

**INTERPREGNANCY INTERVAL AND ITS ASSOCIATION
WITH PREGNANCY OUTCOME AMONG WOMEN OF CHILD
BEARING AGE IN HADIYA ZONE, SOUTHERN ETHIOPIA**



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**JIMMA UNIVERSITY INSTITUTE OF HEALTH, SCHOOL OF
GRADUATE STUDIES, DEPARTMENT OF POPULATION AND FAMILY
HEALTH**

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Women of Child Bearing Age in Hadiya Zone, Southern Ethiopia**

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Abstract

Background: *Inter-pregnancy interval is defined as the time lapsed between two consecutive pregnancies. The length of interval is dependent on the duration of each component, with the postpartum amenorrhea and the menstruating intervals having greater variability in their duration than the other. Inter pregnancy interval shorter than six months after a live birth may be a leading cause of induced abortion, miscarriage, and still birth, because the uterus needs time to recover after a previous pregnancy. This study is used to understand the practice of birth spacing and its association with pregnancy outcome and also helps to design evidence based strategies for interventions in the study area.*

Objective: *To assess interpregnancy interval and its association with pregnancy outcome among women of child bearing age in Hadiya zone, Southern Ethiopia, 2017.*

Methods: *Community based cross sectional study design was conducted in Hadiya zone, Southern Ethiopia from March 1- March 30/2017. A sample of 776 study participants were selected using simple random sampling technique from randomly selected woredas. Descriptive statistics, bivariate and multivariate logistic regression analysis were performed. The variables with p-value <0.25 were candidates for multiple logistic regression analysis. P-value less than 0.05 and 95% confidence intervals in multivariate logistic regression was used to determine an association between independent and dependent variables.*

Results: *Out of 776 reproductive age child bearing women planned to be included in the study, 760 respondents were interviewed using structured questionnaire, yielding a response rate of 97.94%. The median length of interpregnancy interval among respondents was 24 months. From the total respondents, 90% were gave live birth while 10% were gave non-live birth in their last pregnancy outcome. Mothers with interpregnancy interval of shorter than 15 months were five times more likely ended their last pregnancy out come as non-live birth than mothers with IPI of 27-50 months (AOR 4.9, 95%CI 2.14, 11.3). Mothers delivered in the home were three times more likely ended their last pregnancy out come as non-live birth than those gave birth in health institution (AOR 2.89, 95%CI 1.59). Not modern contraceptive users were 2.75 times more likely ended their last pregnancy as non-live birth than mothers used contraceptives after preceding pregnancy outcome (AOR 2.75 95%CI 1.52, 4.98). Mothers with unplanned pregnancy was positively associated with non-live births (AOR 3.4 95%CI 1.845, 6.3).*

Conclusion and recommendations: *More than half of respondents experienced short interpregnancy intervals. Poor pregnancy outcome had positive significant association with short interpregnancy interval, home delivery, unplanned pregnancy and not using of modern contraceptive. To achieve this, attention should be given on institutional delivery, modern contraceptive and information, education and communication on optimum interpregnancy interval.*

Keywords: *interpregnancy interval, pregnancy outcome, Hadiya, Ethiopia*

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List of abbreviations and acronyms

BF:	Breast Feeding
EDHS:	Ethiopian Demographic Health survey
HH:	House Hold
IPI:	Inter Pregnancy Interval
IBI:	Inter Birth Interval
IOI:	Inter Outcome Interval
LB	Live Birth
LMIC:	Low and Middle Income Country
MMR:	Maternal Mortality Ratio
NLB:	Non Live Birth
PCA	Principal Component Analysis
RACBW:	Reproductive Age Child Bearing Women
SNNPR:	South Nations Nationalities and People's Region
SRS:	Simple Random Sampling
SSA:	Sub-Saharan Africa
TFR:	Total Fertility Rate
UNICEF:	United Nations Children's Fund
USAID:	United States Agency for International Development
WCBA:	Women's of Child Bearing Age
WHO:	World Health Organization

Chapter One: Introduction

1.1. Background

Inter-pregnancy interval (IPI) is defined as the time lapsed between two consecutive pregnancies. Poorly timed pregnancies increase health risks for both mother and infant while optimal IPI is an important determinant of maternal health and pregnancy outcomes (1). The length of interval is dependent on the duration of each component, with the postpartum amenorrhea and the menstruating intervals having greater variability in their duration than the other (2).

The “maternal depletion hypothesis” proposes that mothers with short IPI insufficiently recover from the physiological stresses of a previous pregnancy and subsequent lactation. A mechanism proposed for the effects of long IPI is that the benefits of a previous birth in terms of physiological adaptation are gradually lost, as though the mother returns toward an equivalent state to primigravida; this is known as the “physiological regression hypothesis.” Together, these hypotheses imply the existence of an optimal interval that affords enough time for recovery from a previous birth (3, 4).

IPI shorter than six months after a live birth may be a leading cause of induced abortion, miscarriage, and still birth, because the uterus needs time to recover after a previous pregnancy (5). An estimated 303,000 maternal deaths will occur globally in 2015, yielding an overall MMR of 216 maternal deaths per 100,000 live births. Developing regions account for approximately 99% (302,000) of the estimated global maternal deaths, with sub-Saharan Africa alone accounting for roughly 66% (201,000), followed by Southern Asia (66,000) (6).

According to Ethiopian demographic and health survey (2016), Ethiopia has a total population of more than 98 million with total fertility rate (TFR) of 4.6. Which is substantially higher among rural women than among urban women where rural women give birth to nearly three more children during their reproductive years than urban women (5.2 and 2.3, respectively). Also the report showed that 62% of the pregnant women used antenatal care, 28% women delivered with skilled

attendance at birth, 17% received postnatal care, and 35% women practiced contraception with variations across regions (7).

Recommendations for birth spacing made by international organizations were based on information that was available several years ago. Previous evidences by the World Health Organization (WHO) and other international organizations recommended that waiting for at least 2-3 years between pregnancies can reduce infant and child mortality and promote maternal health (2, 8).

However, the most recent WHO recommendation for a healthy pregnancy interval is at least two years (24 months), which corresponds to a birth-to-birth interval of 33 months under the assumption of nine months gestation but, after a miscarriage or induced abortion, the recommended minimum interval to next pregnancy should be at least six months in order to reduce the risk of adverse maternal, perinatal, and infant outcomes (8). This recommendation, according to WHO was considered to be consistent with the WHO/UNICEF recommendation of breast feeding for at least 2 years (9).

Short IPI have been identified as a risk factor for poor pregnancy outcomes, particularly infant mortality, in low- and middle-income countries. Excessively long IPIs (generally exceeding 6 years) are also associated with increased risk of adverse pregnancy outcome (10).

Optimal spacing between pregnancies has greater health advantages for both mother and child, which can give an opportunity for the mother to recover from pregnancy, labor and lactation (11). Longer time period between births allows the next pregnancy and birth to occur more likely to be at full gestation and growth (12). On the other hand, optimal birth spacing yields the greatest health, social, and economic benefits for the family (8).

1.2. Statement of problem

Many women in the world have birth intervals shorter than 3 years. Data based on population reports from 55 countries showed that 26% of women gave birth < 2 years after a previous birth and 31% of the birth intervals were 2–3 years. The largest proportion of women with birth intervals < 3 years were reported from the developing countries (12).

WHO estimates that worldwide 210 million women become pregnant each year and that about two-thirds of them, or approximately 130 million, deliver live infants. The remaining one-third (80 million) of pregnancies end in miscarriage, stillbirth, or induced abortion. Of the estimated 42 million induced abortions each year, nearly 20 million are performed in unsafe conditions and/or by unskilled providers and result in the deaths of an estimated 47,000 girls and women. This represents about 13 percent of all pregnancy-related deaths. Almost all or 98 percent those of abortion-related deaths occur in developing countries (13, 14).

Worldwide, stillbirth rate has declined by 14%, from 22.1 stillbirths per 1000 births in 1995 to 18.9 still births per 1000 births in 2009. But in the African region, there was only an annual decline of less than 1%. The stillbirth rate for developed countries is estimated between 4.2 and 6.8 per 1000 births, whereas for the developing world, the estimate ranges from 20 to 32 per 1000 births. Two thirds of all stillbirths occur in just two regions: South-East Asia and Africa. In sub-Saharan Africa, an estimated 900,000 babies die as stillbirths (8).

Many research findings also showed that births occurring within 2 years are riskier and their intervals are considered to be too short (15). Recent findings show that intervals of 3 to 5 years are safer for both mother and infant compared to ≤ 2 years. However, too long inter-birth intervals (>5 years) are associated with increased risk of complications such as preeclampsia because the mother loses protective effect from previous pregnancy (8, 16).

Short birth intervals are also associated with high rates of premature rupture of membranes, third-trimester bleeding, anemia, and puerperal endometritis which place women at greater risk of hemorrhage, the primary cause of maternal death. Therefore, effective birth spacing is important

not only for population control but also for improving maternal and child health. In developing countries, short birth intervals are prevalent and mostly unintended (12).

Beyond the health and survival implications of high levels of closely spaced and unintended births, high fertility rates accelerate population growth and undermining development effort across all sectors. Closely spaced births have a potentially devastating impact on both the individual and the society. This pattern, combined with high levels of unplanned fertility, makes it difficult for women to become productive members of society, thereby limiting their contribution to economic development (8).

Family planning is thought as one of the best solutions for improving maternal and child health of developing countries like Ethiopia. The expected means of how family planning improves maternal and child health is by promoting birth spacing, healthy timing and spacing of pregnancy (17). Contraceptive prevalence rate is increasing from time to time in our country, Ethiopia and ministry of Health have planned to increase contraceptive prevalence rate from 33% to 66% by 2015 (18).

However, according to EDHS 2011 report, twenty percent have an interval of less than two years, nine percent of births are less than 18 months apart and thirty-six percent of births occur 24-35 months after the previous birth. In general, many studies have been conducted in different developing and developed country on determinants of birth interval and factors associated with adverse birth outcomes (19, 20, 21).

However, there have been very few studies on the association between interpregnancy interval and pregnancy outcomes—i.e. whether the pregnancy results in a live birth or non-live birth as a result of short and long interpregnancy interval at community level using primary data.

Therefore, this study is used to understand the practice of birth spacing and its association with pregnancy outcome and also helps to design evidence based strategies for interventions in this study area.

1.3. Significance of the study

Becoming pregnant too soon after a previous live birth, miscarriage, or abortion places mothers and fetus at a higher risk of health complications or even death. A woman, who becomes pregnant too quickly following a previous birth, or induced abortion or miscarriage, faces higher risks of anemia, premature rupture of membranes, abortion, miscarriage and death.

Therefore, the result of this study will help for the policy makers to consider the association between interpregnancy interval and pregnancy outcomes for attainment of health sector transformation plan and sustainable development goal and it is also important for policy makers to explicitly articulate the benefits of optimal birth spacing for maternal and child health. For health managers used to inform about the association between interpregnancy interval and pregnancy outcomes which can help for the improvement pregnancy outcomes, for health facility used to plan service provision for enhancement of good pregnancy outcomes and for researchers used as a base line to do further research.

Chapter Two: Literature Review

2.2. Socio demographic characteristics and pregnancy outcomes

Birth spacing is an important maternal and child health intervention. Studies have confirmed that healthy pregnancy timing and spacing are important interventions to improve infant, child, and maternal health. Although every pregnancy carries a risk of maternal death or morbidity, some pregnancies are at higher risk than others (22). Evidences from different studies have indicated that the role of socio demographic, economic, and birth history was significant in influencing inter birth intervals among child-bearing age mothers (22, 23).

Cross sectional study conducted in Negest Elene Mohammed Memorial General Hospital in Hosanna Town in 2016 showed that mothers who lived in rural area encountered adverse birth outcomes three times more than those lived in urban area, (AOR 3.5) (21).

Cross sectional survey conducted in Cross river state of Nigeria in 2016 revealed that women in the rural areas had shorter birth intervals than urban between their last pregnancy and index. Women with age <18 or >35 years were more at risk of poor pregnancy outcomes (24).

Cross sectional surveys conducted in rural Uganda in 2015 revealed that women who had attained education above secondary reported slightly more lifetime abortions compared to those who had attained less education but the reverse is true for stillbirths and only 40 % gave birth in health facilities in rural southwestern Uganda (25).

Study done in Rwanda in 2015 revealed that higher age is associated with pregnancy loss it showed women who were older than 35 years when they became pregnant were higher likelihood of a pregnancy loss (2.3 times more likely) (26).

Cross-sectional study conducted in rural Bangladesh in 2014 revealed that average age of first pregnancy was 18.4 years and the average age of delivery 26.4 years. Women with secondary education or higher had a 26% increased likelihood of a short birth interval (AOR 1.26) (27).

2.2. Obstetric and behavioral characteristics and pregnancy outcomes

The study conducted in Rwanda in 2015 revealed that from all last pregnancies, only 40% were wanted pregnancies at the time, while more than a third were unwanted or the mother gave an unclear answer or answer not known (26).

Cross-sectional study conducted in rural Bangladesh in 2014 revealed that parity of four or more was associated with 72% decrease in the odds of a short birth interval compared to a parity of one at the start of the birth interval (AOR 0.28) (27).

Retrospective cohort study done in Scotland revealed that women who conceived again within a short time after delivery tended to have a lower parity than those who waited longer. A higher proportion of women with an interpregnancy interval of less than six months also did not have antenatal care (28).

Cross sectional study conducted in Negest Elene Mohammed Memorial General Hospital in Hosanna Town in 2016 showed that mothers who didn't attend antenatal care were 3 times more likely to have adverse birth outcome when compared to those who attended antenatal care follow up, (AOR 3.2) (21)

The study conducted in rural Uganda revealed that from the pregnancy outcomes reported in each survey, 81–93 % were a live birth, 1–5 % were stillbirth and 5–15.5 % were abortion, resulting in an overall proportion of adverse pregnancy outcomes of 10.8 % across all the surveys (abortion 8.4 % and stillbirth 2.4 %). Both abortion and stillbirth proportions reduced with increasing parity. 48% of pregnant mothers complete the four recommended antenatal visits. Nonattendance of antenatal care for a pregnancy in the past 12 months was associated with higher lifetime abortion frequency but this was not the case for stillbirths (25).

Community based cross sectional study conducted in Dodota Woreda, Arsi Zone in 2016 showed that Only 37% of the participants used modern family planning method between the index child and the last pregnancy, and injectable was the commonly (85%) utilized type of Contraceptive

method among study participants. Fifty two percent of the women breast fed their index child for at least two years and 70% of the women breastfed their index child exclusively for at least six months. About 95% of index child were alive when the women became pregnant of the last child (29).

Cross-sectional study conducted in Kenya public health facilities in 2015 revealed that 88.54% of recent delivery outcome among respondents were live birth including preterm and neonatal mortalities while 11.45% were Poor pregnancy outcomes (termination or miscarriages and still birth). The age of the woman at delivery was not significantly associated with poor pregnancy outcome. Respondents who never received antenatal care during their last pregnancy and respondents who had preexisting medical conditions were significantly associated with poor pregnancy outcomes. The illnesses which significantly affected pregnancy outcome were malaria and pregnancy induced hypertension. High parity was associated with poor pregnancy outcomes. Those who were para three or four had significantly poor pregnancy outcomes (AOR 0.376) compared with lower parity women (30).

The study done in Nigeria in 2016 showed that place of delivery has significant statistical association with whether a child is alive at birth or not in the first year of life. Compared to children born at home, those born in a health facility are statistically significantly more likely to be alive at birth or within the first year of life compared (AOR = 7.037) (31). Also study conducted in Badagry area of Lagos state, Nigeria in 2012 revealed that there is significant relationship between pregnancy outcomes and use of maternal health facilities during delivery (32).

The study conducted in South Africa revealed mean gravidity was 2.3 while mean parity was 2.0. Most (87%) resulted in live births, 9.5% in spontaneous abortion and 2.2% in still births. The proportion of planned pregnancies was 39% and the median time to pregnancy was 6 months (33).

The study conducted in the Republic of Georgia showed that increase in the prevalence of modern methods use is much more likely to reduce the number of abortions by reducing the number of unintended pregnancies (34).

Facility-based cross-sectional study conducted in Guraghe Zone, Southern Ethiopia in 2014 revealed that those mothers who have greater than four pregnancies were more likely to have induced abortion than those who have less than four pregnancies (AOR = 4.28) and those women who reported that they want the current pregnancy were less likely to have induced abortion (AOR = 0.44) than those who do not want their current pregnancy (35).

2.3. Interpregnancy interval and pregnancy outcomes

Community based cross sectional study conducted in Dodota Woreda, Arsi Zone in 2016, revealed that 70.1% responded that they have heard the optimal birth duration. Of those who responded that they have heard optimal birth interval duration, 68.9% of them responded the optimal birth interval duration was between 24 and 33 months while 25.85% were responded as the optimal was 33 months and above. The remaining responded the optimal birth interval was less than 24 months (29).

Study done in Rwanda in 2015 revealed that the percentages of pregnancies ending in a pregnancy loss are the highest after an IPI shorter than 24 months that started after a pregnancy loss. Higher percentages of pregnancy loss than the mean of 3.6 percent were found after a live-born infant that died in its infancy and an IPI of more than two years and after a surviving live birth and a very long IPI (>60 months) (26).

Study done in India revealed that birth interval of three to five years could increase the chances of infant and maternal survival to 2.5 times more when compared to children born at interval of 2 years or fewer (36).

Cross-sectional study done in South African population in 2010 revealed that 33% of women were pregnant in the first 3 months. The proportion of women who were pregnant after 6, 12 and 24 months was 50%, 68% and 83% respectively (33).

Retrospective cohort study done in Scotland revealed that live birth rates after miscarriage were highest (85.2%) in women with an inter pregnancy interval of less than six months and lowest (73.3%) in those with an inter pregnancy interval exceeding 24 months (28).

Study done in Matlab, Bangladesh in 2004 showed that relative to a live birth, short inter pregnancy intervals are highly associated with a very large increase in the odds ratio of a non-live birth outcome. Pregnancies associated with inter-birth intervals of less than 15 months are 4.17 times more likely to end in a non-live birth outcome than pregnancies with inter-birth intervals of 3-7 years. Long inter-birth intervals (84 months or more) are much more likely to include non-live birth (20.2%) than intervals of less than 36 months (3.0%). Also revealed that very short birth intervals (<15 months) are associated with a very substantial increase in the risk of abortion and miscarriage. The odds of having an abortion is 10 times that of having a live birth when a woman becomes pregnant within 6 months of a previous pregnancy outcome and the odds ratio of a pregnancy ending in miscarriage is 3.71 times for a pregnancy with a less than 15- month birth interval relative to a 3-7-year birth interval (37).

Community based cross sectional study conducted in Hadiya Zone Lemo woreda showed that 57.6% of the study subjects spaced births less than 36 months. 35.8% subjects spaced births 36 to 60 months apart and the rest spaced for greater than 60 months (19).

Community based cross sectional study conducted in Dodota Woreda, Arsi Zone in 2016 showed that 17.3%, 33.7% and 49% of the women gave births with in an interval duration of less than 24 months, 24-32 months and 33& above months respectively. This indicated that more than half (51%) of the women had short birth interval (29).

Community based Cross sectional study done in Abnoubd district, Egypt revealed that 13.4%,14%,5.4%,4.3%,5.2% and 13.6% of abortion or miscarriage was occurred with inter outcome interval of <15, 15-17, 18-23, 24-35, 36-59 and ± 60 respectively. Short preceding interval is associated with risk that the pregnancy will result in a non-live birth (particularly abortion) or still birth (38).

Study done in Matlab, Bangladesh in 2007 revealed that 56% of IPIs of <6 months began with a NLB, more than 30% of IPIs of 6–14 months began with a NLB, but just 7.7% of IPIs of 15–26 months began with a NLB, and only 2.8% of IPIs of 27–50 months began with a NLB. The rates of spontaneous fetal loss prior to 28 weeks are highest for IPIs less than 6 months that began with

a live birth (12.9%). They are also high for intervals of at least 75 months (7.2%) and for IPIs of less than 50 months that began with a miscarriage or stillbirth. Except for IPI of less than 6 months of duration is most likely to end in a miscarriage if it began with one. For example, the relative odds of a miscarriage after an IPI of less than 6 months following a live birth are 3.30 (39).

IPIs shorter than 6 months after live births are also associated with high rates of induced abortion (9.2%). The relative odds (compared with the IPI of 27–50 months that began with a live birth) are even greater when other covariates are controlled (AOR 7.53). IPIs of 6–14 months after live births are associated with an above-average rate of induced abortion (3.2%). Very long IPI (± 75 months) are also associated with elevated rates of induced abortion (6.2%). The lowest rates of induced abortion occur after IPIs of 15–26 months (1.9%) and IPIs 27–50 months (1.7%) compared to IPIs of 50 months or less that began with a live birth. The lowest rates of induced abortion occur for IPIs of less than 26 months after miscarriages and stillbirths (0.1–1.5%) (40). Community based cross sectional study conducted in rural Bangladesh in 2014 revealed that 24.6% had a birth interval shorter than 33 months and the birth intervals of less than 21 months were associated with a greater than two-fold increased risk of adverse pregnancy outcome (AOR 2.23), as well as increased risk of stillbirth (AOR 2.13) compared to birth intervals of 45 months or longer (27).

The study conducted in Kenya in 2013 showed that about 71.2% of the women who experienced adverse pregnancy outcomes had birth interval lengths outside the 36-59 months. The finding also revealed that having a preceding birth interval length of 36 - 59 months reduces the probability of reporting an adverse pregnancy outcome (miscarriage, stillbirth, or an abortion). Where long interpregnancy intervals are found to be associated with an increased risk of stillbirths (41).

2.4. Summary of Literature Review

Healthy pregnancy timing and spacing are important interventions to improve infant, child, and maternal health. Although every pregnancy carries a risk of maternal death or morbidity, some pregnancies are at higher risk than others. The role of socio demographic, economic, and birth history was significant in influencing inter birth intervals among child-bearing age mothers. The length of the preceding birth interval affects pregnancy outcomes. Relative to a live birth, short inter pregnancy intervals are highly associated with a very large increase in the odds ratio of a non-live birth outcome. Very short birth intervals (<15 months) are associated with a very substantial increase in the risk of abortion and miscarriage. Where long interpregnancy intervals are found to be associated with an increased risk of stillbirths

2.5. Conceptual frame work on interpregnancy interval and its association with pregnancy outcomes

The independent variables that described pregnancy outcomes were classified into Socio-demographic variables, obstetric, and behavioral variables and interpregnancy interval categories while the dependent variable was recent pregnancy outcomes (poor pregnancy outcomes (abortion or still birth) and live births). Diagrammatically it is shown as follows:

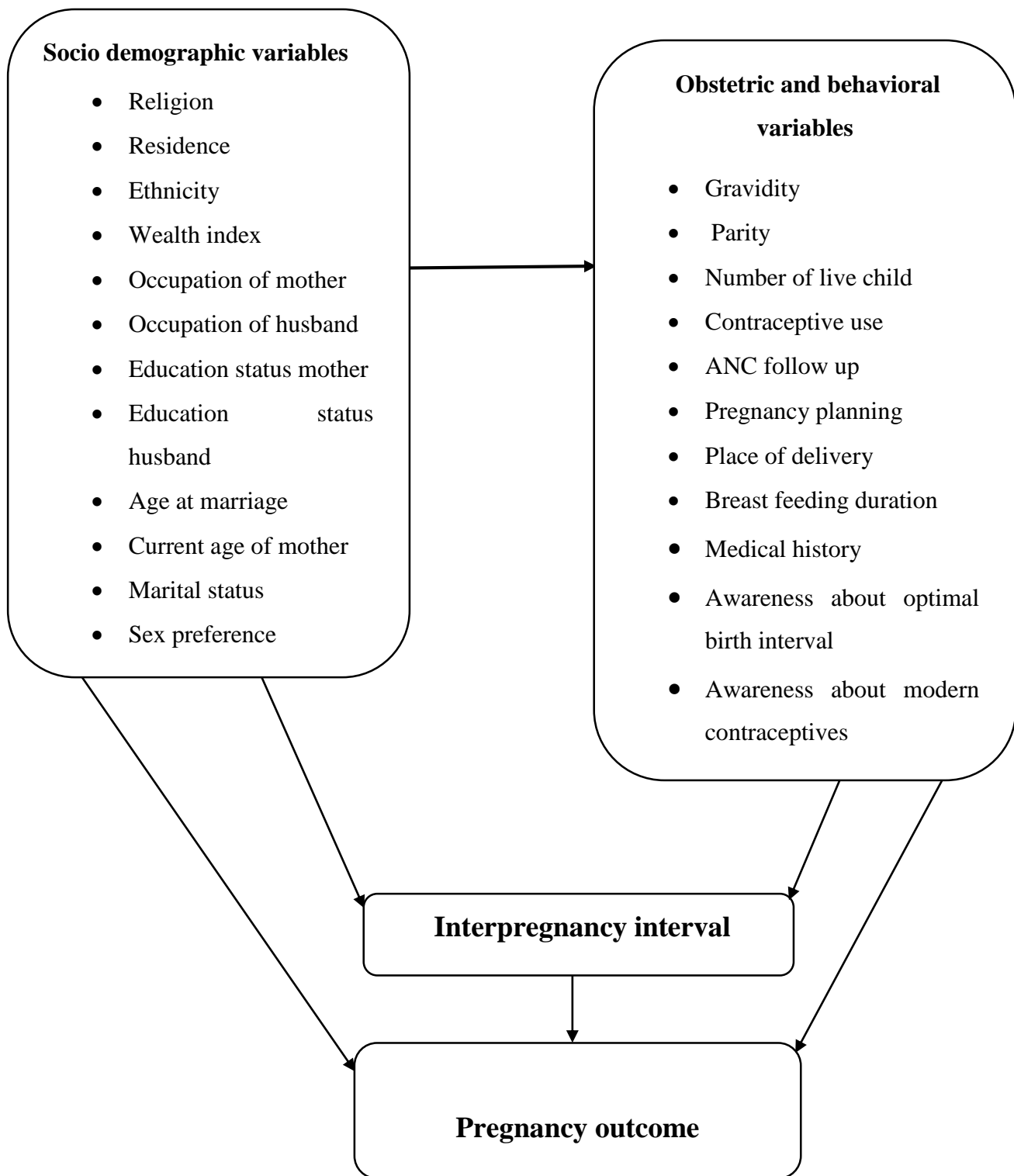


Fig 1: Conceptual frame work for interpregnancy interval and its association with pregnancy outcome among women’s of child bearing age (adapted from reviewed Literatures).

Chapter Three: Objectives of the Study

3.1. General objective

- ❖ To assess interpregnancy interval and its association with pregnancy outcome among women of child bearing age in Hadiya zone, Southern Ethiopia, from March 1-30 /2017.

3.2. Specific objectives

- To assess proportion of interpregnancy intervals among women of child bearing age in Hadiya zone, Southern Ethiopia.
- To determine the prevalence of pregnancy outcomes among women of child bearing age in Hadiya zone, Southern Ethiopia.
- To identify the association between interpregnancy intervals and pregnancy outcome among women of child bearing age in Hadiya zone, Southern Ethiopia.

Chapter Four: Methods and Materials

4.1. Study area and periods

The study was conducted in Hadiya zone, which is found in SNNPR and located 230 Km southwest of Addis Ababa, capital city of Ethiopia and 194 km from the regional capital city, Hawassa. Hadiya zone has 10 districts and two town administration with a total of 329 kebeles (the smallest administrative unit). Among which 305 are rural kebeles. Based on 2007 Census, the total projected population of the zone is 1,573,841 of which 366,705 are women of reproductive age group, 54,455 are estimated pregnant women. Contraceptive prevalence rate of the zone is 49% whereas ANC coverage is 83%. In Hadiya zone there are 3 public hospitals, 61 health centers and 305 health posts in districts. Zonal health department is located in the capital of the zone, Hosana town, and there are 12 woreda/town health offices which are responsible for managing health activities in each of the districts in the zone (42).

This study was conducted from March 1- March 30, 2017.

4.2. Study design

A community based cross-sectional study design was employed.

4.3. Population

4.3.1. Source population

All women of child bearing age, who experienced at least two consecutive pregnancy outcomes and recent pregnancy outcome occurred within the past two years prior to the data collection.

4.3.2. Study population

Randomly sampled women of child bearing age living in the selected district who had at least two consecutive pregnancy outcomes and the recent pregnancy outcome occurred within the past two years prior to the data collection.

4.5. Eligibility criteria

4.5.1. Inclusion criteria

Women of child bearing age with history of preceding pregnancy outcome was live birth.

Women of child bearing age with history of recent pregnancy outcome was whether live birth or non-live birth

4.5.2. Exclusion criteria

Women, who unable to respond because of illness were excluded

4.6. Sample Size Determination

The sample size was calculated for each specific objectives as follows:

The sample size for the first specific objective was calculated with consideration of the following assumptions: level of confidence was 95%, $(Z\alpha/2) = 1.96$, marginal error (d) =0.05 and population proportion of 35.8% ($p=0.358$). Which was used as proportion for women had IBI of 36-60 month from cross sectional study conducted in Hadiya Zone, Lemo woreda (19). In addition 10% non-respondent rate was added and since, the sampling technique contains multi stage sampling, design effect of two was used. Based on these assumptions, the sample size was calculated using single population formula as follows:

$$n = (Z\alpha/2)^2 p (1-p)/d^2$$

$$n = (1.96)^2(0.358) (1-0.358)/0.05^2$$

$$n = 353$$

For design effect= $353*2=706$

Then by adding 10% non-respondent rate, sample size was 776.

The sample size for the second specific objective was calculated with consideration of the same assumptions like first specific objective using single population formula ($p=10.5\%$ of poor pregnancy outcome or NLB) (39), $n = 317$

The sample size for third objective (association between IPI and pregnancy outcomes) was calculated based on two population formula by inserting into Epi info version 7 statcalc:

Parameters used in double population proportion formula were:-

P1 = percent of outcome among exposed group

P2 = percent of outcome among unexposed group

Confidence interval = 95%

Power 80%, ratio 1:1 and by using different categories of inter pregnancy intervals which had significant association with dependent variable from study conducted in Bangladesh, the percent of outcome or NLB in unexposed (IPI categories 27-50 months which was reference categories or optimal IPI) was 2.8% and the percent of outcomes among exposed (IPI of <6 months was 55.7% of NLB and 6-14 months was 31.3% of NLB) (39). Which gave sample sizes of 62 and 145 respectively. The final sample was 776. This sample size was taken since it can accommodate for all specific objectives.

4.7. Sampling procedure

In order to obtain representative sample for this study multistage sampling technique was used. From two town administration, one town (Shone town) and from 10 districts, 3 districts (Gibe, Mirab Bedawachow and Misirak Bedawachow districts) were randomly selected using lottery method. From selected town administration, 2 kebeles and from selected district, 10 kebeles (a total of 12 kebele) were randomly selected by using lottery method from the two strata. Family folders with help of health extension workers were referred before the actual data collection process carried out in all selected kebeles to identify women's with history of at least two consecutive pregnancy outcomes, at least the last pregnancy outcome was within the last two years prior to data collection and the preceding pregnancy outcome was live birth. Households with women's of childbearing age who fulfill inclusion criteria was identified and corresponding house identification number was given to develop sampling frame. In case two or more women who were eligible for interview exists in the same household, lottery method were used to select one of them. Women's of childbearing age who fulfill inclusion criteria in the selected kebeles were identified. Sampling frame was created for each selected kebeles separately based on family folder and finally simple random sampling technique was employed to select the study subjects.

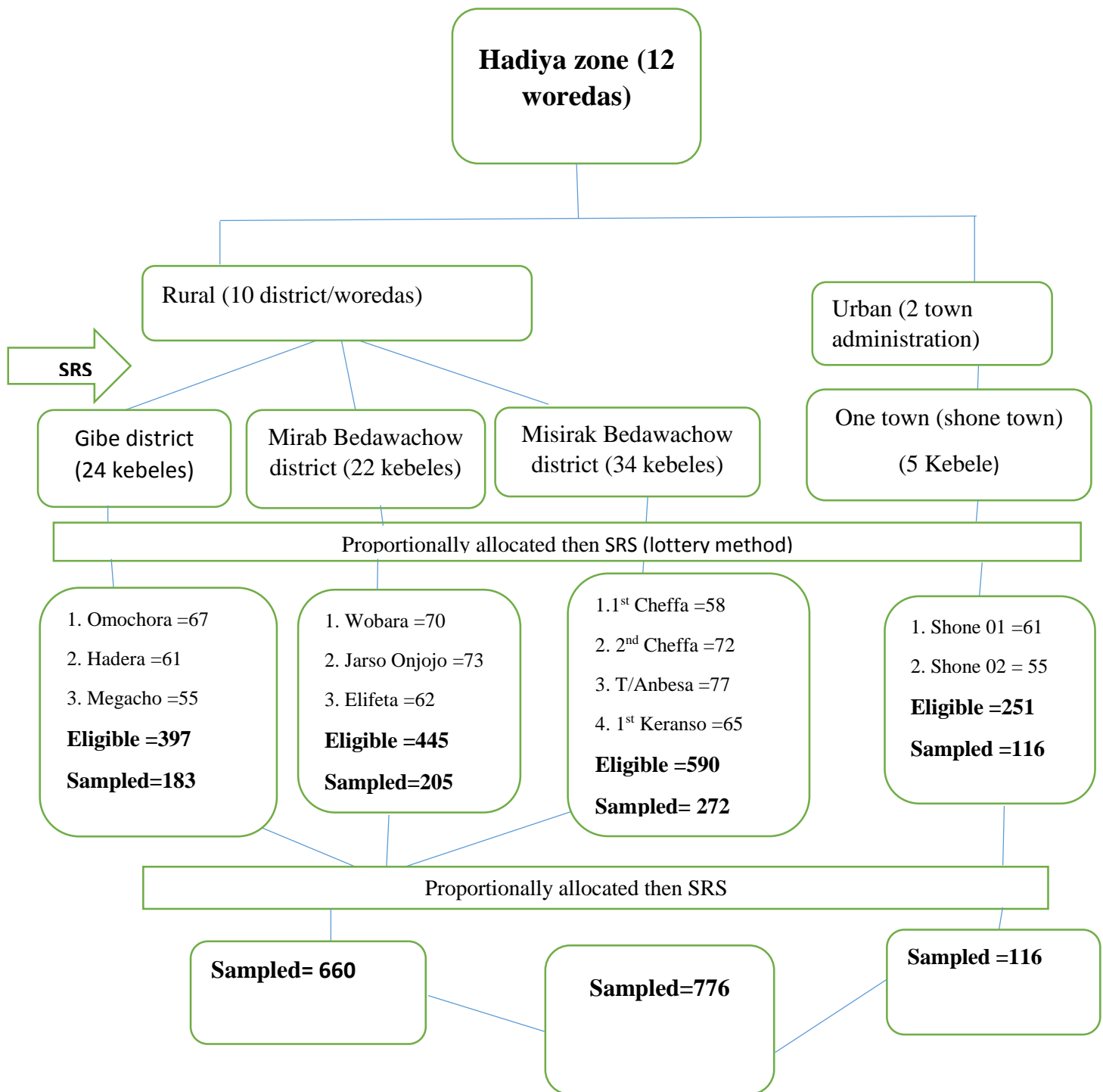


Figure 2: schematic presentation on sampling techniques used to select study subjects for the study on interpregnancy interval and its association with pregnancy outcome among WCBA in Hadiya zone, 2017.

4.8. Data collection tools and procedures

Data were collected by using structured questionnaire adapted from different literatures (19, 29, 39) and modified according to the local context by the investigator. The questionnaire was developed in English language originally and translated to Hadiyisa. The Hadiyisa language questionnaire was used to collect data after being pre-tested out of the selected kebeles of study area (weragere kebele). Structured questionnaire was used to obtain information on socio demographic, obstetric and behavioral characteristics, awareness of birth space, interpregnancy interval and wealth index of respondents. After personal introduction, the purpose and the benefits of the study was told to the study subjects and finally the consent and willingness of them was asked to give their responses for the prepared questionnaires. Next, face to face interview was conducted using structured questionnaire containing both open ended and close ended questions to those who was voluntary to participate.

4.9. Study variables

4.9.1. Dependent Variables

- Recent pregnancy outcome or:
 - Live birth or
 - Non-live birth (abortion or still birth)

4.9.2. Independent Variable

- Socio-demographic (age of the mother, marital status, occupation of mother, occupation of husband, religion, wealth index, ethnicity, educational status of mother, educational status of husband, sex preference, age at marriage)
- Obstetrics and behavioral variable (number of pregnancies, number of live birth, number of live children mother currently had, planning of pregnancy, gestational age, sex of preceding child, contraceptive use, ANC follow up, duration of breast feeding, medical histories, awareness on birth spacing and modern contraceptive)

- Interpregnancy interval categories between preceding live birth and conception of current pregnancy outcomes (<15 months, 15-26 months, 27-50 months, and ± 51 month) (19, 29, 39).

4.10. Operational definition

Birth intervals: period between two recent consecutive live births measured in months

Inter pregnancy interval (IPI): is the period between the delivery of live birth and another conception and it is also known as birth spacing

Short IPI: it denotes IPI less than 15 months after preceding live birth

Medium IPI: it denotes IPI from 15-26 months after preceding live birth

Optimal IPI: it denotes IPI from 27–50 months after preceding live birth

Long IPI: it denotes IPI from ≥ 51 months (≥ 5 years) after preceding live birth

Pregnancy outcome: whether a pregnancy ended with a miscarriage, induced abortion, stillbirth, or live birth

Poor pregnancy outcome: is pregnancy that ended with NLB (abortion or stillbirth).

Live birth: delivery of a live baby at any gestational age.

Spontaneous abortion: also known as miscarriage, is a fetal loss before a gestational age of 28 completed weeks through naturally.

Stillbirth: is a fetal loss after a gestational age of 28 completed weeks.

Induced abortion: is termination of pregnancy through intentionally (by medication or instrumentally) before gestational age of 28 completed weeks.

Parity: the number of times that a woman has given live birth, regardless of whether the child born was alive or not.

Preceding pregnancy outcome: the antecedent of the two recent pregnancy outcome

Current pregnancy outcome: the subsequent (the last) of the two recent pregnancy outcome

Women of child bearing age: women's with age between 15 to 49 years.

Awareness of optimum birth space: a person knows or heard about optimum birth interval.

Awareness of modern contraceptive: a person knows or heard about at least one of modern contraceptives.

Behavioral characteristics: characteristics such as ANC use, breast feeding, modern contraceptive use and medical histories.

4.11. Data processing and analysis

The collected data was coded, checked and entered into Epi-Data version 3.1. It was cleaned and edited accordingly then exported to SPSS Version 21.0. Descriptive statistics using measure of central tendency, frequencies, proportions and diagrams was used to check its distribution and describe the study population in relation to relevant variables. Cross tabulation was also performed to see the distribution of different variables in relation to outcome variable. Multi-collinearity among the independent variables were checked. The goodness-of-fit of the model were checked by Hosmer and Lemeshow significance test. Bi-variate analysis was run using logistic regression to identify candidate variables for multivariable analysis. Variables with p-value < 0.25 in bi-variate analysis were considered as candidates for multiple logistic regressions and they were entered into multivariate logistic regression model to identify the important determinants by controlling possible confounding effects. Backward stepwise logistic regression was used to identify variables which had the largest contribution to the model. To control possible confounders P-value <0.05 was considered to show statistical significance and odds ratio with 95% confidence interval was used to measure strength of association.

Wealth index analysis: Principal component analysis was used for socioeconomic variables involved in measuring the wealth of the households. Socioeconomic variables included were presence of electricity, watch, radio or tape, television, mobile or fixed phone, stove, bed room, ox, cow, sheep, goat, and source of drinking water, kind of toilet and farm land. The assumptions of factor analysis/PCA were checked to conduct data reduction. Bartlett's Test of Sphericity was checked and it was taken as significant at $p < 0.05$ to conduct factor analysis. Sampling adequacy

for factor analysis/PCA checked with Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the results in this measurement accepted if it is >0.5 . Varimax rotation employed during factor extraction to minimize cross loading of items on to many factors. At the end of the principal component analysis, the wealth index was obtained as a continuous scale of relative wealth. Finally, quintiles of the wealth index were created to see its association with pregnancy outcomes.

5.12. Data quality Assurance

To assure the quality of data, before data collection the tool was adapted from different literature (19, 29, 39). The adapted English version instrument was translated into Hadiyisa and re-translated back into English with independent translators to check the consistency of the questionnaire. Since one woman can contribute more than one interpregnancy intervals, this study was confined only to the last interpregnancy interval in order to reduce recall bias. The pretest was carried out in 5% of sample size prior to the actual data collection time outside of study population (Weragere kebele) to make necessary adjustments. The questionnaire was checked for its clarity, understandability, uniformity and completeness of the questions. Important amendments and logical flow of ideas was maintained based on the pretest result. Data was collected by trained 18 female data collectors whose mother tongue was Hadiyisa and high school completed and above and supervised by two health officer professionals. Training on the objective of the study about how to select households, how to conduct interview including consent taking methods and data handling methods was given for them by principal investigators for two days. Every day the questionnaires were reviewed and checked for completeness and relevance by the supervisors and every other day by the principal investigator and all the necessary feedback were offered to data collectors in the next morning before data collection.

5.13. Ethical clearance

Ethical clearance was obtained from the institutional review board (IRB) of Jimma University, institute of Health Science. A formal letter, from institute of Health sciences of Jimma University was submitted to Hadiya zone Health Department then latter obtained for selected woredas from Hadiya zone health Department, finally woredas permission were got for the selected kebeles to conduct the study. To ensure confidentiality the study participants were registered using codes but not in names. Mothers were informed that their participation were voluntary and based on her choice. Orally informed consent was obtained from respondents prior to the interview.

5.14. Dissemination of the plan

The findings of this study will be presented to Jimma university institute of health, school of graduate studies, department of population and family health, to Hadiya zonal health department, important stakeholders, and as much as possible, efforts will be taken to publish on scientific journal. Depending on the opportunities, the finding will be presented in conferences or seminars.

Chapter 5: Results

5.1. Socio-demographic Characteristics

Out of 776 reproductive age child bearing women planned to be included in the study, 760 respondents were interviewed using structured questionnaire, yielding a response rate of 97.94%. The age of respondents included in this study ranged between 20 to 48 years with mean age of 31 years (SD \pm 4.63) and age at marriage ranged between 15 to 30 years with mean age of 20 years (SD \pm 2.24). Four hundred sixty three (61%) of mothers were unable to read and write. Seven hundred nineteen (94.6%) of the respondents were housewives and six hundred fifty seven (86.4%) were rural resident. Six hundred (78.9%) were Hadiya by ethnicity. Majority (749 (98.6 %)) were married and 517 (68%) were protestant by religion.

Table 1: Socio-demographic characteristics of the respondents in Hadiya zone, SNNP, Ethiopia, 2017. (N=760)

Back ground variable	Categories	Frequency	Percent (%)
Place of residence	Rural	644	84.7
	Urban	116	15.3
Marital status of the mother	Married	749	98.6
	Single/ Widow/ divorced	11	1.4
Religion of the mother	Protestant	517	68.0
	Islam	216	28.4
	Orthodox	23	3.0
	Catholic	4	0.6
Age of the mother	15-24	230	30.3
	25-34	475	62.5
	35-49	55	7.2
Age at marriage	<18	66	8.7
	\geq 18	694	91.3

Ethnic group of the mother	Hadiya	600	79
	Kambata	95	12.5
	Halaba	48	6.3
	Others*	17	2.2
Educational level of the mother	Unable to read and write	463	61
	Primary	246	32.4
	Secondary and above	50	6.6
Educational level of the Husband	Unable to read write	274	36.1
	Primary (grade 1-8)	332	43.7
	Secondary above (grade >=9)	154	20.2
Occupation of the mother	House wives	719	94.6
	Others**	41	5.4
Occupation of the husband	Farmer	512	67.4
	Merchant	136	17.9
	Employee	47	6.2
	Student	37	4.9
	Daily laborer	28	3.7
Wealth index	Lowest	154	20.3
	Second	151	19.9
	Middle	150	19.7
	Fourth	153	20.1
	Highest	152	20

*Other: *Gurage, Amhara, Wolayita, ** farmer, merchants, students, daily laborer*

5.2. Obstetric and behavioral Characteristics of the Study Participants

Three hundred thirty four (43.9%) and three hundred nine (40.7%) of the respondents were gravid and para four and above respectively. 52.6% of preceding child to recent pregnancy outcome were male in sex. About 322(42.4%) of the women had 3-4 alive child currently. Ninety one (12%) of recent pregnancy outcomes of respondent were unplanned pregnancy. Out of total respondents, 684(90%) of mothers were gave live birth while the remaining 76(10%) mothers gave non-live birth in their recent pregnancy outcomes. From NLB (poor pregnancy outcomes), 36(4.7%), 21(2.8%) and 19(2.5%) were spontaneous abortion, induced abortion and still births respectively.

Table 2: Obstetric and behavioral characteristics among respondents in Hadiya zone, SNNP, Ethiopia, 2017. (N=760)

Variables	Categories	Frequency	Percent (%)
Gravidity			
	2	106	13.95
	3-4	320	42.1
	>=5	334	43.95
Parity			
	<=2	125	16.45
	3-4	326	42.89
	>=5	309	40.66
Number of alive child			
	2	130	17.1
	3-4	322	42.4
	>=5	308	40.5
Pregnancy plan			
	Unplanned	91	12.0
	Planned	669	88.0
Sex of preceding child			
	Male	400	52.63
	Female	360	43.37

Place of delivery			
	Health institution	403	53.03
	Home	357	46.74
Preexisting medical illness history			
	no	742	97.6
	yes	18	2.4
Illness during Last pregnancy			
	no	674	88.7
	yes	86	11.3
Duration of exclusive BF			
	<6 months	111	14.6
	>=6months	649	85.4
Over all duration of BF			
	<24 months	356	46.9
	>=24 months	404	53.1

5.2.1. Awareness and practices of modern contraceptives among respondents

Six hundred fifty two (85.8%) of respondents had awareness or informed about at least one of modern contraceptives methods. Among the modern contraceptives methods, injectable (628 (82.6%)) and implants 627 (82.5%) were the most well-known methods among respondents. About four hundred ninety four (65%) of respondents were used modern contraceptives in between birth of preceding child and conception of last pregnancy outcome while the remaining 266(35%) not used modern contraceptives. About two hundred eighty four (37.4%) were used implants before the conception of the last pregnancy. Among modern contraceptive used, 492(99.6%) used for spacing birth. The median duration of modern contraceptive used among respondents were 20 months (SD \pm 12.95)

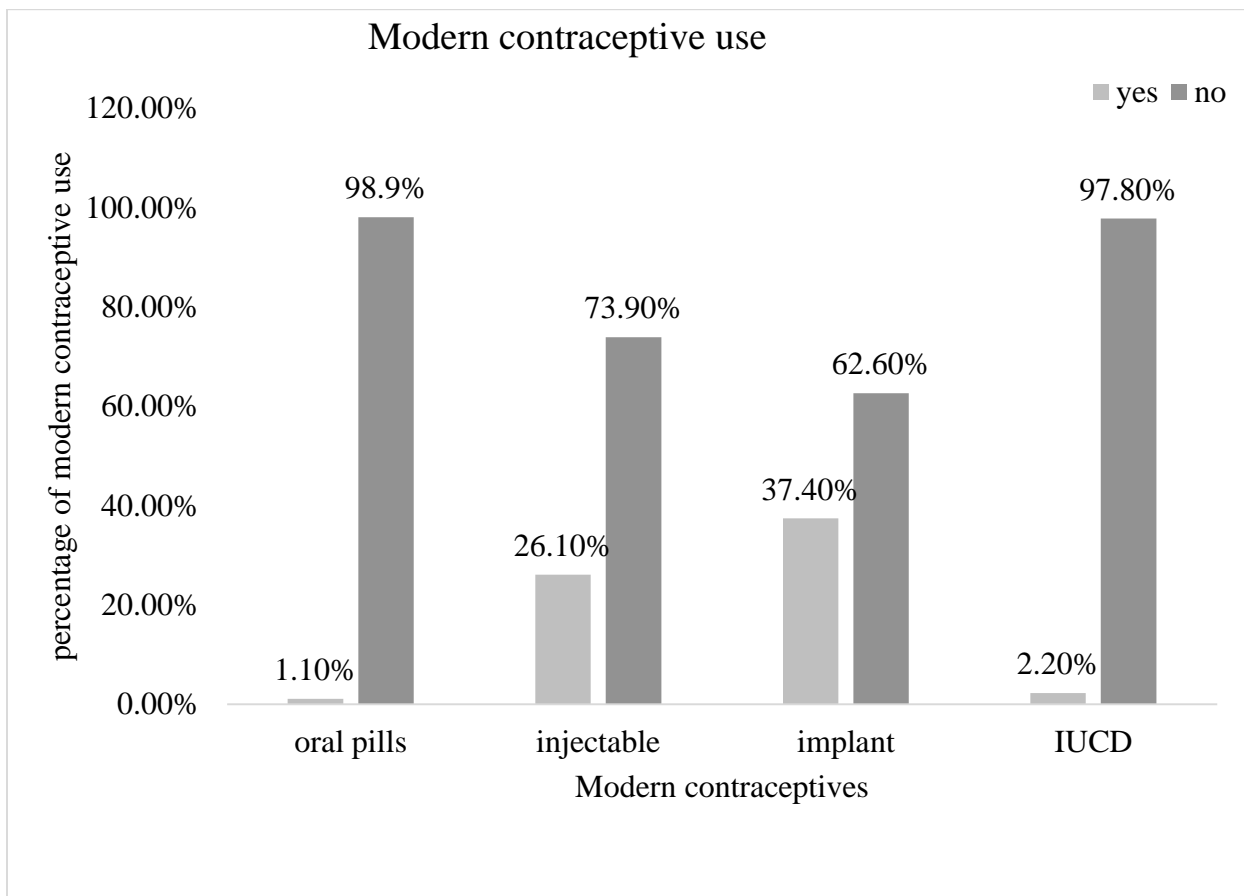


Figure 3: modern contraceptive use among respondents in Hadiya zone, SNNP, Ethiopia, 2017.

5.2.2. ANC follow up among respondents

From total respondents, seven hundred six (92.9%) mothers were attend ANC at least one times for their last pregnancy. Among them 262(52.5%) attended greater or equals to four times while 54(7.1%) not attend ANC for their last pregnancy.

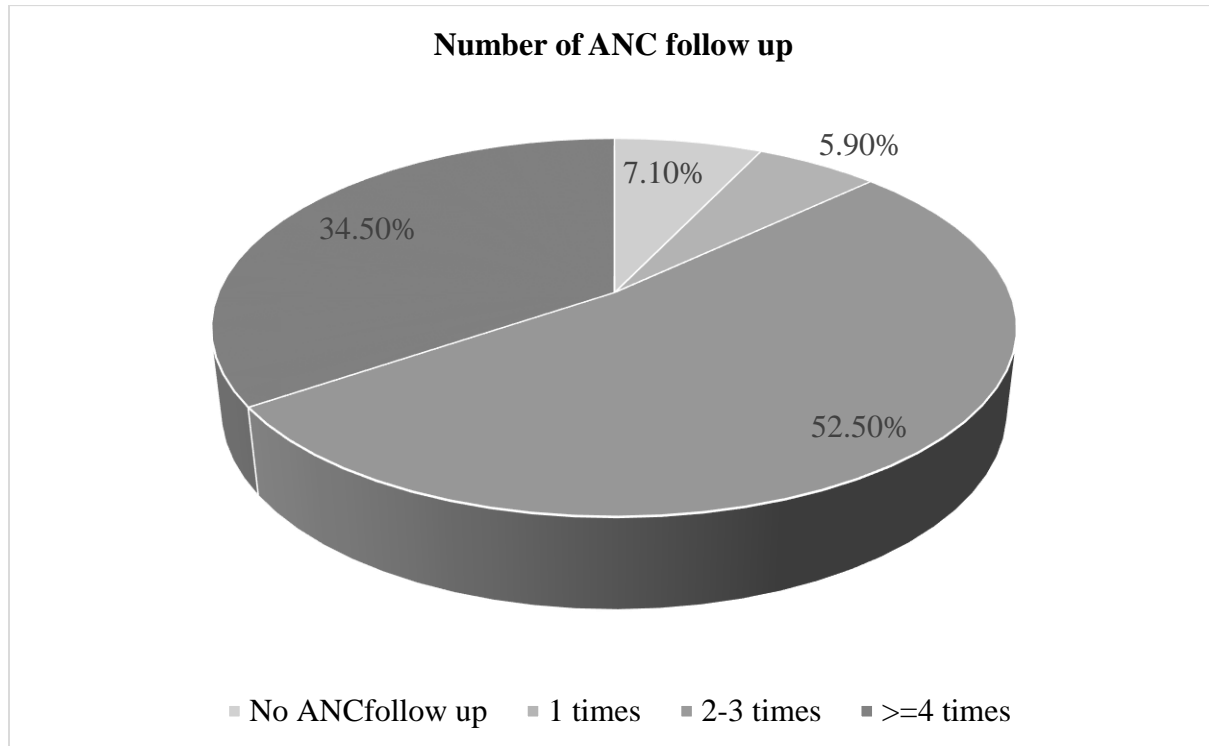


Figure 4: ANC follow up among respondents in Hadiya zone, SNNP, Ethiopia, 2017.

5.3. Awareness and practices of birth space among respondents

Out of total respondents asked whether they have ever heard or informed about optimal duration of birth intervals, 626 (82.4%) of respondents were informed about optimum birth space duration between two live births. Median preferred length of birth interval by respondents was 36 months (SD+/- 9.135) for the two successive live birth. 657(86.4%) of the women responded that optimum birth interval has positive impact on both maternal and child health while 70(9.2%) responded it has positive impact for mother only.

5.3.1. Duration of interpregnancy interval among respondents

The median length of interpregnancy interval among respondents was 24 months (SD+/- 13.65). The interpregnancy interval had been categorized in to <15 months, 15-26 months, 27-50 months and \geq 51 months. Accordingly, three hundred seventy six (49.5%) of the study subjects spaced IPI between 15-26 months between preceding live birth and conception of current pregnancy outcomes.

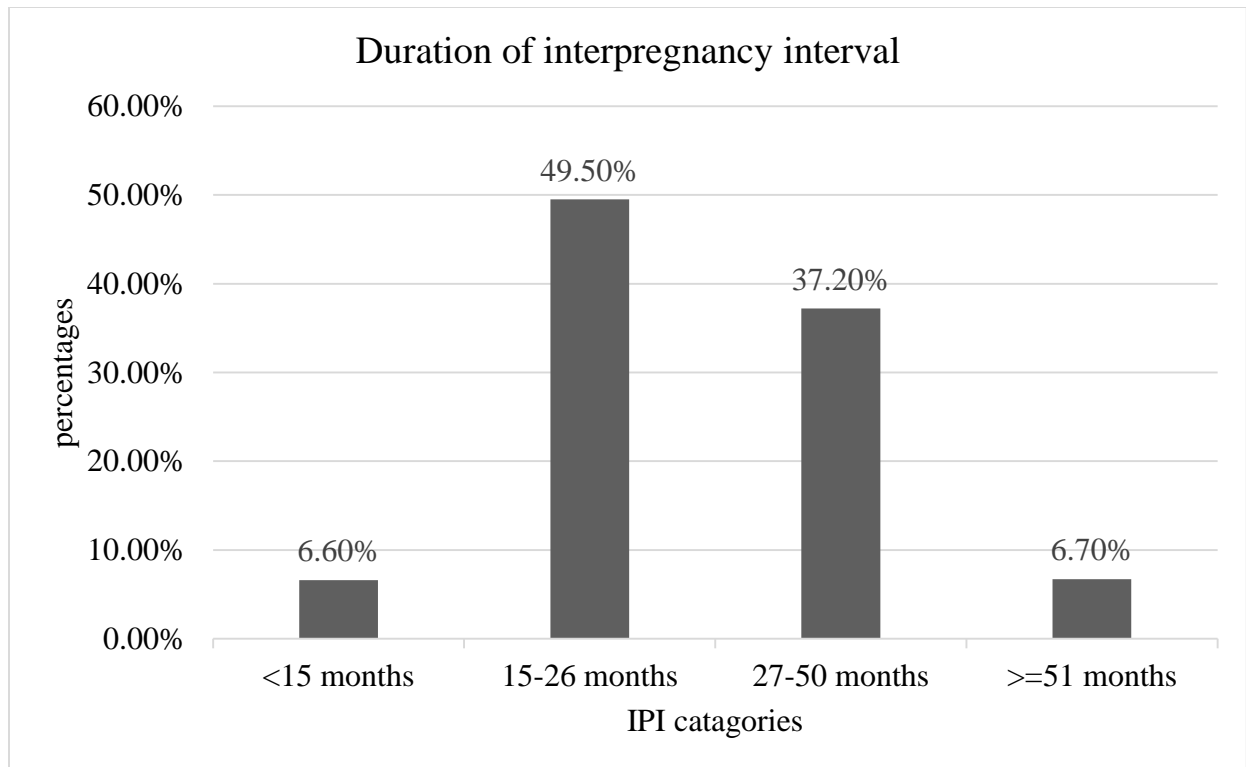


Figure 5: duration of interpregnancy interval among respondents in Hadiya zone, SNNP, Ethiopia, 2017.

5.6 Factors associated with pregnancy outcome

In table 3 below, predictor variables in multiple logistic regression were mentioned. Thirteen independent variables which had P-value of less than 0.25 in bi-variate analysis were included in multiple logistic regression analysis. From variables included in multivariate logistic regression: place of delivery, planning of pregnancy, duration of interpregnancy interval and modern contraceptive use were significant predictors of pregnancy outcomes. The results of the multiple logistic regression analysis showed that mothers with duration of IPI shorter than 15 months were five times more likely ended their last pregnancy as poor pregnancy outcome or NLB as compared to IPI of 27-50 months (AOR 4.9, 95%CI 2.14, 11.3). Mothers delivered in the home or out of health facility were three times more likely gave NLB as compared to mothers delivered in health institution (AOR 2.89, 95%CI 1.59, 5.26). Mothers not used modern contraceptive were 2.75 times more likely ended their last pregnancy as NLB than mothers used modern contraceptives after preceding pregnancy outcome (AOR 2.75 95%CI 1.52, 4.98). Mothers not planned their last pregnancy was 3.4 times more likely ended their pregnancy as NLB than mothers planned their last pregnancy (AOR 3.4 95%CI 1.845, 6.3).

Table 3: Bivariate and multivariate logistic regression analysis output showing predictors of pregnancy outcomes among reproductive age child bearing women in Hadiya zone, Southern Ethiopia, 2017. (N=760)

Variables	Live birth	Non-live birth	COR (95%CI)	AOR (95% CI)
Residence				
Rural	573(89%)	71(11%)	2.751(1.086, 6.97)	1.54(0.52, 4.62)
Urban	111(95.7%)	5(4.3%)	1.0	1.0
Maternal age				
15-24	193(83.9%)	37(16.1%)	2.34 (1.4, 3.8)	1.26(0.66, 2.40)
35-49	52(94.5%)	3(5.5%)	0.7(0.21, 2.36)	0.77(0.18, 3.33)
25-34	439(92.4%)	36(7.6%)	1.0	1.0
Pregnancy plan				
Unplanned	67(73.6%)	24(26.4%)	4.25(2.46, 7.3)	3.4(1.85, 6.30)*
Planed	617(92.2%)	52(7.8%)	1.0	1.0
Place of delivery				
Health institution	386(85.5%)	17(4.2%)	1.0	1.0
Home	298(83.5%)	59(16.5%)	4.495(2.567, 7.87)	2.89(1.59, 5.26)*

Duration of IPI				
<15 months	32(64%)	18(36%)	8.8(4.126, 18.774)	4.9(2.14,11.30)*
15-26 months	337(89.6%)	39(10.4%)	1.811(1.002, 3.27)	1.5(0.807, 2.80)
>=51 months	49(96.1%)	2(3.9%)	0.639(0.143, 2.852)	0.41(0.085, 1.96)
27-50 months	266(94%)	17(6%)	1.0	1.0
Wealth index				
Lowest	132(85.7%)	22(14.3%)	2.65 (1.8, 5.96)	1.07(0.436, 2.64)
Second	128(84.8%)	23(15.2%)	2.85 (1.27, 6.4)	1.56(0.436, 2.64)
Middle	137(91.3%)	13(8.7%)	1.5 (0.624, 3.64)	0.89(0.345, 2.29)
Fourth	144(94.1%)	9(5.9%)	0.99 (0.38, 2.57)	0.65(0.23, 1.8)
Highest	143(94.1%)	9(5.9%)	1.0	1.0
Exclusive BF				
<6months	95(85.6%)	16(14.4%)	1.65(0.914,2.99)	1.3(0.65, 2.56)
>=6 months	589(90.8%)	60(64.9%)	1.0	1.0
Over all duration of BF				
<24 months	302(84.8%)	54(15.2%)	3.1(1.84, 5.2)	1.64(0.92, 2.93)
>=24 months	382(94.6%)	22(5.4%)	1.0	1.0

Awareness on modern contraceptive				
Yes	591(90.6%)	61(9.4%)	1.0	1.0
No	93(86.1%)	15(3.9%)	1.56 (0.85, 2.86)	0.51(0.247, 1.06)
Gravidity				
2	101(95.3%)	5(4.7%)	1.0	1.0
3-4	294(91.4%)	26(8.1%)	1.8 (0.67, 4.78)	1.62(0.576, 4.56)
>=5	289(86.5%)	45(13.5%)	3.15 (1.215, 8.144)	2.25(0.82, 6.2)
Modern contraceptive use				
Yes	465(94.1%)	29(5.9%)	1.0	1.0
No	219(82.3%)	47(17.7%)	3.44(2.108, 5.617)	2.75(1.52, 4.98)*
ANC follow up				
yes	647(91.6%)	59(8.4%)	1.0	1.0
no	37(68.5%)	17(31.5%)	5.04(2.67, 9.5)	1.78(0.824, 3.85)
Medical illness during pregnancy				
yes	72(83.7%)	14(16.3%)	0.52(0.28, 0.98)	0.795(0.379, 1.66)
no	612(90.8%)	62(9.2%)	1.0	1.0

**statistically significant variables at P<0.05, COR=crude Odds Ratio, AOR=adjusted Odds Ratio, CI=Confidence Interval. Model fitness (Hosmer and Lemeshow significance Test) = 0.813*

Chapter Six: Discussion

Eighty six percent of the respondents had awareness about optimum birth spacing. However, 56% (95% CI 52.8%, 59.7%) of mothers practiced IPIs shorter than 27 months or below WHO recommended optimum duration of IPI in between preceding live birth and conception of recent pregnancy outcome. 37.2% (95%CI 33.9%, 40.7%) were experienced IPI of 27-50 months (expected safe IPI duration) which is correspondent with IBI of <36 months and 36-59 months respectively and 6.7% (95% CI 5.0%,8.6%) were experienced IPI of \geq 51 months. This finding is consistent with community based cross sectional study conducted in Hadiya Zone Lemo woreda of 57.6% of the study subjects spaced IBI less than 36 months and 35.8% subjects spaced births 36 to 60 months apart (19). It is also consistent with study conducted in Dodota Woreda, Arsi Zone where more than half of the women had short birth interval or <33 months (29). But higher than study conducted in rural Bangladesh of 24.6% of women had a short birth interval (<33 months). The possible reason for this difference might be due to socio economic differences and low up take of modern contraceptive among respondents.

In this study, 90% (95% CI 87.8%, 92.2%), of mothers were gave live birth while 10% (95% CI 7.8%, 12.2%) gave non-live birth in their last pregnancy outcome. This study is consistent with the study conducted in South Africa where 87% resulted in live births, while 11.7 % (9.5% in spontaneous abortion and 2.2% in still births) (33). This finding is also consistent with the study conducted in Egypt of 89.7% of last pregnancy outcomes were live birth while 8.5% and 1.7% were abortion and still birth respectively (38). Poor pregnancy outcome finding of this study is higher than study conducted in Dodota Woreda, Arsi Zone, Ethiopia of 3.7% women had history of pregnancy loss between the index child and the last pregnancy (29). This discrepancy is might be due to different socio culture in the study areas.

Short interpregnancy interval was strong predictor of pregnancy outcome. According to this finding, short IPIs were much more likely than longer ones to begin with NLB. Women whose interpregnancy interval were between 27 and 50 months after a preceding pregnancy outcome had a lower likelihood of NLB than those with IPIs shorter than 15 months. Women practiced IPIs of less than 15 months were five times more likely ended their last pregnancy as NLB than women practiced IPIs of 27–50 months in between delivery of preceding child and conception of last

pregnancy outcomes. This finding is consistent with other studies conducted in India, Matlab Bangladesh and rural Bangladesh (27, 36, 37, 39, 40). But, in this study long IPI had no significant association with pregnancy outcomes but it had positive association with poor pregnancy out come in other studies (37, 39, 40) .This difference is might be due to presence of few number of respondents who practiced long IPI in our study area and using of different cut of point of interpregnancy intervals to say long IPI.

Women delivered in the homes were positively associated with poor pregnancy outcomes. The finding of this study showed that mothers who delivered at home were three times more likely ended their last pregnancy as NLB than those delivered in health institution. This finding is agreed with study conducted in Badagry area of Lagos state, Nigeria in 2012 where there is significant relationship between pregnancy outcomes and use of maternal health facilities during delivery (32). This finding is also agreed with study conducted in Nigeria in 2016 of Compared to children born at home, those born in a health facility are statistically significantly more likely to be alive at birth or within the first year of life compared (31).

Unplanned pregnancy was positively associated with poor pregnancy outcomes. Women not planned their last pregnancy were three times more likely ended as NLB than women planned their last pregnancy. This finding is agreed with study done in Guraghe Zone, Southern Ethiopia of women who want the current pregnancy were less likely to have induced abortion than those who do not want their current pregnancy (35).

Modern contraceptive use was one of another variable associated with pregnancy outcomes. Not modern contraceptives users were 2.75 times more likely ended their last pregnancy as NLB than modern contraceptive users. This finding is agreed with the study conducted in the Republic of Georgia of increase in the prevalence of modern method use is much more likely to reduce the number of abortions by reducing the number of unintended pregnancies (34).

Limitation of the study

Some of the limitations of the study were: recall bias of exact interpregnancy interval and gestational age. The results of this study also might be biased as the respondents affected by social desirability bias to respond or tell the existing realty about abortion history.

Chapter Seven: Conclusion and Recommendation

7.1. Conclusion

Greater proportions of respondents in the study area had awareness about optimum birth spacing. However, more than half of respondents experienced short interpregnancy interval than recommended optimum duration of interpregnancy interval. One out of ten of recent pregnancy was ended as non-live birth. Among poor pregnancy outcomes, majority was ended by abortion. Poor pregnancy outcome had positive significant association with short interpregnancy interval, home delivery, unplanned pregnancy and not using of modern contraceptive.

7.2. Recommendation

Based on the result obtained in this study, the following recommendations are forwarded:

For FMOH, Regional health bureau and Zonal health departments:

In order to improve the pregnancy outcome, special focus should be given to institutional delivery, modern contraceptive and information education and communication on optimum birth spacing.

For district health offices and health facilities:

To improve pregnancy outcomes, social mobilization of the community on reproductive health issues should be done through health education to reduce poor pregnancy outcome. Also, the community should be educated on interpregnancy interval, modern contraceptive and the importance of health institution delivery. One possible strategy to reduce poor pregnancy outcomes at the community level is strengthen health extension workers and health development army to register and follow mothers through household visits to promote uptake of contraceptive and institutional delivery.

For researchers:

We recommended doing of longitudinal study to reduce recall biases with follow up of mothers who had short, optimal and long interpregnancy intervals and their outcomes of pregnancy.

REFERENCES

1. Conde-Agudelo A, Rosas-Bermúdez A, K.-G.A.E. of birth spacing on maternal health: a systematic review. *A.J.O.G.* 2007; 196(4):297–308, 2012.
2. Dibaba Y: Factors influencing women's intention to limit childbearing in Oromia. *Ethiop J Heal Dev* 2008; 22(3):28–33.
3. Miller JE. Birth intervals and perinatal health: an investigation of 3 hypotheses. *Fam Plann Perspect* 1991; 23:62-70.
4. Zhu BP, Rolfs RT, Nangle BE, Horan JM. Effect of the interval between pregnancies on Perinatal outcomes. *N Engl J Med* 1999; 340:589-94.
5. R. Eleanor, B. Siladitya, and C. Norman, Effect of Interpregnancy interval on outcomes of pregnancy after miscarriage: Retrospective analysis of hospital episode statistics in Scotland, *British Medical Journal*; 2010, 341: 3967-3980.
6. Group WB. Trends in Maternal Mortality : 1990 to 2015. 2015;
7. Central Statistical Agency [Ethiopia] and ICF International: Ethiopia Demographic and Health Survey, Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency and ICF International; 2016.
8. World Health Organization and Department of Making Pregnancy Safer, Technical Consultation Report on Birth Spacing, WHO, Geneva, Switzerland, 2005.
9. WHO: Report of a WHO Technical Consultation on Birth Spacing. Geneva, Switzerland: WHO; 2007. 9-9-2011
10. Smith GC, Pell JP, Dobbie R, Interpregnancy interval and risk of preterm birth and neonatal death: retrospective cohort study. *BMJ* 2003, 327(7410):313.
11. Rasheed P, AL-Dabal BK. Birth interval: perceptions and practices among urban based Saudi Arabian women. *Eastern Mediterranean Health Journal*, 2007
12. ICPD and the MDGs: Working as One Fifteen-Year Review of the Implementation of the ICPD PoA in Africa ICPD at 15; 2009
13. World Health Organization (WHO), Unsafe Abortion, 2007.

14. Global and Regional Estimates of the Incidence of Unsafe Abortion and Associated Mortality, 5th ed. 2007
15. Saumya R, John T, Ian A: Correlates of inter-birth intervals: implications of optimal birth spacing strategies in Mozambique. Population Council, 2006
16. Orji E, Shittu A, Makinde O, Sule S: Effect of prolonged birth spacing on maternal and perinatal outcome. *East Afr Med J*, 2004, 81:388–391.
17. UNAIDS, Engaging Families for Healthy Pregnancies - A Focused Desk Review of Knowledge, Attitudes and Behaviors Related to Pregnancies in Three High-Risk Situations: Advanced Maternal Age; High Parity; and Rapid Repeat Pregnancies After Abortion or Miscarriage. Baltimore: Johns Hopkins Bloomberg School of Public Health Center for Communication Programs, 2014
18. MOH, National Reproductive Health Strategy 2006-2015. Federal Democratic Republic of Ethiopia, Ministry of Health: Addis Ababa, Ethiopia, 2011
19. Samuel Yohannes, Mekitie Wondafrash, Mulumebet Abera and Eshetu Girma, Duration and determinants of birth interval among women of child bearing age in Southern Ethiopia. *BMC Pregnancy and Childbirth*, 2011, 11:38.
20. Zenebu Begna, Sahilu Assegid, Wondwosen Kassahun and Mulusew Gerbaba, Determinants of inter birth interval among married women living in rural pastoral communities of southern Ethiopia: a case control study. *Biomedcentral Pregnancy and Childbirth*, 2013, 13(116).
21. Abdo RA, Endalemaw TB and Tesso FY, Prevalence and associated Factors of Adverse Birth Outcomes among Women Attended Maternity Ward at Negest Elene Mohammed Memorial General Hospital in Hosanna Town, SNNPR, Ethiopia, 2016.
22. Royce RA. Birth spacing – the long and short of it. *JAMA*, 2006, 295(15):1837–8.
23. S. N. Singh, N. Singh, and R. K. Narendra, “Demographic and socio-economic determinants of birth interval dynamics in manipur: a survival analysis,” *The Online Journal of Health and Allied Sciences*, 2010, vol. 9, no. 4.
24. Ameh S, Adeleye OA, Kabiru CW, Agan T, Duke R, Mkpanam N, et al. Predictors of Poor Pregnancy Outcomes Among Antenatal Care Attendees in Primary Health Care Facilities in Cross

- River State , Nigeria : A Multilevel Model. *Matern Child Health J* [Internet]. 2016;(April). Available from: "<http://dx.doi.org/10.1007/s10995-016-1965-5>
25. Asiki G, Baisley K, Newton R, Marions L, Seeley J, Kamali A, et al. Adverse pregnancy outcomes in rural Uganda (1996 – 2013): trends and associated factors from serial cross sectional surveys. *BMC Pregnancy Childbirth* [Internet]. 2015;1–12.
 26. Habimana-Kabano I, Broekhuis A, Hooimeijer P. The Effects of Interpregnancy Intervals and Previous Pregnancy Outcome on Fetal Loss in Rwanda (1996 – 2010). 2015.
 27. de Jonge HCC, Azad K, Seward N, Kuddus A, Shaha S, Beard J, et al. Determinants and consequences of short birth interval in rural Bangladesh: a cross-sectional study. *BMC Pregnancy Childbirth* [Internet].2014;14:427.
 28. Love ER, Bhattacharya S, Norman C. Effect of interpregnancy interval on outcomes of pregnancy after miscarriage : retrospective analysis of hospital episode statistics in Scotland, 2010
 29. Seifadin Ahmed, Yadeta Dessie, Tesfaye Gobena, Duration of birth interval and associated factors among married women in Dodota Woreda, Arsi Zone, Ethiopia, 2016.
 30. Jebet J, Oyore JP. Poor pregnancy outcomes in public health facilities in Kenya. 2015;(October 2012):4–10.
 31. Umar AS. Use of Maternal Health Services and Pregnancy Outcomes in Nigeria. 2016;
 32. D OEP. Socio-cultural factors affecting pregnancy outcome among the ogu speaking people of Badagry area of Lagos state , Nigeria . 2012;2(4):133–44.
 33. Braimoh Bello, Danuta Kielkowski, Dick Heederik, Kerry Wilson Time-to-pregnancy and pregnancy outcomes in a South African population, 2010, 10:565
 34. Westoff CF, Serbanescu FI. GEORGIA FURTHER ANALYSIS The Relationship between Contraception and Abortion in the Republic of Georgia Further Analysis of the 1999 and 2005 The Relationship between Contraception and Abortion in the Republic of Georgia. 2005;
 35. Tesfaye G, Hambisa MT, Semahegn A. Induced Abortion and Associated Factors in Health Facilities of Guraghe Zone , Southern Ethiopia. 2014;2014
 36. Sebastian MP, Khan ME, Roychowdhury S. Promoting healthy spacing between pregnancies in India: Need for differential education campaigns. *Patient education and counselling*.2010; 395-401

37. Julie DaVanzo (RAND), Lauren Hale (RAND), Abdur Razzaque (ICDDR, B), and Mizanur Rahman (Pathfinder International) the effects of birth spacing on pregnancy outcomes and infant and child mortality in Matlab, Bangladesh, 2004.
38. Etemad A. A. El-Sherif, M. H. Qayed, Ali H. Zarzour, Kawthar Fadel, the Effects of Birth Spacing on Infant and Child Mortality, Pregnancy Outcomes & Maternal Morbidity in Abnoub District, Rural Assiut, Upper Egypt, 2008
39. Davanzo J, Hale L, Razzaque A, Rahman M. Effects of interpregnancy interval and outcome of the preceding pregnancy on pregnancy outcomes in Matlab , Bangladesh. 2007; 1079–87.
40. Davanzo J, Hale L, Razzaque A, Rahman M. The effects of pregnancy spacing on infant and child mortality in Matlab, Bangladesh: how they vary by the type of pregnancy outcome that began the interval, 2008, *Popul Stud (Camb)*; 62: 131-154.
41. Awiti JO. Preceding Birth Interval Length and Maternal Health in Kenya. 2013;
42. Hadiya zone health department annual report, 2016.

ANNEXES

Jimma University Institute of Health, School of Graduate Studies, Population and Family Health Department

Annex 1: English version Questionnaire

Questionnaire for data collection on interpregnancy interval and its association with pregnancy outcome among women of child bearing age in selected district, Hadiya zone, southern Ethiopia.

Informed consent form

Dear respondent:

Hello, my name is_____. This questionnaire is prepared to conduct a study on interpregnancy interval and its association with pregnancy outcomes among women of child bearing age. I am here to enroll and take interview from eligible study participants like you and fill in the questionnaire forms prepared by researcher. I am glad to inform you that you are one of the chosen study participants to participate in this study. The purpose of this study is to assess the interpregnancy interval and its association with pregnancy outcomes among women of child bearing age in Hadiya zone. The information in this questionnaire will be kept strictly confidential, will not be divulged to any one and only the research team will have access to the information you gave but your name and address will not be recorded or identified even by the research team. This questionnaire will be filled only if you agree to take part in the study. However, your genuine and true responses you give value for success of the study and also will help for better understanding of the problem that would eventually help in designing appropriate intervention to solve the problems and I sincerely ask you to give your genuine and true responses to the questions provided.

So, do you agree to participate in this study?

Yes/agree -----No/disagree -----

Date of data collection----- Starting time _____ End time _____

Name of data collector----- signature-----

Name of supervisor----- signature-----

Questionnaire Code _____

Part I: Information on socio- demographic characteristics of the mother			
S. No.	Questions	Response and Coding	Skip
101	House hold number	-----	
102	Residence	1. Urban 2. Rural	
103	District	-----	
104	Kebele	-----	
104	Age of the mother in completed years	-----years old	
105	Marital status	1. Single 2. Married 3. Divorced 4. Widowed	
106	At what age did you marry?	-----years	
107	Religion	1. Orthodox 2. Protestant 3. Muslim 4. Catholic 5. Others (specify)_____	

108	Ethnicity	<ol style="list-style-type: none"> 1. Hadiya 2. Kambata 3. Wolayita 4. Gurage 5. Amhara 6. Other ethnics(specify)----- 	
109	Educational status of mother	<ol style="list-style-type: none"> 1. Unable to read and write 2. Read and write 3. Grade completed----- 	
110	Educational status of husband	<ol style="list-style-type: none"> 1. Unable to read and write 2. Read and write 3. Grade completed----- 	
111	Occupation of the mother	<ol style="list-style-type: none"> 1. Employee 2. House wife 3. Merchant 4. Student 5. Farmer 6. Daily laborer 7. Others(Specify)_____ 	
112	Occupation of the husband	<ol style="list-style-type: none"> 1. Employee 2. Merchant 3. Student 4. Farmer 5. Daily laborer 6. Others(Specify)_____ 	

Part II: Information on the inter pregnancy interval and pregnancy outcomes of the mother

S. No.	Questions	Response category	skip
201	How many pregnancies have you ever had, including abortion and stillbirth?	-----	
202	How many live birth have you ever gave?	-----	
203	How many children do you have now?	Male----- Female-----	
204	What was the sex of preceding child?	1. Male 2. Female	
205	Was the recent pregnancy planned?	1.Yes 0.No	
206	What was recent pregnancy outcomes?	1. live birth 2. non-live birth	→ If non-live birth skip to ques.no.208
207	How long was the duration of inter pregnancy interval between delivery of preceding child and conception of recent pregnancy outcome in month?	-----months	
208	If recent pregnancy outcome was non-live birth for Q 206, how it was happen?	-----	
209	If recent pregnancy outcome was non-live birth for Q 206, how long was the duration inter pregnancy interval between delivery of preceding child and conception of recent pregnancy outcome in month?	-----months	
210	How long was gestational age of recent pregnancy outcome in week, if recent pregnancy outcome was non-live birth for Q206?	-----weeks	

Part III: Question about birth spacing			
S. No.	Questions	Response and coding	Skip
301	Have you ever heard about optimal birth space?	1. Yes 2. No	
302	If yes to Q301, In your opinion what is the optimum duration birth interval in between two consecutive live birth?	----- months	
303	Does adequate/optimum birth spacing have a health advantages?	1.yes 2.no 3. I don't know	
304	If yes to Q 303, to whom do you think have a health advantages?	1. Mother 2. Child 3. Both 4. I don't know	
305	If your answer is no for Q 303, to whom do you think have a health disadvantages?	1. Mother 2. Child 3. Both 4. I don't know	

Part IV: Awareness and Practice of Modern Contraceptive use			
S. No.	Questions	Response and coding	Skip
401	Do you know any modern female contraceptive method used to limit or avoid pregnancy?	1.yes 0.No	
402	If yes for Q401, which one?	1. Oral pills 2. Injectable 3. The one which is inserted under the skin 4. The one which is inserted to the womb	
403	Have you used any modern contraceptive method before conception of last pregnancy outcome?	1. Yes 0. No	
404	If your answer to Q403 is yes, what was the purpose?	1. Birth spacing 2. Limiting birth 3.Other(specify)-----	
405	If your answer to Q403 is yes, which modern method/s did you use?	1. Oral pills 2. Injectable 3. The one which is inserted under the skin 4. The one which is inserted to the womb	
406	For how long did you use contraceptive?	----- Months	
Part V: Breast feeding practice, ANC and medical histories of respondents			
S. No.	Questions	Response and coding	Skip
501.	Did you breast feed for your preceding child?	1. Yes 0. No	

502	If yes for Q501, for how long did you breast feed exclusively?	----- Months	
503	For how long did you breast fed him/her before becoming pregnant?	----- Months	
504	Had you attended ANC follow up When you were pregnant for recent pregnancy outcomes?	1. Yes 0. No	
505	If your answer for Q504 is yes how many times did you visit ANC clinic?	_____time/s	
506	During ANC follow up did you get any information regarding optimal inter pregnancy interval?	1.Yes 0.No	
507	Where did you deliver your index child?	1.Health facility 0.Home	
508	Did you have any pre-existing medical illnesses before termination of current pregnancy outcome?	1. Yes 0. No	
509	If yes, which ones?	1. Diabetes mellitus 2. hypertension 3. cardiac disease 4. HIV/AIDS 5. others (specify)___	
510	Had you any medical illnesses during but before termination of the current pregnancy outcome?	1. Yes 2. No	
511	If yes, which ones?	1. malaria 2. Anemia 3. Pregnancy induced hypertension 4. others (specify)	

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Part VI: Household wealth index identification questionnaires

601. Does the household has any of the following properties.(circle)		1. yes		0. no
	Functioning radio	1		0
	Functioning television	1		0
	Stove	1		0
	kerosene	1		0
	electric	1		0
	motorcycle	1		0
	Gari	1		0
	Cart	1		0
	Watch	1		0
	Mobile phone	1		0
602	Does the Household have the following animals?	1. yes	0. no	How many?
	oxen	1	0	
	cows	1	0	
	Horse	1	0	
	mule	1	0	
	Goats	1	0	
	cheeps	1	0	
	Chicken	1	0	
603	What is the main source of drinking water for members of your household?	1. piped water 2. protected dug well		

		<ul style="list-style-type: none"> 3. unprotected dug well 4. protected spring 5. unprotected spring 6. rainwater 7. tanker truck 8. surface water (River, pond) 9. bottled water 10. others specify _____ 	
604	What kind of toilet facility do members of your household usually use?	<ul style="list-style-type: none"> 1. flush or pour flush toilet 2. ventilated improved pit latrine (VIP) 3. pit latrine with slab 4. pit latrine without slab/ open pit 5. No facility/bush/field 6. others (specify) _____ 	
605	Do you share this toilet facility with other households?	1. Yes 0. No	If no, skip to Q607
606	If "yes for Q 505" how many households use this toilet facility?	No. Of households _____	
607	Main material of the floor. Record observation	<ul style="list-style-type: none"> 1. earth/ mud 2. wooden 3. ceramic tiles 4. cement/bricks 5. other specify _____ 	
608	Main material of the roof. Record observation	<ul style="list-style-type: none"> 1. thatch/leaf 2. plastic sheets 3. wood 4. corrugated iron sheet 5. cement 	

		6. other (specify)_____	
609	Main material of the exterior walls. Record observation.	1. wooden and mud 2. wood/sticks 3. cement 4. stone with lime/cement 5. bricks 6. WOOD plank/SHINGLES 7. other (specify)_____	
610	How many rooms do the household has?	No. of rooms -----	
611	How many bed rooms do the household has?	No. of rooms -----	
612	Does any member of this household own any agricultural land?	1. Yes 0. No	If no, skip to Q 614
613	If yes, How many (local units) of agricultural land do members of this household own?	Local units 1. Local units _____ 2. Don't know	
614	Does any member of this household have a bank or microfinance saving account?	1. Yes 2. No	

Annex 2: Hadiyisa version questionnaire

Jimmii yunniversitei faya'oommi egechchi lasaanchch qooddoi lammi lammfoorommi lammbèenne yookki ammannee lasaanchchi lammi foroommi sharaddinne yookki matayoomma sarayyimmi lammi diggirrei maassi kittaaba neqqashsha guddissimmina wixxaakkammi naqqashsha iitti sagaraa uwwoo manna siidimmina guddaakko guddishsha.

Lophpittattoo aayichchee:

Isummi_____yammammokko. Ku xammichch lammi lammfoorommi lammbèenne yookki ammannee lasaanchchi lammi foroommi sharaddinne yookki matayoomma sarayyimminna gudaakko xammichchaa. Kinnee kasarayyinna dabachcha uwwitakkeenna araqqa dollantakkohanne, kinn neqaashshi kasaraayyina araqqi awaaddi yohanne, eebikkinna araqqi hayyidantakkoo ayichche ayyi uwwitakammi naqashuwwa qoxixanchchinne, mexxaqanchchinne mulli manni afoobèannii ihukkissa caakkinsoommuyya, ayyi neqqashshammi uwwitakamokki kinni ittinnette.

Xammichcha dabarimmanne mahi sawwitti heéatte?

1. Ooyya ashherre,
2. ittammommoyyo

Galaxxinnoommo!!

Naqqashsha xammaanchchi summi_____

furmmàa_____ayyaammoo_____

Baxxanchchi –1: gatti ogoraa naqqaashsha

xigo	Xammichcha	Dollichchaa dabachchaa	higonaa
101	Minni annan summa teim xigo	_____	
102	Gatti kulluletta	1. Beerrò 2. Gaxara	
103	woradi	_____	
104	Kabalée	_____	
104	Ama ummuri	_____	
105	Mine isakam ogoraa	1. mine isittooko	

		2. Baajaammotte 3. Buubesachcho 4. manichchi lehaakohanne	
106	Mine issito ummurra?	_____hinchcho	
107	Hayimaanootti	1. Ortodokisa 2. Amanaano 3. Isilaammo 4. Katoolikka 5. mulekka (caakisse)_____	
108	Shummòo	1. Hadiyyaa 2. Kambatta 3. wolayitaa 4. guraaggée 5. Amhaarra 6. mulanne(caakisse)_____	
109	Ammi lossân koffitte	1.kittaabimma kannanâmma xantamibeéanne 2. kittaabimma kannanâmma xantamanne 3. lossanni kofitte kuree _____	
110	Minni anni lossân koffitte	1.kittaabimma kannanâmma xannobeéanne 2. kittaabimma kannanâmma xanohanne 3.lossanni kofitte kuree _____	
111	Ammi baxxi oggora	1. addilli baxxanchotte 2. minni ammatte 3. dadaranchchotte 4. lossanchchotte 5. abuullanchote	

		6. balli baxxanchotte 7.mullekki yoollassi_____	
112	Minni anni baxxi oggora	1. addilli baxxanchcho 2. dadaranchcho 4. lossanchcho 5. abuullanchcho 6. balli baxxanchcho 7.mullekki(caakisse)_____	

Baxxanchchi-2: lammi lamiforrommi lambéenne yooki fonggoganne lasanchchi lammi forrommi sharaddanne yooki hiraago

xigo	Xammichcha	Dollichchaa dabachcha	higonnaa
201	Kabaddi affebée meèi korre lammi foori ikkate?	_____	
202	Kabaddi affebée meèi fooram oosso qattatte?	_____	
203	Kaba kina meèi oossi heèaatte?	1.Goonni_____ 2. Landdi _____	
204	Lasanchchi lammi foromma hasattenni ikkitookki?	1. oyya 0. oyyayyo	
205	Lassanchchi lammi forroom sharadinse illaggenanni ciilli alibachchi mahhi heèukko?	1. goonichcho 2. landichchotte	
206	Leesanchchi lammi fooroom sharaddi maha heèukko?	1.foorinnem qeramakko 2. fooram heèukkoyoo	→ Fooram ihuubelas s Xammich ch tigi 208, higge.

207	Illaggenni ciillichinse lasanchi lammi foorommi ashsheròì affebèinna yookki amman meèi aganni heèuukko?	_____ aganna	
208	Xammichchi xig 206, lassanchi lammi forroom sharadi foorammi ihubeelassi , hinkidde ihhenna xannukko?	_____	
209	Xammichchi xig 206, lassanchi lammi forroom sharadi foorammi ihubeelassi , illaggenni ciillichinse lasanchi lammi foorommi ashsheròì affebèinna yookki amman meèi aganni heèukko?	_____ aganna	
210	Xammichchi xig 206, lassanchi lammi forroom sharadi foorammi ihubeelassi , forammi ihubeèekki qaramukkokki meèi saantannetti heèukko?	_____ saanta	

Baxxanchchi-3: Lammi lamforoommi lambènne yookki fongogibikkina yoo ammi lachchi hiraaggo

Xigo	Xammichcha	Dollichchaa dabachchaa	higonnaa
301	Lammi lamforoommi lambènne heèim hassisso fongogi tèim amanni hinikaan ihmimi hassissodàee macesahinni?	1. oyya 2. macceesummoyyo	
302	Xammichchi xig 301, oyya yittitlassi meèi agana ihmimi hassissokkokki?	_____ agana	
303	Ushshexakka qarimmi awaddi yookko yitaa sawitohinni?	1. oyya 2. awwadooyoo 3. lammomme 4. laummoyyo	

304	Xammichchi xigi 303, Ooyya yitilassi ushexakka qarimmi ayyi fayàommina awaddokko yita sawitooto?	<ol style="list-style-type: none"> 1. Amanattee 2. Ciillinatte 3. Lamminattemme 4. laummoyyo 	
305	Xammichchi xigi 303, Awwadooyoo yitilassi ushexakka qarimmi ayyenatte awaddoyyo yita sawitootokki?	<ol style="list-style-type: none"> 1. Amana 2. Ciillina 3. Lamminammi 4. laummoyyo 	

Baxxanchchi-4: Doolabbi abarosso kodimmina awaxakammanni bikina yookki ammi lachchi hiraaggo

Xigo	Xammichcha	Dollichchaa dabachchaa	higonnaa
401	Doolabbi abarosso kodimmina awaxakammokka lakkohinniyye?	<ol style="list-style-type: none"> 1. ooyya 0. ooyyayyo 	
402	Xammichchi xigi 401, ooyya yitilassi hinikanne laqqottokki?	<ol style="list-style-type: none"> 1. liqqicakammokka 2. marfièikka 3. anggi maalli worronne aagisakkamokka 4. mahitsananne/goossanne aagisakamokka 	
403	Doolabbi abarosso kodimmina awaxakammokka lassanchch lammi foorommi sharadinsee illagge awaxxitahinniyye?	<ol style="list-style-type: none"> 1. ooyya 0. ooyyayyo 	
404	Xammichchi xigi 401, ooyya yitilassi awaxxitti mashikà mahaa?	<ol style="list-style-type: none"> 1. qaqqisso qarimma dassisimmina 2. qarimma ullisimmina 3. mullekki(caakkisse)_____ 	
405	Xammichchi xigi 403, ooyya yitilassi hinikanne?	<ol style="list-style-type: none"> 1. liqqicakammokka 2. marfièikka 	

		3. anggi maalli worronne aagisakkamokka 4. mahitsananne aagisakamokka	
406	Hiinikaanni ammanninnatte awaaxxitokki?	_____ aganna	

Baxxanchchi-5: Annuna iccimmibikkina ammi fayyoommibikkina yoo hiraaggo

Xigo	Xammichcha	Dollichchaa dabachchaa	higonaa
501	Lassanichch lammi sharadinsee illageenni ciilla annunna iccisaattenni?	1.ooyya 2.ooyyayyo	
502	Xammichchi xigi 501, ooyya yititilassi xallèi annunna hinikaanni aganni affebèinna iccissitokki?	_____ aganna	
503	Lassanchchi lamforromma ashshettebèe affebèe meèi aganna ciilla iccisaatte?	_____ aganna	
504	Lassannichchi lammi lamforrommi ammannenne lammi forrommi awanatto issitahinni?	1.ooyya 2.ooyyayyo	
505	Xammichchi xigi 501, ooyya yititilassi meèi korre?	_____ korre	
506	Lammi forommi amannenne ushexxakka qarimmi bikkina naqaashuwa maccesattenni?	1.ooyya 2.ooyyayyo	
507	Ooyya yititilass,lassanchchi cilla hanonette qattitokki	1.fayoomma eggechch minnenne 2.minnenne	

508	Lassanchchi lammi foorommi sharaddinse illagenne ayyi dassakko xissi hirraaguwwi heèukkonni?	2. ooyya 3. ooyayyo	
509	Ooyya yititilass,hinkanni heèukko?	1. sukkaalli jabbo 2. xiiggi gaffechchi jabbo 3. wodanni xisso 4. HIV/AIDS 5. mullanne (caakisse)___	
510	Lassanchchi lammi foorommi sharaddinse illagenne asheraakko tissi heèukkonni?	1. ooyya 2. ooyayyo	
511	Ooyya yititilass, hinkanni heèukko?	1. wobbàa 2. xiiqq hanqattoomma 3. lamomi formmi ammanne asheeraakko xiiqqi gaffechcha 4. mullanne(caakkisse)_____	

Baxxanchchi-6: minnni abarossinna yooki ammaxxi xammichchuwwa

601	kiminnenne awanno keenni heèahinni	2. yook ko	1. beèe
	Awaddo uwwukkuyya yoo radio	1	0
	Awaddo uwwukkuyya yoo televejjiini	1	0
	Stovii	1	0
	Keṛossinni/qaddalli gaaza	1	0
	elekitrikki	1	0
	Doddoqèe	1	0
	Garrèi	1	0
	kaammèe	1	0

	Saatti/amanne kuranchchi	1	0
	mobiilli	1	0
602	mirgòì	1	0
	Saayyi	1	0
	Farashi	1	0
	Baquchchi	1	0
	Felakkichchi	1	0
	Gereechchi	1	0
	Antabakkichchi	1	0
603	Araqqi amanne wò hannisette awaxxitakamokki		1.bonbài wò 2.ginbakkòì balli wò 3.ginbkobeèì balli wò 4.ginbakkoi bùoo 5.xeenni wò 6.tanikkerri wò 7.daajji teimmi leelli wò 8.iffisammawaaroo wò 9.mullanne (cakkisse)- _____
604	Kinni mini manni shumma shummeòokkokki hannonnette?		1. woòinne baxxo shummi minnennette 2. foshshi beèi shummi minnennette 3. Gogaalli shummi minnennette 4. daphphitti beèi shummi minnennette 5. haqqi woroonnette 6. mullanne(caakisse)_____

605	Shummi mine mulli manninne maqqirrenne awaxxitakamokki?	1. ooyya 0. ooyyayyo	Oyyayy ihulass xammich 507 ashshere
606	Xammichch xiggi 505 ooyya, yitittilassi meèii mine awwaxxitakkamokki	_____	
607	Minni gaxxi baxxamukkokki mahinsette?	1. buchchinsette 2. orràinne 3. haqqinisse 4. simmintòinse 5. mullanne ,caakisse _____	
608	Mini iimanni baxxamukkokki mahinsette?	1.guffinnette/buyyinsette e 3. sharàinnette 3.haqqinnette 4.qoriqorròinnette 5.simminittòinnette 6.mullanne/caakisse____ _____	
609	Mini goritanni baxxamukkokki mahinsette? Main material of the exterior walls. moòe	1. haqqinne harinne 2. haqqinne meegaròinne 3. siminittòinne 4.kinninne siminttòinne 5.bolokkettinne 6. tawwullàinne 7. mullekka/caakkisse____ _____	

610	Kinni minnina meèi baxxanchch heèatte?	Baxxanchchi xiggi _____	
611	Kinni minnenne meèi insèakkammi baxxanchchuwwi heèatte?	Baxxanchchi xiggi _____	
612	Kinnuwwinna abullu uulli heèatte?	1. ooyya 0. ooyyayyo	Oyyayy ihulass xammich 514 ashshere
613	Ooyya yititlassi hinkaanni heekitarri uulli heèatte?	1. heekitarri _____ 2. làummoyyo	
614	Kinnuwwinna bankkanne teèimmi mikroifàinnansanne dissitakkam akkawunit xigg heèaattenni?	1. ooyya 0. ooyyayyo	

DECLARATION

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

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Date of submission: 13/06/2017

This thesis has been submitted for examination with my approval as University advisor

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