facilities old hospital wards; or, as in Papua New Guinea, a house on stilts may function as a MWH. [5]

The way women are cared for differs from country to country. Some facilities are completely self-catering and women provide their own food, water and firewood. Others are completely catered for, and sometimes the economic status of the women determines whether she is provided with food or not. [5]

When staying in the MWH, women often have access to antenatal care. They may visit the routine antenatal care program in the health facility but more often the MWH is visited regularly by a nurse, midwife or doctor. Often the time women spend in the MWH is also used to give health education about pregnancy, giving birth and neonatal care. [5]

The costs of a MWH are covered in different ways. Communities have been involved in building huts while ministries of health or non-governmental organizations contribute to building costs. Running costs may be partly covered by user fees and by fundraising projects coordinated by the waiting women. [6]

### **MATERNITY WAITING HOMES IN ETHIOPIA**

Maternity waiting home started in the late 1980s in Ethiopia at hospital level. Although it existed and was available, utilization was not highly encouraged among pregnant women (WHO, 1996). This low utilization resulted from socio-economic, demographic, facility related and culture and custom related constraints. These resulted in high maternal and newborn mortality. Even though MWHs started in 1980s, ten years later, 1990, Ethiopia's MMR was 1250 per 100,000 live births. This might illustrate fewer uptakes of MWHs within that period. [7]

In 2014, the Federal Ministry of Health in Ethiopia (FMOHE) designed a policy and strategy which promotes the implementation of MWHs (Ethiopian FMOH, 2005). Even though the country showed good progress in achieving MDGs 3 and 4, still it is an agenda to be solved under SDGs (IN HEALTH, 2015). Consequently, it was believed that MWH is the direct strategy to increase facility delivery, improve newborn and maternal morbidity and mortality. Consequently, it is necessary to revise the effect of MWH on improving maternal and child health from the very beginning based on existing data. Therefore, the objective of the narrative short review is to investigate the effectiveness of maternity waiting homes (MWHs) on newborn and maternal health as well as skilled delivery in Ethiopia from MDGs to SDGs. [8]

## **Risk selection**

The concept of risk selection, and the aim to use resources effectively, played an important role in the early descriptions of MWHs. Consequently, selection of women for referral to a maternity waiting home is important. Selection takes place during antenatal clinics by the attending health professional, either within the hospital or in health centers or clinics without labor facilities. Several studies suggest that risk assessment should play a central role in reducing maternal mortality. It was believed that by selecting women with risk factors such as a poor obstetric history, high parity or anemia and advising them to stay near a hospital could prevent a poor outcome. Selection of women with high-risk pregnancies, however, has not always been successful consequently, although risk selection has played an important role the MWHs usually also allow women without formal risk factors to stay there, especially if they live far from health facilities. [5]

From the year 1990 to 2015, 13.6 million women were died with pregnancy and related complications globally. Sub-Saharan Africa alone accounting for roughly 201,000 followed by Southern Asia 66,000. At the country level, Nigeria and India account for over one third of all maternal deaths worldwide in 2015, with approximate 58,000 & 45,000 maternal deaths respectively [9]. The maternal mortality ratio is expressed per 100,000 live births in order to emphasize the obstetrical risk of pregnancy and childbearing. In Ethiopia estimate of the maternal mortality ratio is 412 deaths per 100,000 live births that is for every 1,000 births in Ethiopia, there are about 4 maternal deaths. [10]

Maternal delays in utilization of emergency obstetric care are the contributing factors for high maternal mortality in developing countries. Delay in arrival at a health facility, delay in receiving adequate treatment and delay in seeking health care. Different strategies designed and employed to reduce those maternal delays. [10]

Regardless of Ethiopia's remarkable success in reducing infant and under-5 mortality, the reduction in maternal and neonatal mortality is relatively low. The neonatal mortality rate currently stands at 29 deaths per 1,000 live births and accounts for 43% of all under-five mortality [12]. The maternal mortality ratio (MMR), 353 per 100,000 live births is among the highest in the world [1]. Most maternal and infant deaths occur during the time of childbirth and

in the first few hours and days after birth: more than 40% of maternal and newborn deaths and stillbirths occur during the time of birth, 45% maternal deaths and 36% of neonatal deaths occur during the first 24 hours. Hemorrhages, hypertension in pregnancy, obstructed labor, abortion, and sepsis are the major causes of maternal death. Indicating the interventions to address these threats require institutional care. [10-13]

## ***1.2 Statement of the Problem:***

Globally Death of women from complications of childbirth remains a major health problem. In 2010, nearly 300,000 women died in childbirth, the vast majority in developing countries. The maternal mortality ratio deaths associated with pregnancy or childbirth per 100,000 live births has proven to be one of the most intractable health indicators in the developing world. Few resource-limited countries have made significant progress toward the Millennium Development Goal 5 target to reduce the maternal mortality ratio by 75% between 1990 and 2015. Lesotho, for example, has one of the highest maternal mortality ratios in the world in fact, the maternal mortality ratio increased from 237 to 1155 per 100,000 live births between 1990 and 2009. In contrast, almost all resource-rich countries have less than 10 maternal deaths per 100,000 live births. [14,15]

In 2015, the maternal mortality ratio (MMR) 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. The probability of a 15 year-old girl in the region eventually dying from a maternal cause was as high as 1 in 37—compared to 1 in 3400 in the WHO European Region. [16]

Common causes of maternal death in resource-limited settings include obstetrical haemorrhage, per partum infections, eclampsia and obstructed labour. The majority of these deaths can be prevented with timely access to emergency obstetrical care. However, in resource-limited settings, many deliveries occur at home, often aided by a traditional birth attendant or family member without the skills or the equipment to respond effectively to obstetric emergencies. The geographic distance between women's homes and the nearest health facility can also magnify the problem. In a setting like rural Lesotho, where women must traverse mountainous terrain to

reach a facility with obstetric services, the delay can be significant. If a woman experiences a complication with rapid onset, even a delay of several hours can be fatal. Such emergencies often cannot be easily predicted. [14]

In Ethiopia The estimate of the maternal mortality ratio for the 7-year period preceding the 2016 EDHS is 412 deaths per 100,000 live births; that is, for every 1,000 births in Ethiopia, there are about 4 maternal deaths. The data show a steady decline in the MMR for the 7-year period preceding the surveys: from 871 deaths per 100,000 live births in the 2000 EDHS, to 673 deaths per 100,000 live births in the 2005 EDHS, and to 676 deaths in the 2011 EDHS, to reach 412 deaths per 100,000 live births in the 2016 EDHS.[10]

Several women in developing countries face challenges in accessing timely institutional care mainly due to various factors such as socio-cultural, geographical, a limited number of well-equipped and well-functioning facilities as well as weak referral system {16-20}. In Ethiopia, though delivery by skilled healthcare provider has shown a substantial increase from 10% in 2011 to 53% in 2015, the coverage of postnatal care (PNC) within 48 hours of birth has stalled at 10%.[10]

An estimated 5.9 million children under 5 years of age died in 2015, with a global under-five mortality rate of 42.5 per 1000 live births. Of those deaths, 45% were new-borns, with a neonatal mortality rate of 19 per 1000 live births. Levels of child mortality are highest in sub-Saharan Africa, where 1 child in 12 dies before their fifth birthday, followed by South Asia where 1 in 19 dies before age five. The major causes of neonatal mortality in 2015 were prematurity, birth-related complications (birth asphyxia) and neonatal sepsis, while leading causes of child death in the post-neonatal period were pneumonia, diarrhoea, injuries and malaria. [18]

A total of 88 perinatal deaths were identified from the prospective follow up study. The PNMR (perinatal Mortality Rate) in the study was 50.22 per 1000 total births (95% CI 39.99, 60.5). Only 11% of the women were assisted by health professionals (Doctors/Nurses or Midwives) during delivery, 42.91% received assistance from Health extension workers (HEW's) and Traditional Birth Attendants (TBAs). On the other hand, 45.33% were assisted by their neighbors and relatives/ friends. The critical issue was that women who delivered at health institutions had higher neonatal mortality rate (1.87%) as compared to those who delivered at home (1.46%)

Most of the time The PNMR (perinatal Mortality Rate) is still high in sub Saharan Africa with deferent reasons. [19]

### **1, Recognizing Danger Signs**

Most women and families in the study area, particularly in rural settings, did not know the danger signs of childbirth. As a result, many did not seek health care because they were not aware of the problem.

### **2, Financial Issues and Cost**

Lack of money influences laboring women's health care seeking behavior. When a woman attended antenatal care, if problems are observed they are advised to have a follow up and deliver at health institutions. However, families may not have enough money to pay for transport and for food while at institutions. This does contribute to the first delay in seeking health care services.

### **3, Distance and Transportation**

Poor road conditions and often with no river crossings and lack of public transportation are Practical problems that hinder access and utilization of delivery services in the study area; especially for those living in remote villages. Women need to be carried on a stretcher to the Road side or nearest health facility; which is inconvenient for a laboring woman and requires many young people to carry her. Even when the difficult travel from rural villages to the nearest health center is overcome, access to appropriate obstetric care is further hampered by inadequate emergency referral links between health centers and hospitals.

### **4, Delay in Receiving Appropriate Care Once a Facility is reached**

Health facilities lack qualified health workers, basic newborn care equipment, supplies, and effective referral system. Thus, health centers are not very useful when labor is complicated and surgical interventions are needed. [19]



## ***2, LITERATURE REVIEW***

### ***2.1, LITERATURES REVIEWS***

Many studies revealed that the use of MWHs was linked to the use of maternal health services and indicated lower risk of maternal and perinatal death. However, there are barriers to access to and use of MWHs. Lack of family and community support, food insecurity, the cost of staying at MWHs, distance and lack of knowledge about the MWHs are some. Additionally, lack of basic social and healthcare services; inadequate sleeping space, beddings, water and sanitary services, food and cooking facilities and lack of visits to mothers were the factors deterring the use of MWHs. [7,20-23]

Evidences in Nigeria, showed that MWH reduced maternal mortality ratio from 10 per 1000 to less than one per 1000 deliveries & stillbirth rate from 116 per 1000 deliveries to 20 per 1000 deliveries. The holds true in Malawi, it reduced maternal mortality in the area to be zero. In Eritrea also 49% increase in health center births after the introduction of a maternity waiting home [20-22]

Another study in Zimbabwe to evaluate the effect of a maternity waiting home on perinatal mortality. Women with antenatal risk factors there was a significant 50% reduction in the risk of perinatal death for the women who stayed at the maternity waiting home compared to women who came from home during labor. The use of maternity waiting homes has the potential to reduce perinatal mortality in rural areas with low geographic access to hospitals and merits further evaluation. [24]

Another study done in University of Arizona College of Medicine Phoenix the maternal mortality rate for MWH was 105/100,000 and 1,066/100,000 for nonMWH, Relative Risk (RR) 0.145 (95% Confidence Interval (CI) 0.062 to 0.204). Perinatal mortality rate was 60/1,000 in MWH compared to 65/1,000, RR 0.782 (CI 0.602 to 1.120) in nonMWH. Stillbirth rate was 18/1,000 in MWH and 184/1,000 in nonMWH, RR 0.204 (CI 63.88 to 94.08). Neonatal mortality rates were 16/1,000 in MWH and 15/1,000 in nonMWH, RR 0.862 (CI 0.392 to 1.628). Cesarean deliveries rate was 24/100 For MWH and 18/100 in non-MWH, RR 1.229 (CI 1.226-1.555). [25]

Another prospective study In Zimbabwe that compared MWH to Chipinge Hospital, A Facility

That served 200,000 people. The MWH was built in 1988 to aid in reducing adverse Outcomes during the peripartum period. There were 1573 births in the MWH and 2915 in Chipinge Hospital within the study period. Maternal mortality rate was significantly decreased in the women who stayed at the home versus those directly admitted to the hospital. [26]

This was a retrospective study based in the Northern and Southern Red Sea Zones of Eritrea. It compared maternal mortality of eleven maternity homes built to accompany 11 different health facilities in the above regions to the previous year before the establishment of the MWHs. The study ranged between 2006 and 2009 the study concluded that MWH improves maternal Outcomes. [20]

This was a prospective study conducted in 1994 in Eastern Zambia. The study compared a MWH to the town's major hospital, Nyanje RCZ. The MWH was built next to the main hospital. The study recorded 218 births in the MWH and 292 in the direct admit group. The results revealed that 91% of the women who stayed at the MWH had a high risk pregnancy examples include prior cesarean delivery, pre-eclampsia, perinatal death, abnormal presentation as opposed to 57% in the women who delivered at the hospital. The authors found no statistical difference in maternal and perinatal mortality. [27]

This was an observational study based in Ethiopia that compared outcomes at a MWH, also known as Attat to one of the major hospitals the outcomes compared women who were admitted through the MWH versus those directly admitted to Attat hospital. There were 142 births in the MWH and 635 in the control group. The results showed that the maternal mortality was 21.2 per 1,000 in the Attat hospital as opposed to 0 in the MWH, while stillbirth rate was ten times more in the direct hospital admits. [21]

In Oromia region Ethiopia 32.7% of pregnant mothers received antenatal care from a skilled provider and 13.3% of pregnant mothers getting their delivery at health facility. Problems related to delivery at health facility identified and 47.5% of women stated that delivery at health facility was not necessary, 31% of women stated that delivery at health facility is not customary and 21.3% of women stated that health institutions are too far or did not have transportation to reach health facility. Geographic access to health centers plays a major role in institutional delivery care use among rural mothers [28, 29].

## ***2.2 Factors associated with Unfavourable maternal outcome***

Different study revealed different factors associated with maternal outcome. Absence of antenatal follow up is factor associated with unfavorable maternal outcome in different literature. According to world health statistics 2016 report absence of antenatal follow up was a factor associated with adverse maternal outcome.[18] A study conducted in Nigeria found mother who had absence of antenatal follow up were more likely develop unfavorable maternal outcome than those had antenatal follow up [30].

Multiparty was a factor associated with maternal outcome in a hospital based prospective study conducted in India [31].

The primary causes of maternal deaths are hemorrhage (mostly bleeding after childbirth), hypertension during pregnancy (pre-eclampsia and eclampsia), sepsis or infections, and indirect causes mostly due to interaction between pre- existing medical conditions and pregnancy. Most maternal deaths are preventable as the health-care solutions for preventing or managing the complications of pregnancy and childbirth are well known. All women need access to good-quality antenatal, childbirth and postpartum care. It is also crucially important to ensure access to contraception in order to prevent unintended pregnancies. Factors that prevent women from receiving adequate health care during pregnancy and childbirth include limited availability and poor quality of health services, a lack of information on available services, certain cultural beliefs and attitudes, and poverty. [18]

## ***2.3, Factors associated with unfavourable prenatal outcome***

Different literature's revealed different factors associated with unfavorable perinatal outcome among mothers whose gave berth. According to world health statistics 2016 absence of antenatal follow up was a major contributor for the unfavorable perinatal outcome, Low gestational age was found to be a strong predictor of adverse perinatal outcome when compared to appropriate gestational age, Low APGAR score was a factor associated with adverse perinatal outcome in different literature. [18]

A study done in Nigeria found new born with Apgar score <7 at first minutes were four times more likely to have adverse outcome compared to Apgar score >7 at fifth minutes [13]. This

finding is consistent with local studies conducted in different countries in which low Apgar score is a factor significantly associated with adverse perinatal outcome [32]

NICU service was a factor significantly associated with adverse perinatal outcome in different literatures. A study done in Tanzania found neonates admitted to NICU with different indications had three times good perinatal outcome than those who had no NICU service [33].

## 2.4, conceptual framework

This conceptual framework shows the relationship between factors associated with unfavorable maternal and perinatal outcome of mothers among admitted in maternal waiting homes.

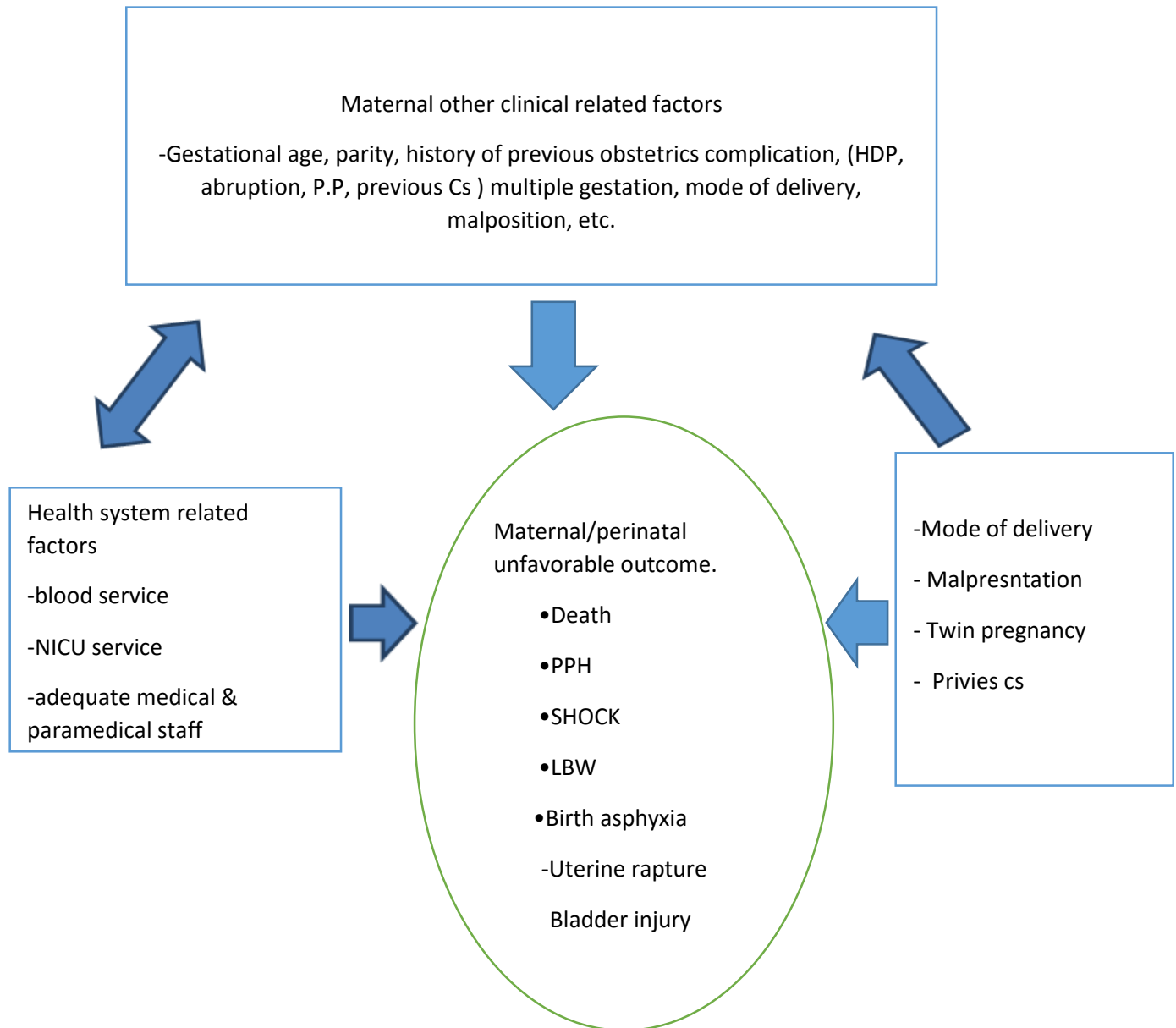


Figure 1 Conceptual frame work of factors associated with adverse maternal and perinatal outcome among mothers admitted in maternal waiting homes.

(Source: - adapted and modified from N jo ro g e. E, 2011 [34])

### **3, OBJECTIVES**

#### ***3.1, General objectives***

To determine maternal and perinatal unfavorable outcomes among mothers delivered in the study period admitted in maternal waiting homes in Attat primary Hospital from January 1 to June30/2018.G.C

#### ***3.2, Specific objectives***

1. To assess ma of magnitude of maternal and perinatal unfavorable outcome among mothers and new born admitted in maternal waiting homes in Attat Hospital from January 1 to June30/2018 G.C
2. To identify factors associated with unfavorable maternal and perinatal outcome among mothers admitted in maternal waiting homes Attat Hospital from January 1 to June30/2018 G.C

### ***3.3 Significance of study***

In obstetric emergency cases that cause major mortality & morbidity of both mother and foetus if not managed early and appropriately. In Ethiopia, where early diagnosis and intervention is not equally performed at all setups due to lack of human resources, diagnostic facilities, inadequate transportation facilities, low awareness of community to seek health care early, which might contribute to difficulty of managements and increased risk of unfavourable out comes; it is important to assess the magnitude and factors associated with unfavourable maternal and perinatal outcome among mothers with admitted in maternal waiting homes.

In Ethiopia particularly in Attat hospital the role of maternal waiting homes were not well studied so, this study was help to develop practice on mode of approach patients presenting with high risk in general, diagnosis & prevention of complications. This study also providing baseline information about the magnitude and factors associated with unfavourable outcome in our country for minimizing morbidity and mortality of mothers and new born by early prediction and detection, for early initiation of resuscitation and definitive management on time before complications. It was also have significant advantage for health professionals and other concerned body in that it will add useful information about maternal waiting homes.

The result of this study was also add epidemiological and clinical information that was serve as an essential input for policy makers to design proper strategies and also helps as references for those who want to undertake researches on the unfavourable outcome of high risk since there was no adequate study conducted in our country which deals about it and will help the hospital to act on the issue depending on the findings to decrease the maternal and perinatal morbidity and mortality.

## ***4. Methods and Materials***

### ***4.1 Study area and period***

The study was conducted from January 1 to June 30, 2018 in Attat hospital which is found in Cheha district, Gurage zone in SNNP, Ethiopia. It is located 168km to the south west of Addis Ababa & 254km far from regional city of Hawassa and 17km from wolkit town. It gives service for 800,000 populations of Gurage zone, some parts of south west showa oromia, Silte and Hadiya zone. The service has been operative since 1969. The hospital owner by the Ethiopian Catholic Church and is managed by Medical Missionary sisters an international religious congregation. Currently it has 100 beds in medical, surgical, pediatrics and in gyn 56 bed in maternal waiting homes(areas) staffed with 64 health professionals of different categories such as:-Gynecologist, General Surgeon, IESO, General practitioner, Health officers ,nurses, midwives and 68 administrative workers. The hospital provides outpatient, in patient services, major and minor operation, NICU, psychiatric, MCH, HIV/TB control, laboratory, x-ray, US, Pharmacy and Physiotherapy services and also has home for those high risk mothers until delivery. Specifically in labor & delivery ward there were 12 midwives & 9 bed for active 1st stage of labor, 4 delivery coach in 2nd stage room,8 bed in postnatal room with different delivery & neonatal resuscitation instruments.

### ***4.2, Study design***

The hospital based cross-sectional study was conducted at department of obstetrics and gynecology unit in Attat hospital in the study period.

### ***4.3, Source population***

All Pregnant woman whose gestational age were  $\geq 28$  complete weeks and delivered, their neonates at labor/maternity ward in Attat hospital during the study period.

### ***4.4, Study population***

All pregnant women whose gestational age were  $\geq 28$  complete weeks with admitted in maternal waiting home and delivered, their neonates at labor/maternity ward in Attat hospital during the study period. And those mothers, neonates and their corresponding medical records that fulfill eligibility (inclusion/exclusion) criteria were considered study population.



## ***4.5 Inclusion/Exclusion criteria***

### ***4.5. 1, Exclusion Criteria***

Patients referred to other hospital, patients disappeared by themselves and, patients come from outside after delivered from high risk mothers.

- All mothers who delivered in ATTAT hospital but not in study period.
- All mothers' comes from her home.

### ***4.5.2, Inclusive criteria***

All pregnant mothers who delivered in ATTAT primary hospital from admitted in maternity waiting area GA of  $\geq 28$  weeks in study time period.

## ***4.6. Sample size and Sampling technique***

All delivery in Attat primary hospital among admitted in maternal waiting homes in the study time period. The sample size was estimated by time from january1, 2018 up to June 30, 2018 G.C. simple continues sampling method.

### ***4.6.1, sampling method***

All patients who were admitted in maternity waiting homes delivered in delivery room of attat hospital during the study period.

## ***4.7. Variables of the study***

### ***4.7.1. Dependent Variable***

Maternal outcome status: - unfavorable maternal out come

- Favorable maternal outcome.

Perinatal outcomes status - unfavorable perinatal outcome

- Favorable perinatal outcome.

### ***4.7.2. Independent variables***

#### **Socio-demographic factors**

Age, residence, fetal sex, income, marital status, occupation, ethnicity and religions

**Health System related factors:** referral system, distance traveled, transport facilities, blood transfusion facilities, NICU service, and adequately trained medical and paramedical staff.

#### **Clinical factors**

Gestational age, parity, hypertension, history of previous abruption and placenta prvia, previous CD, HGB at admission & discharge, types of APH, fetal presentation, birth weight ,APGAR score, birth asphyxia, ANC follow up ,mode of delivery privies Cs scar etc.

## ***4.8, Measurements***

Maternal and prenatal of outcome of mothers admitted in MWH was determined by using the number of cases identified during the six month studies period those who were admitted and managed for delivery and related, their neonates delivered to the maternity/labor ward of Attat hospital. Patient Socio-demographic characteristics, maternal morbidity and mortality, and perinatal morbidity and mortality were measured among high risk mothers.

### ***Instruments and data collection procedure***

Data was collected by reviewing medical records & interviewing mothers during study period until discharge from the hospital. A pretested structured questionnaire was used to collect data regarding patient Socio-demographic characteristics, identify high risk, maternal and newborn

outcomes for each delivery among MWH. Data was collected by six midwives and three second year IESO students who were trained on how to complete the data collection questionnaire during six month data collection period.

Give training for six midwives, three 2nd year IESO students and one supervisor who were staff & graduated with nutrition. The training take two days and focus on refreshment about high risk mothers how to present, Ix modalities, management option & its maternal and perinatal complication, how to fill the questionnaire, way of approach to the client & communication with supervisor.

Newborn outcome for neonates referred to neonatology unit was obtained by reviewing neonatology unit registration book. Aggregate data on total number of mothers who gave birth in the hospital during the study period was obtained by reviewing registration books of the labor/maternity ward. The data collection process was supervised by the supervisor, who was staff & graduated with nutrition during the data collection period on daily bases.

#### ***4.9, Data processing and Analysis***

The data was entered and analyzed using Statistical package for social sciences (SPSS) version 20. The entered data were cleaned, checked for consistency, extent of outliers, the different statistical assumptions and the appropriate correction was done prior to analysis. First descriptive analyses were carried out for each of the independent variables. Second, Bivariate analyses was done for each of the independent variables with the outcome variables. Variables which had p-value < 0.05 on bivariate analysis were taken as candidates for multivariate binary logistic regression model to identify their independent effects. Finally, Variables with p-value less than 0.05 on multivariable logistic regression model analysis were taken statically significant factors for the outcome variable. The strength of association between dependent variable and independent variables were expressed by odds ratio (OR) and the findings were described and summarized using tables, figure and paragraphs.

#### ***4.10, Ethical Consideration***

Before data collection, Ethical Review Committee of the Jimma University medical center institute of health Sciences approved this study. Written consent was obtained from all delivery

from MWH mothers included in the study to promise keeping confidentiality of their response & no any influence on their own culture

#### ***4.11, Data quality management***

To check clarity of questioner pretest questionnaire was prepare two weeks before actual time of data collection, data collectors were trained on how to complete the data collection questionnaire, collect and fulfill documentation and strict daily follow up during data collection time by supervisor.

#### ***4.12, Operational definition and definition of terms***

***Unfavourable maternal outcome:***-A mother dead or sustained complication like haemorrhagic shock, postpartum haemorrhage, severe anaemia, DIC, couvalre uterus, renal failure, uterine rupture, peri-partum hysterectomy, bladder injury wound dehiscence prolonged hospital stay after diagnosed and managed in high risk mothers.

***Favourable maternal outcome:*** - A mother alive with no any complication after delivered their neonate at labour and delivery unites from admitted in MWH.

***Unfavourable perinatal outcome:***-perinatal death (intrauterine fatal death/still birth +death of neonates within first seven days of extra uterine life) or neonate delivered with low birth weight, birth asphyxia, preterm delivery, low Apgar score, premature and neonatal sepsis delivered from MWH.

***Favourable perinatal outcome:***-Alive neonate delivered from mothers admitted from MWH. Without any complication.

***Maternal mortality:*** was defined as any death reported as occurring during pregnancy or childbirth, or within two months after the birth or termination of a pregnancy.

***Perinatal mortality:*** death of foetus between 28 weeks of intrauterine life and the first seven days of extra uterine life.

***Neonatal mortality:*** the probability of dying within the first month of life.

***Acute renal failure:*** Persisted oliguria (urine  $\leq 500\text{ml}/24\text{hours}$ ) and presence of elevated serum creatinine  $\geq 140\text{ mmol/l}$ .

**Preterm baby:** babies born alive before 37 weeks of pregnancy are completed.

**Peri-partum hysterectomy:** Is a surgical removal of the uterus performed at the time of delivery or within 24 hours after delivery.

**Prolonged hospital stay:** Patient admitted for more than one day for SVD and three days for C-section.

**Birth asphyxia:** - is a progressive accumulation of lactic acid and carbon dioxide results in acidosis and reduction of oxygen characterized by FHB < 100 B/min or > 180 B/min.

**Quality obstetric service:** provision of service for mother and new born with well-equipped setup like U/S, OR/ anaesthetics facilities, use of blood and its products to correct anaemia, advanced neonatal care facilities and adequately trained medical and paramedical human resource.

**APGAR score:**-A score for the new born based on appearance, heart rate, grimace, activity (movement) and response.

**Low APGAR score:**-Is new born Apgar score of < 7 at 1st /5th minutes.

**Term birth:**-A new born delivered at gestational age of 37 completed weeks to 41 completed weeks and 6 days

**Very low birth weight:**-Is new born baby weight 1000 gram to < 1499gram at time of delivery.

**Low birth weight:**-Is new born baby weight between 1500- 2499gram at time of delivery.

**Normal birth weight:**-Is new born baby weight 2500gram to < 4000gram at time of delivery.

**Live birth:** - New-born shows signs of life after the delivery.

**Postpartum haemorrhage:**-Excessive bleeding following delivery (>500 ml in vaginal delivery, >1000 ml in CD and twin vaginal deliveries, >1500 ml following caesarean hysterectomy) or a drop in haematocrit > 10% from baseline or derangement in vital sign following bleeding after delivery of fetes to 6 weeks postpartum.

**Anaemia:**-Maternal haemoglobin < 11 gram/ decilitre.

**Caesarean delivery:** - Delivery of the neonate through a surgical incision through the abdominal wall (laparotomy) and uterine wall (hysterectomy) after 28 weeks of gestation.

**Parity:** - Number of delivery experiences after 28 completed weeks of gestation. A woman whose first delivery or viable pregnancy was twin was considered primiparous.

**Primipara:**-A single delivery experience after 28 completed weeks of gestation

**Multi Para:**- $\geq 2$  deliveries experience after 28 completed weeks of gestation

**Grand multi Para:** - Delivery experience  $\geq 5$  after 28 completed weeks of gestation

**Residence:**-Kebeles putted in whole number on mothers card (eg, 01, 02,..) were taken as Urban and Kebeles putted in specific name on mother's card were taken as Rural.

**Ante natal care:**-Health care given to a pregnant woman so as to ensure the birth of healthy baby with minimal health risk to the mother.

**Deranged vital sign:** - hypotension: blood pressure  $< 90/60$ mmHg, tachycardia: pulse rate  $> 100$  beats per minutes, temperature  $\geq 38$ oc, fast breathing  $> 21$  breath per minutes

**Gestational age:** was estimation/calculation of duration of pregnancy with different mechanisms such as last normal menstruation period, early first trimester ultra-sound, month of amenorrhea, quickening time, human choriogonadotrophin hormone (HCG) and fundal height.

**Non-reassure fatal status:**-The presence of fatal compromise signs such as repetitive deceleration (variable/late), loss of beat-to-beat variability and baseline bradycardia or tachycardia.

#### **4.13, Dissemination plan of the result**

Findings will be presented to master's thesis defense of JU, Faculty of Public Health & Medical Science, and school of Graduate Study. The results will be submitted to the coordinator of IEOS, Regional Health Bureau, Zonal Health Offices and None governmental organizations working on this area, Attat hospital and Gurage zone health department. Also there was an attempt to publish the result in reportable journals.

## 5. RESULT AND DISCUSSION

### 5.1. RESULT

When I was doing this research I safer a lot because of can't get any clear admission criteria for maternity waiting area in the hospital in the country and around the globe. Finally structured questionnaire was developed based on published studies and adapted to local situation with certain modifications. The questionnaires included the possible factors associated with prenatal and maternal outcome including socio-demographic factors, health system related factors and clinical conditions. Finally I get 156 mothers to study.

During the study six months period( from January 1,2018 up to June 30,2018 a total of 2080(1616 spontaneous vaginal delivery the rest that means 464 was caesarean delivery ) women gave birth in Attat primary hospital 156 women were from maternal waiting homes showing magnitude of 7.5%. Majority of the mothers were rural residence 139 (89.11%) and Gurage 117 (75%) in ethnicity. The highest proportion of mothers 73(4.81%) was in the age group of 25-30years.

**Table 1** Socio-demographic characteristics of respondents and those who gave birth in Attat Hospital from maternal waiting home, 2018 (n=156)

Variables	frequency	Percentage (%)
<b>Residency</b>		
Urban	17	10.9
Rural	139	89.1
Total	156	100.0
<b>Age of Mather</b>		
<=18	8	5.1
18-24	53	33.98
25-30	73	46.81
31-34	19	12.2
>35	3	1.9
Total	156	100.0

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<b>Ethnicity of Mather</b>		
Gurage	117	75.0
Amhara	35	22.4
Hadiya	4	2.6
Total	156	100.0
<b>Religion of Mather</b>		
Muslim	98	62.8
Orthodox	54	34.6
Protestant	4	2.6
Total	156	100.0
<b>Marital status of Mather</b>		
Married	150	96.2
Unmarried	3	1.9
Separated / divorced	2	1.3
Widowed	1	0.6
Total	156	100.0
<b>Occupation of Mather</b>		
Housewife	83	53.2
Employed	56	35.9
Student	2	1.3
Merchant	15	9.6
Total	156	100.0
<b>Educational status</b>		
No formal education	57	36.5
Primary	58	37.2
Secondary	28	17.9
More than secondary	13	8.4
Total	156	100.0
<b>Monthly income in Ethiopian birr</b>		
<=500	11	7.1
501-1499	88	56.4

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1500-2999	38	24.4
>=3000	19	12.2
Total	156	100.0

## 5.2 health system related factors of mothers.

Majorities 131 (84%) of the mothers were multipara and also does not remember last normal menstrual period 99(63.5%). Regarding gestational age 150(96.2%) was term pregnancy most of the mothers come from her own homes that mean without referral paper that accounts 107 (68.6).the most common admission to stay in maternity waiting home is previous two or more caesarean scar, previous VVF and uterine repair it accounts 62(39.7%) followed by one previous caesarean scar it 40 in number 25.6% last but not least majority of mothers stayed in maternal waiting area for two to three weeks 96 in number (61.5%).All of mothers has ANC follow up and single pregnancy cephalic in presentation 139(89.1%)and 104(66.7%)respectively. out of this 99(63.5%)delivered by caesarean section.

**Table 2** Health system related factors of mothers who gave birth at Attat Hospital, 2018 from maternal waiting home stays (n=156)

variables	frequency	Percentage
<b>Parity</b>		
Primi	13	8.3
2-5	131	84.0
6-8	11	7.1
>=9	1	0.6
Total	156	100.0
<b>last normal menstrual cycle(LNMP)</b>		
Yes	57	36.5
No	99	63.5
Total	156	100.0
<b>Gestational age according to term</b>		
>=34-36+6day	6	3.8

>=37-41+6	150	96.2
Total	156	100.0
<b>Did the mother referred form other health facility</b>		
Yes	49	31.4
No	107	68.6
Total	156	100.0
<b>Admission diagnosis or reason to stay in MWH</b>		
I previous Cs	40	25.6
twin pregnancy and or mal presentation	27	17.3
bad obstetrics history	3	1.9
grand multipara and above	12	7.7
medical reasons	3	1.9
APH and Hx of PPH	4	2.6
previous II CS +privies uterine repair +fistula repaired	62	39.7
distance from health facility	5	3.2
Total	156	100.0
<b>How many weeks she stay in maternal waiting homes</b>		
<=1 week	52	33.3
2-3weeks	96	61.5
>=4weeks	8	5.1
Total	156	100.0
<b>No of fetus</b>		
Single	139	89.1
Twin	15	9.6
Triplet	2	1.3
Total	156	100.0
<b>Fetal presentation</b>		
Cephalic	104	66.7
Breech	44	28.2

Transverse	8	5.1
Total	156	100.0
<b>Mode of delivery</b>		
vaginal delivery	54	34.6
caesarian delivery	102	65.4
Total	156	100.0

### 5.3 Maternal Outcome

According to this study no recordable maternal death at all from delivered Mather admitted in maternal waiting homes. The favourable maternal outcome counts 145(92.9) majority of mothers delivered without complication 139(89.1%) out of this 99(63.5%) delivered by caesarean section. some mothers gets some complication during delivery its 11 mothers (7.1%) primarily PPH it accounts 5(3.2%). 143(91.7%) mothers was stay for less than or equal to three days and 133(85.3%) of mothers haemoglobin level between 10.1 and 12.

**Table 3.** Distribution of maternal outcome among mothers who gave birth in Attat Hospital, 2018 from maternal waiting homes (n=156)

Variables	Frequency	Percentage (%)
<b>Maternal outcome</b>		
Favorable	145	92.9
<b>Life outcome</b>		
Alive	156	100.0
<b>Complication occurred during labour and delivery</b>		
Yes	11	7.1
No	145	92.9
Total	156	100.0
<b>Complication during labour and delivery</b>		
uterine rapture repair	1	1.3
bladder injury	3	1.9
PPH	5	3.2

Other(small bowel adhesion)	2	1.3
Total	11	7.7
Without complication	145	92.3
Total	156	100.0
<b>Hospital stays after delivery in day</b>		
<=3day	143	91.7
4-7day	10	6.4
>7day	3	1.9
Total	156	100.0
<b>Hemoglobin at admission</b>		
7-10	2	1.28
10.1-12	147	94.23
>12	7	4.48
Total	156	100.0
<b>Hemoglobin at discharge</b>		
7-10	10	6.4
10.1-12	133	85.3
>12	13	8.3
Total	156	100.0
<b>maternal condition at discharge</b>		
Improved	156	100.0

#### **5.4 Perinatal Outcome**

The magnitude of perinatal unfavourable outcome is 20means (12.8%).majority of delivery single in tone, female in sex and weighing between 2500 and 3499g 140(89.74%),79(50.6)and 130 (83.3%) respectively and also APGAR score of 150(96.2%) get  $s \geq 7$

**Table 4** Distribution of perinatal outcome among new-borns those delivered from mothers who gave birth in Attat Hospital from admitted in MWH, 2018 G.C(n=156)

<b>Variables</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>Number of neonate delivered</b>		

Single	140	89.74
Twin	14	8.97
Triplet	2	1.3
Total	156	100.0
<b>Sex of neonate</b>		
Male	77	49.4
Female	79	50.6
Total	156	100.0
<b>Life outcomes</b>		
live berth	154	98.8
died(IUFD/stillbirth and early neonatal berth)	2	1.2
Total	156	100.0
<b>APGAR score if alive</b>		
>7	150	96.2
<=6	5	3.2
0	1	0.6
Total	156	100.0
<b>Have neonate sign of prematurity</b>		
Yes	3	1.9
No	153	98.1
Total	156	100.0
<b>Birth weight in grams</b>		
<=2499 g	17	10.9
2500-3499g	127	81.4
>=3500g	12	7.7
Total	156	100.0
<b>Did the neonate admitted in NICU</b>		
yes	17	10.9
no	139	89.1
Total	156	100.0

<b>What is the indication of admission</b>		
berth asphyxia	3	1.92
low birth weight	17	10.89
Total	20	12.82
System	136	87.1
Total	156	100.0
<b>Condition of neonate at discharge</b>		
improved	155	99.4
died	1	0.6
Total	156	100.0

### **5.5 Factors associated with unfavourable maternal outcome among mothers delivered from MWH**

Association of each independent variable on outcome variable was assessed by bivariable and multivariable logistic regression. Different socio-demographic and health system related/clinical variables were tested for their association with the maternal unfavourable outcome among mothers delivered from maternal waiting homes. None of the socio-demographic variables of the mothers illustrated an association with the maternal unfavourable outcome in mothers at the bivariate analysis. Variables which have association with maternal outcome variable by bivariable analysis were; admission diagnosis (grand multiparas and above), fatal presentation (shoulder/transvers), and primies caesarean delivery or scar (P-value <0.25 significance level. Finally, maternal primies caesarean scar, fatal presentation, mode of delivery remains statically significant at P-value <0.05 on multivariable logistic regression analysis,

To identify independent factors of maternal unfavourable outcome, variables that exhibited significant association at P-value <0.25 by bivariable analysis were simultaneously entered in to multivariable logistic regression analysis. At 95% CI

**Table5;** - Factors associated with maternal outcome of mothers who delivered form MWH on bivariable and multivariate logistic regression analysis in Attat hospital, 2018 G.C.

Variables	Maternal outcome		COR(95%CI)	AOR(95%CI)	P-value
	Favourable	Unfavourable			

	outcome	outcome			
<b>Age in years</b>					
<18	8(5.1%)	0(0%)	1.6	(0.66,3.8)	
18-30	120(76.9%)	6(3.6%)	0.100	(0.008-1.264)	
31-34	15(9.6%)	4(2.6%)	0.533	(0.038,7.487)	
>35	2(1.3%)	1(0.6%)	1.0		
<b>Residency</b>					
Urban	16(10.3%)	1(0.6%)	0.806	(0.097-6.719)	
Rural	129(82.7%)	10(6.4%)	1.0		
<b>Admission diagnosis or reason to stay in MWH</b>					
One previous Cs twin pregnancy and or mal presentation	39(25.0%)	1(0.6%)	1.0		1.0
Bad obstetrics history	26(16.7%)	1(0.6%)	1.500	(0.66,3.8)	2.00(0.84-4.60]
grand multipara and above	3(1.9%)	0(0.0%)	2.06	(0.94,4.5)	
medical reasons	8(5.1%)	4(2.6%)	<b>19.5</b>	<b>(1.917,198.345)*</b>	<b>7.83(1.78-34.57)**</b>
APH and hx of PPH	2(1.3%)	1(0.6%)	19.50	(0.866,439.326)	5.49(0.9232.54)
previous 2 CS +privies uterine and vasico-vaginal fistula repaired	3(1.9%)	1(0.6%)	13.000	(0.641,263.815)	
distance Frome health facility	59 (37.8%)	3 (1.9%)	1.983	(0.199,19.760)	1.5(0.86,2.75)
<b>Fatal presentation</b>					
Cephalic	99(63.5%)	5(3.2%)	1.0		1.0

Breech	40(25.6%)	4(2.6%)	1.980(0.506,7.754)	5.49 (0.92-32.54)	
Transverse	6(3.8%)	2(1.3%)	<b>6.600</b> <b>(1.053,41.359)*</b>	<b>2.53(1.16-5.50)**</b>	<b>0.044</b>
<b>Mode of delivery</b>					
vaginal delivery	50(32.1%)	4(2.6%)	1.0	1.0	
caesarian delivery	93(59.6%)	6(3.8%)	0.8066(0.217,2.992)	<b>0.056(0.003, 0.979)**</b>	<b>0.016</b>
Laparotomy	2(1.3%)	6(3.8%)	6.250(0.461,84.787)	<b>0.066(0.004, 0.962)**</b>	
<b>Parity</b>					
Primipara	12(7.7%)	133(85.3%)	1.108(0.131-9.409)		
Multipara	1(0.6%)	10(6.4%)	1.0		
<b>No of Foetus</b>					
Single	128(82.1%)	11(7.1%)	1.0		
Twin	17(10.9%)	0(0.0%)	0.8(0.3-2.05)		
<b>Previous scar</b>					
Yes	98(62.8%)	4(2.6%)	<b>0.274(0.076-0.982)*</b>	<b>0.198(0.046, 0.843)**</b>	<b>0.047</b>
No	47(30.1%)	7(4.5%)	1.0	1.0	

\*Variables which had p-value <0.25 by bivariate analysis.

\*\*Variables which had p-value<0.05 by multivariate analysis.

### ***5.6 Factors associated with unfavourable perinatal outcome among newborn those delivered from mothers whose admitted in MWH***

Association of each independent variable on outcome variable was assessed by bivariable and multivariable logistic regression. Different socio-demographic and health system related/clinical variables were tested for their association with the unfavourable perinatal outcome among newborns those delivered from MWH. None of the socio-demographic variables of the mothers illustrated an association with the unfavourable perinatal outcome in newborns at the bivariate



analysis. Variables which have association with prenatal outcome variable by bivariate analysis were; multiple gestation that means twin pregnancy, mode of management laparotomy (uterine rapture) and low birth weight at P-value <0.25 significance level. On multi-variant analysis is twin and birth weight. To identify independent factors of unfavourable perinatal outcome, variables that exhibited significant association at P-value <0.25 bivariate analysis were simultaneously entered in to multivariable logistic regression analysis to control confounding.

**Table 6** Factors associated with perinatal outcome of mother's delivered from MWH on bivariate and multivariable logistic regression analysis among new born in Attat hospital, 2018

variables	Perinatal outcome		OR(95%CI)	AOR(95%CI)	p-value
	<i>Favorable outcome</i>	<i>Unfavorable outcome</i>			
<b>Number of fetus</b>					
Single	133(85.3%)	6(3.8%)	1.0	1.0	
Twin	3(1.9%)	14(9.0%)	<b>0.010(0.002,0.043)</b> *	<b>0.001(0.000, 0.016)**</b>	<b>0.015</b>
<b>Sex of neonate</b>					
Male	66(42.3%)	11(7.1%)	1.296(0.505-3.328)		
Female	70(44.9%)	9(5.8%)	1.0		
<b>APGAR score</b>					
>7	135(86.5%)	15(9.6%)	1.0		
<=6	0(0.0%)	5(3.2%)	2.610		
0	1(0.6%)	0(0.0%)	0.86(0.33-2.26)		
<b>Birth weight in gram</b>					
<=2499	1(0.6%)	16(10.3%)	<b>0.02 (0.00,0.19)*</b>	<b>0.006(0.00,0.080)**</b>	<b>0.00</b>
2500-3400	123(78.8%)	4(2.6%)	0.908(0.32,2.6)	3(0.67,	
>=3500	12(7.7%)	0(0.0%)	1.0	1.0	
<b>Fetal presentation</b>					
Cephalic	93(59.6%)	11(7.1%)	1.0		
Breech	36(23.1%)	8(5.1%)	0.828(0.093,7.372)		
Transverse	7(4.5%)	1(0.6%)	1.556(0.167,14.480)		

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<b>Mode of delivery</b>					
Vaginally	50(32.1%)	4(2.6%)	1.0	1.0	
Caesarian	85(54.5%)	14(9.0%)	<b>0.40(0.003,0.543)*</b>		<b>0.049</b>
laparotomy	1(0.6%)	2(1.3%)	<b>0.082 (0.007,0.970)*</b>	0.86(0.33,2.26)	<b>0.046</b>

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\*Variables which had p-value <0.25 by bivariate analysis.

\*\*Variables which had p-value<0.05 by multivariate analysis.

## 6, Discussion

In this study, the magnitude of unfavorable maternal and perinatal outcome among mothers delivered from maternal waiting area were 11(7.1%) and 20(12.8%) respectively. Grand multiparas and above, caesarian delivery, laparotomy for uterine rupture and mal-presentation especially shoulder presentation was statically significant factor associated with maternal unfavorable outcome. On the other hand multiple gestation that means twin pregnancy, low Apgar score, mode of management laparotomy (uterine rupture) and low birth weight were statically significant factors associated with perinatal unfavorable outcome among Mather's whose delivered from maternal waiting area. Some of the Mather's developed some type of post-partum complication which is the primary one primary post-partum hemorrhage, iatrogenic ally bladder injury and uterine rupture. According to my study the maternal and prenatal unfavorable outcome is relatively less from another study, According to on privies study at this hospital 22 years retrospective hospital based study conducted in 2010. This showed that there is significant association between maternal and perinatal birth with MWHs utilization [24]. In this study, in a total of 24,148 deliveries, 6805 mothers attended MWHs and 17343 mothers did not utilize MWHs. Maternal mortality was 89.9 per 100000 live births (95% CI, 41.1–195.2) for women who utilized MWHs and 1333.1 per 100 000 live births (95% CI, 1156.2–1536.7) for non-utilizers; stillbirth rates were 17.6 per 1000 births (95% CI, 14.8–21.0) and 191.2 per 1000 births (95% CI, 185.4–197.1). Consequently, there is a significant difference and advantage in decreasing maternal and perinatal mortality among utilizers than non-utilizers. [21]

Another study conducted in Arizona the maternal mortality rate for MWH was 105/100,000 Perinatal mortality rate was 60/1,000. Cesarean deliveries rate was 24/100 for MWH [25]

Another study in Eritrea A rapid assessment of the maternity waiting homes was conducted in six sub-zones of Northern and Southern Red Sea Zones during the period April 20-29, 2009 using questionnaires administered to health workers, community members, traditional birth attendants and the beneficiaries No maternal death was recorded in the health facilities during that period. There were seven neonatal deaths and seven still births during the same period making the peri-natal death rate of 1.6%. [20]

This review revealed that there was a significant risk of increasing perinatal and maternal mortality among MWH of non-utilizing mothers. Also having access for MWHs increases the skilled delivery. In addition there are no established standard MWHs admission criteria. The study done in 1990 by Poovan et al and later in 2010 by J Kelly showed that there is a significant difference both in maternal and neonatal mortality [24]. Those who did not utilize MWHs have high risk of dying due to pregnancy than those who utilized MWHs.[20]

No study has been done in Ethiopia to access MWHs effect on skilled delivery. But other studies from Zambia, Eritrea, Liberia and Laos explained that increasing access of MWHs for mothers in inaccessible areas increases skilled delivery and decreases maternal and perinatal mortality This might be due to lack of attention toward MWHs as one component of maternal and child health care services.

In the previous experience of using maternal waiting home were shown to be important to increase the intention of using maternal waiting home for pregnant women. This means prior experience of MWHs utilization increases future likelihood of use and in turn it increases skilled delivery. This is similar with studies conducted in Zambia, Kenya and Malawi [34]

There are no admission criteria for studies done in MWHs in Ethiopia. This is consistent with other studies in which mothers with dangerous pregnancy history, symptom and signs have to be admitted to MWHs. But according to Knowles, every pregnant woman should be admitted to MWHs (WHO, 2016). The possible suggestion could be all pregnant mothers should be admitted to MWHs regardless of distance and other pregnancy related danger signs. [34,35]

According to this studies mothers level determinants of MWH utilizations are lack of finance, distance from nearby health facility with MWHs, low social support, cultural influence, custom and lack of knowledge towards MWHs; these hinder mothers from the utilization of MWHs. These findings are similar to studies from Kenya, Liberia, Malawi, Zimbabwe, Zambia, Eritrea, Timor-Leste and Nicaragua The distance between mothers' residence and MWHs have no association with perinatal health outcomes. This might be due to attitude difference between study settings. At admission, all mothers were checked for examination by doctors and IESO in this study similar to Kenyan mothers [33].

## ***7, Conclusion and Recommendation***

### ***7.1, Conclusion***

In Ethiopia, maternal waiting homes have significant importance in reducing maternal and perinatal mortalities. There is no study done on the relationship between MWHs and skilled delivery. In addition, although studies showed that utilization of MWHs have relation with maternal and perinatal health outcome, there was no community based and/or strong study designed previously to study MWHs and skilled/safe delivery. Therefore, conducting community based longitudinal study is mandatory to assess its effect on skilled delivery, perinatal and maternal mortality. Despite of such studies shortage, the existing evidences indicated that the country will have better the progress of SDGs achievement.

### ***7.2 Recommendations***

Overall, the findings of this study have important policy implications for health on problems of Problems has an important public health significance regarding maternal and neonatal health, special attention should be given to mothers and neonates in order to halt the progress of illness and its consequences. In the long run, these problems may be alleviated by integrating efforts from different sectors. However, short term efforts can be performed before long term solutions are obtained. Taking this in to consideration, the following recommendations are brought forward.

When I was doing this research I safer a lot because of can't get any clear admission criteria for maternity waiting area in the hospital in the country and around the globe. Finally structured questionnaire was developed based on previously published studies and adapted to local situation with certain modifications. The questionnaires included the possible factors associated with prenatal and maternal outcome including socio-demographic factors, health system related factors and clinical conditions.

The health centre maternity waiting homes and hospital maternity centre slightly different because of the resource, Man power by investigation us you know obstetrics is a bloody business so it needs attention and also all pregnant mothers are at risk but in our seat up unable to admit all obstetric mothers because of limited number of resource. I divide the mothers in two category

The First one low risk mothers that meant able to deliver at health centres' level if some things happen refer apiece to hospital those are list in below by table the second ones are high risk mothers that needs special attention and must be deliver in hospital those are listed in below. i recommend to use us admission diagnosis additionally a gestational age of  $\geq 34$  completed weeks to avoid long stay in waiting homes and proper uses of resource for both groups.

**Table 7** Admission criteria for mothers in maternity waiting homes

<b>s.no</b>	<b>Admission in health centre maternity waiting homes</b>	<b>Admission criteria in rural hospital for maternity waiting area</b>
1	no scar	Previous I Cs scar
2	Multipara	Twin pregnancy
3	single tone pregnancy	Complicated pregnancy(HDP,
4	cephalic presentation	Previous Bad obstetrics history (HDP, placenta previa abruption placenta, and so on...)
5	no bad obstetrics history	Previous II Cs scar
6	uncomplicated pregnancy	Previous repaired for uterine and or VVF
7	Rh + mothers	Previous myomectomy.
8	distance from heath facility	Mal presentation (breech, transverse...
9		Grand multipara and above
10		Rh-ve mothers. Previous classic inverted 'T', and 'J' shape uterine scar

Second recommendation on mothers that needs elective caesarean delivery for example previous myomectomy scar, previous II or more LUSCS, J shape, inverted T, classical, fistula repair and so on mothers better to stay until 39 completed weeks for afeard of neonatal prematurity. Up on my observation most of the mothers delivered from MWH with II or more caesarean scar, previous myomectomy, prior repair for uterine rapture and VVF fistula immediately CS done after spontaneous onset labour with this reason none of fatal seen for prematurity so attat hospital is effective regarding to fatal prematurity by dong such kinds of practice am also recommend this things.

## ***8, LIMITATION OF THE STUDY***

The data collected was not represent the entire Ethiopia district since it was conducted at a primary hospital for the district (provide services to both rural and urban populations). The findings were a reflection of Gurage zone since all obstetric emergencies in the town are managed at this hospital and the magnitude was calculated basing on all pregnant women who delivered at Attat primary catholic hospital, Gurage zone SNNP.

- ❖ Short duration of follow up: this study only followed mothers from admitted In MWH their new born from admission to discharge from the hospital.
- ❖ Limitation due to institution based cross-sectional study that can limit the generalizability
- ❖ There are no admission criteria for studies done in MWHs in Ethiopia.

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## 10. ANNEXES

### Information and Consent Form

#### *Information sheet*

My name is \_\_\_\_\_ I am working with Ibrahim Shemsu who is doing research for partial fulfillment for the requirement of Master of Integrated Emergency Obstetrics and General Surgery at Jimma University Institute of Health, Department of Gyn/Obs.

I am conducting study on the maternal and perinatal outcome of mothers delivered who's admitted in maternal waiting area in Attat hospital. The result that will come out of this study will be used by the government and the hospital to base their rational decision to develop appropriate strategies to combat this problem. The research is intended to benefit the community including the people that will be participating in this research and will introduce no risk to the participant. Your participation is entirely voluntarily and you can quit from the study any time you want. You will have no penalty if you fail to show desire to participate and the quality of any service that you want from this facility won't be compromised due to your unwillingness. I, however, do hope that you will participate since the data that come from you will be important input for this study. I would like to ask you to be honest for your responses and be sure the responses are real because your real response to this study is very important. Your name and other personal identity will not be used and hence the information we will collect from you will completely be kept confidential and will not be disclosed to any third person other than the people participating in this study. For any question you want to ask us, you can use the contact address here under.

May I now begin the interview?

If yes, continue interviewing

If No, thank and stop interviewing

Name of the interviewer: \_\_\_\_\_ Sign. \_\_\_\_\_ Date \_\_\_\_\_

Name of the supervisor: \_\_\_\_\_ .Sign. \_\_\_\_\_ Date \_\_\_\_\_

Addresses Tel: -----

## Consent Form

I am (the respondent), informed that the researcher is going to conduct study in this hospital to determine maternal and perinatal outcome of Mather delivered from maternal waiting area . I am also informed that the result of the study will be used by both the government and the hospital appropriate strategies to tackle this problem and the research will benefit the community in general including me, and the research will not inflict any harm to me. I have been told that I have full right to understand and then take part in the study on the basis of my interest and I can ask them questions I found any. Moreover, I am notified that my participation in the study is entirely voluntarily, and that I can quit from the study any time I want. Likewise, I will not be subjected to any form of punishment and service that I want from this facility won't be compromised following my failure to participate in the study. In the same way, I am explained that the information collected from me will be kept confidential unless obtained permission from me. Finally, the information that I (the respondent) will give is honest and I am sure the responses are real.

Name of the interviewer\_\_\_\_\_

Date: \_\_\_\_\_ Signature\_\_\_\_\_.

## 11. Questionnaire

Jimma University Institute of Health, Department of OB/GYN. Questioner prepared to collect data on maternal and perinatal unfavorable outcome of APH deliveries in Attat hospital Gurage Zone, SNNP regional state, Ethiopia.

I am **Ibrahim Shemsu** a final year IESO student in master's program at Jimma University. I brought these questionnaires to study unfavorable maternal and perinatal outcome.

Medical record number: -----.

### ***Part I. Identification of the patient who visited the gynecology/ obstetric department with high risk and delivered.***

1. Residence: (1). Urban (2). Rural
2. Age of mother (1)>18 (2)18-30 (3)31-34 (4)>35
3. Ethnicity: (1) Gurage (2) Amhara (3) Hadiya (4)Oromo (e) others
4. Religion: (a) Muslim (2) Orthodox (3) Protestant (4) others
5. Marital status: (1) married (2) un married (3) separated\divorced (4) widowed
6. Occupation: (1) housewife (2) employed (3) student (4) merchant (5) others
7. Educational status: (1) no formal education (2) primary (3) secondary (4) more than secondary
- 8, Monthly income (1)  $\leq$ 500 ETB (2)500-1499 (3) 1500-3000 (4)  $\geq$ 3000

### **Part II. Gynecologic /OBS History**

- 1, parity( 1) primi gravid ( 2) multigravida(3 )grand multipara( 4 )great grand multiparous
- 2, LNMP known (1) yes (2) no
- 3, GA in week (1) preterm (2) term (3) post term
- 4, Did the mother referred from other health facility? (1) Yes (2) no
- 5, if yes Distance traveled in Km to arrive this hospital

(1)<49km (2)50-99km (3)100-149 km (4)>=150km

6, Admission diagnosis or reason for stay in MWH

- 1, previous I caesarean section scar
- 2, suspected twins/ mal presentation
- 3, bad obstetrics history
- 4, Grand multipara
- 5, Pre-eclampsia/medical reasons
- 6, Ante partum hemorrhage/history of postpartum hemorrhage
- 7, previous II C/s scar,
- 8, previous repaired for Ux rapture & fistula(vesico-vaginal or recto virginal )
- 9, distance from health facility

7, how many weeks she stay in MWH (1) =<1week (2) 2-3weeks (3)>4 weeks

**Part III. Radiologic findings**

1. Did US investigation done? (1) Yes (2) no
2. What is BPP? (1) Reassure (2) equivocal (3) non reassure
3. No. of fetus (1) single (2) twin
4. Fetal presentation (1) cephalic (2) breech (3) transverse

**Part IV. Management outcome**

1. Plan of management: (1) Vaginal delivery (2) Caesarian delivery (3) laparotomy
2. If vaginal delivery: (1) spontaneous (2) induced (3) instrumental deliveries.
3. IF CD (1) Emergency (2) Elective

**Part V. Fetal outcome**

1. Number of neonate delivered? (1) Single (2) twin (3) triplet

2. Sex of neonate delivered (1) male (2) female

3. Prenatal outcome (1) favorable (2) unfavorable

4 Life outcome (1) live birth (2) died (IUFD/still birth and early neonatal death)

4.1 If alive APGAR score (1)>7 (2) <= 6 (3) 0

5, Have neonate sign of prematurity (1) yes (2) no

6, Birth weight in grams (1) <2499g (2) 2500-3499g (3)>=3500g

7, Did the neonate admitted to NICU? (1) Yes (2) no

7.1 If yes, what was the indication of admission? (1) Birth Asphyxia (2) low birth weight (3) prematurity (4) other

8, what was the condition of neonate at discharge? (1) Improved (2) died

8.1 If died, what was the cause of death? (1) Respiratory failure (2) neonatal sepsis (3) other

## Part VI. Maternal outcome

1. Maternal outcome (1) favorable (2) unfavorable

1.1. Life outcome----- (1) alive (2) died

1.2. If dead what was the cause of death? (1) Hypovolemic shock (2) aspiration (3) sepsis (4) other.

1.3. If alive did any complication occurred? (1) Yes (2) no

1.4. If yes, what complication? (1) Ux rapture repair (2) Ux rapture hysterectomy (3) bladder injury (4) PPH (5) other

2. Did the mother indicated for transfusion? (1) Yes (2) no

3. Hospital stays after delivery in days?

(1) <=4 days (2) 4-7days (3)>7days

4. What was her Hgb at discharge?

(1)7-10 (2)10.1-12 (3)>12

5. What was the condition of the mother at discharge? (a) Improved (b) died

Name of data collector----- Sign----- Date-----

Name of Supervisor-----Sign----- Date-----