

**RISK FACTORS OF HIGH FERTILITY STATUS AMONG MARRIED
WOMEN IN GILGEL GIBE FIELD RESEARCH CENTER OF JIMMA
UNIVERSITY , OROMIA, ETHIOPIA : A CASE CONTROL STUDY**

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A thesis submitted to the Department of Epidemiology, College of Public Health & Medical Sciences Jimma University in partial fulfillment of the requirements for the degree of Masters of Public Health in Epidemiology, (MPHE).

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JIMMA UNIVERSITY
COLLAGE OF PUBLIC HEALTH & MEDICAL SCIENCES
DEPARTMENT OF EPIDEMIOLOGY

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Abstract

Background: Fertility is the most important component of population dynamics and plays a major role in changing the size and structure of the population of a given area over time. Uncontrolled fertility has adversely influenced the socio-economic, demographic and environmental development of the country. Ethiopia is one of the most populous countries in Africa, which suffers from direct and indirect related population problems. The Total Fertility Rate is 4.8 children per woman and under five mortality rates 88 per 1000 live births.

Objective: This study was designed to identify risk factors of high fertility status among Married woman Gilgel Gibe Field Research Center of Jimma University, Oromia, Ethiopia.

Methods: A community based Unmatched case-control study was conducted. Where cases are women with number of children ever born alive greater or equal to five and controls are women with number of children ever born alive less than five. There were 120 cases and 240 controls selected using simple random sampling technique. Logistic regression was used to analyze the data by using backward logistic regression variable selection techniques. All explanatory variables that were associated with the outcome variable (fertility status) in univariate analysis with p-value of 0.25 or less were included in the initial logistic models.

Result: Among 28 variables considered in this study, only 6 of them were found significantly and independently associated with the level of fertility. As it can be noted from the present study that the mean number of children per woman in the high fertile group was 6.0 (median = 6.0) while it was 3.0 (median = 3.0) in the low fertile group. The variation in the number of children ever born alive between the women age at last birth less than or at 30 years and greater or equal to 31 years is significant with adjusted OR of 25.65 and 95% CI (11.89, 55.31). Under-five mortality affected number of children ever born alive significantly (AOR= 1.91, 95% CI: (1.01, 3.62). Monthly income of family, Age at first marriage, history of stillbirth experience and number of children desired before marriage were the other variables that showed significant associations with the level of fertility.

Conclusion and recommendation: The study finding implies high fertility status is strongly associated with age at last birth and child death and, some other factors like stillbirth. Hence measures that reduce child mortality and stillbirth are believed to decrease fertility status besides promoting child survival. Measures should also be taken in order to shorten age at last birth.

Key words: Fertility status, under five mortality, Child Ever Born.

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ABBREVIATIONS

CBE: Community Based Education

CEB: Child Ever Born

CPR: Contraceptive Prevalence Rate

CSA: Central Statistical Agency

DHS: Demographic and Health Survey

EDHS: Ethiopian Demographic and Health Survey

GGFRC: Gilgel Gibe Field Research Center

HIV/AIDS: Human Immune Deficiency Virus /Acquired Immune Deficiency Syndrome

MDGs: Millennium Development Goals

MMR: Maternal Mortality Rate

NGO: Non Governmental Organization

OR: Odds Ratio

PI: Principal Investigator

SPSS: Statistical Package for Social Sciences

TFR: Total Fertility Rate

WFS: World Fertility Survey

1. INTRODUCTION

1.1. Background

The demographic pattern of developing countries is characterized by the co-existence of high fertility and high infant, and child mortality [1]. Fertility is the most important component of population dynamics and plays a major role in changing the size and structure of the population of a given area over time. Fertility is a complex variable which is affected by multiple factors [2].

In 2008, of the 1.4 billion women in the developing world of reproductive age (15-49 years), more than 570 women die per 100,000 live births and 70 percent of this die due to totally avoidable reasons. Women are under-represented in governance and decision-making positions. Most women do not have any autonomy in decision making in their personal lives [3]. These women live in countries where their status is poor to extremely poor and these conditions threaten their health in many ways. Studies conducted in a number of countries show that wherever fertility is high, maternal, and infant and child mortality rates are high. Fetal deaths, low birth weight, and related problems are also associated with unregulated fertility. High maternal and under five mortality are also associated with such reproductive practices as short birth intervals, pregnancies in women under age of 20 and above the age of 35 years. Fertility rate is highest in sub-Saharan Africa than many parts of the world, mainly due to strong kinship networks and high economic and social values attached to children [4].

Ethiopia is one of the sub-Saharan African countries where high and persistent fertility rate has been seen for a long period of time. Although a slight decreasing trend has shown from year to year, it is still high as compared to developed nations [5]. Ethiopia is also one of the most populous countries in Africa next to Nigeria, which suffers from direct and indirect population related problems [6]. Uncontrolled fertility has adversely influenced the socio-economic, demographic and environmental development of the country [7]. Various reasons were mentioned for the reasons that kept the fertility rates still high in Ethiopia. Poverty, war and famine, low level of education, economic status and less autonomy of women and traditional barriers were usually mentioned as a reason for this persistent and high fertility rate in Ethiopia [5].

The demographic significance of Ethiopian population growth on the African continent is substantial. The country is one of the largest and poorest that even in the midst of crisis, have maintained high levels of fertility [8]. Its population has increased nearly sevenfold from 11.8 million at the beginning of the 20th century to about 73.9 million in 2007. The estimated annual rate of growth and doubling period was 2.6% and 26 years, respectively [9].

The CPR in Ethiopia observed in the 2011 EDHS has doubled from that reported in the 2005 EDHS (29 percent compared to 15 percent) for currently married women. But more than half of currently married women who were not using any family planning method at the time of the survey say they intend to use a method in the future. While CPR among urban women has only slightly increased in the last five years (47 to 53 percent), CPR has doubled from 11 percent in 2005 to 23 percent in 2011 among rural women [10].

The maternal mortality ratio (MMR) of the country was 871, 673 and 676 per 100,000 live births in 2000 and 2005 and 2011, respectively. According to the preliminary report of 2011 EDHS the infant and under-five mortality rates were 59 and 88 per 1000 live births in 2011 [10, 11].

The Oromia Regional State where the present study will be undertaken also is not out of this. Oromia represents the largest regional state with 353,690 (32%) square kilometers land area of the country and an estimated population size of 28,067,000 (35.4%) for July 2008 [6]. The high plateaus of the region have been tremendously affected by uncontrolled population growth throughout ages. The potential health service coverage and utilization of the region is about 70.5% and 27%, respectively. Around 3.7% of women deliver at health care facilities, while over 95% of them deliver at home. The infant, and under-five mortality rate is 76 and 122 per 1000 live births respectively [12]. According to the preliminary report of 2011 EDHS, the total fertility rate and contraceptive prevalence rate of the region were 5.2 and 13.6 %, respectively [10].

The women in Ethiopia were found to be at a disadvantaged position compared with the male counterparts mainly due to their low social status that results from a lack of access to family resources, education, occupation and decision-making power [13]. The women in Gilgel Gibe Field Research Center (GGFRC) where the present study will be undertaken as part of the country are not an exception.

1.2. Statement of the problem

High fertility is defined as a total fertility rate (TFR) of 5.0 or higher. The TFR represents the average lifetime births per woman implied by the age-specific fertility rates prevailing in one historical period [14].

The high-fertility countries lag in many development indicators, as reflected for example in their rate of progress toward achievement of the Millennium Development Goals (MDGs). These countries have also received less development assistance for population and reproductive health than countries more advanced in their transitions to lower fertility, and the assistance they did receive increased only marginally from 1995 to 2007, a period during which commitments to both health and HIV/AIDS rose substantially [14].

As high fertility is associated with increased obstetric and medical risks of mothers, in order to reduce fertility and control population growth of the country, the factors that influence fertility should be clearly identified [15]. Experience of fertility transition countries also emphasizes the role of its determinant in fertility change [16]. Human fertility is a function of a variety of factors. Fertility determinant varies by residence, educational background, and other background characteristics of a woman depending on the specific conditions of the given area [1, 17]. Early marriage, especially in the peak fertility age 20-29 places many women at a high risk of pregnancy which translates into high fertility rates. Because in this age group breastfeeding duration and duration of postpartum amenorrhea shorter than older women and less effective in contraceptive use [18]. Adolescent fertility also known as teenage fertility refers to women could have given more than two live births before the age of 20 years and who did not breastfeed, as well as did not use family planning [19].

At the household and individual level, high fertility means not only a large number of births by the end of most women's reproductive careers, but also typically a high incidence of pregnancies at young ages, of unplanned and unwanted pregnancies, and of closely-spaced pregnancies, all of which can affect household and individual welfare. Assessing the causal impact of high fertility is an analytical challenge because fertility is, to a greater or lesser extent, a choice. Co-variation of fertility with other outcomes—health, social, and economic—may reflect deliberately chosen trade-offs rather than a straightforward causal effect of fertility [14].

Therefore, a proper understanding of these factors are of paramount importance in tackling the problem of uncontrolled fertility, which paves the way for the improvement of the prevailing socioeconomic problems of the country. Particularly, it would have a substantial contribution in the improvement of the health status of women and children. It is plausible that they may be related to each other.

2. LITERATURE REVIEW

2.1. General Fertility Situation

World population is projected to reach 7 billion early in 2012, up from the current 6.8 billion. This current growth in the world's population is considerably high. Recent middle-range estimate projects that the Earth's population could increase from 6 billion in 2005 to 7.3 billion in 2025 and 9.4 billion in 2050. Ninety-five percent of this growth will take place in the developing world [2]. Most of the additional 2.3 billion people will enlarge the population of developing countries, which is projected to rise from 5.6 billion in 2009 to 7.9 billion in 2050 which was increasing four times as fast, 1.37 per cent annually, and will be distributed among the population aged 15-59 (1.2 billion) and 60 or over (1.1 billion) because the number of children under age 15 in developing countries will decrease. Three least developed countries including Bangladesh, Ethiopia and the Democratic Republic of the Congo were among the ten most populous countries in the world. In contrast, the population of the more developed regions is expected to change minimally, passing from 1.23 billion to 1.28 billion which was rising at an annual rate of 0.34 per cent, and would have declined to 1.15 billion were it not for the projected net migration from developing to developed countries, which is projected to average 2.4 million persons annually from 2009 to 2050 [20].

The average total fertility rate for sub-Saharan Africa as a whole is more than five children per women, which is almost twice the world average of 2.5 [21]. More developed regions have fertility levels below replacement; whereas, least developing regions have five or above five children per women [20].

Niger has the highest total fertility rate (TFR) in Africa and in the world. The total fertility rate was 7.4 children per woman. Girls who marry at a young age face the health risks that accompany adolescent childbearing. In Niger more than 70 percent of girls in their early 20s had married before 18, and in any single year, one in seven girls ages 15 to 19 has given birth [21]. Under-five mortality had reached 82 deaths per 1,000 births in South-Central Asia, but it was still as high as 148 deaths per 1,000 births in sub-Saharan Africa [20]. According to the recently published estimate of the number of maternal deaths worldwide decreased by 34 percent from 1990 to 2008 (from around 546,000 deaths to 358,000 deaths each year from complication of

pregnancy, child birth and unsafe abortion). Developing countries still account for 87 percent of the total. That comes to about one death every minute. Pregnancy related complications cause one quarter to one half of deaths among women of reproductive age in developing countries [22].

The Ethiopian Demographic and Health Surveys (EDHS) report shows that the total fertility rates (TFRs) of 2000, 2005 and 2011 was 5.5, 5.4 and 4.8 respectively. Overall, utilization of health services remains low for a number of reasons, including limitations in the services and delivery capacities available, as well as the affordability and quality of the services [23]. As maternal deaths related to child-bearing is unacceptably very high in our country, knowing the factors affecting the fertility levels of women at the individual and community levels in the rural context of Ethiopia where the majority of women reside would help greatly in averting deaths related to high fertility and thereby raising the status of women at large.

2.2. Determinants of Fertility

Though fertility is a biological phenomenon, there are a number of other factors influencing the levels and differentials of fertility among and within populations. Factors affecting fertility are broadly classified into proximate (direct) and distal (indirect) factors. The proximal factors are bio-behavioral factors known to be the intermediate determinants are the biological, reproductive and behavioral/attitude factors through which the indirect determinants must devolve to affect fertility and affect fertility directly, while the later, distal determinants are socio-cultural factors which consists of socio-economic and demographic factors affect fertility indirectly through affecting the bio-behavioral factors [1, 2].

Fertility differences among populations and trends in fertility over time can always be traced to variations in one or more of the intermediate fertility variables. Educational attainment has, in general, a depressing effect on fertility through the adoption of small family norms, knowledge and use of contraceptives, and later ages at first union and birth. The linkages between infant and child mortality and fertility are well known. Increased child survival chances are expected to generate a decline in the propensity to “hoard” or “replace”, two mechanisms by which families were perceived to have ensured the attainment of desired family size. It is believed that high infant and under-five mortality causes high fertility through the insurance and replacement

effect. The hoarding or insurance effect is conditioned by the general perception of mortality risks at the societal level, the “Child replacement effect” reflects the families’ response to actual child mortality experience and is based on the fact their previous child bearing [24, 25].

Study on analysis of data from rural Ethiopia supports under-five mortality had a strong significant effect on the number of children ever born. An increase in the number of children who have died raises the probability of attaining higher fertility [1]. Similarly the relation between fertility and child mortality experienced by mothers was found to be very strong and positive, in which it illustrated that under-five mortality, had a significant positive effect on fertility status. That is, an increase in the under-five mortality rate increases fertility significantly. As the number of children who died increased, women were exposed to a higher risk of uncontrolled fertility [26].

Continued high rates of infant and child mortality have contributed to high levels of fertility, because many couples may have "extra" children to make up for those who die young, but this relationship is complex. A study in India focuses on the biological relation between fertility and child mortality. The neonatal death of a child shortens the interval unit to the next birth because parents want to quickly replace the lost child and /or because shortened post-partum amenorrhea. Women who experienced a child death were more likely to have shorter subsequent birth intervals comparing to those who did not have such experience. When the number of survival child increased, the fertility level correspondingly decreased [27, 28].

The relationship between education attainment of parents and level of fertility generally noted in surveys of sub-Saharan African countries and other parts of the world has been an inverse one. Groups with high educational attainments (either husband or wife) have lower fertility than low educational groups [29]. Education can affect birth rate through a number of channels including changes in the level of contraceptive knowledge, desire for children and economic productivity. Women’s education has long been known to be an important factor related to fertility via multiple pathways from delaying the onset of childbearing to reducing the desired number of children to more effective control of fertility, among other aspects. Bongaarts (2010) has recently examined the role of education in fertility differences within sub-Saharan Africa, with particular

emphasis on educational differences in desired family size as well as use and effectiveness of contraception, among other factors [30].

Educated women are more likely to postpone marriage, have smaller families and use contraception more than uneducated women. The educational level of the parents (wife or husbands) influences access to modern knowledge and new ways of life. In addition, education tends to break down barriers to communication about family planning between spouses [31]. Similarly it has important implications in raising family planning discussion like the use of contraception, which ultimately reduces the fertility level and helps to reach the replacement level of fertility with their husbands. Woman's education, directly and indirectly influences contraceptive use [32]. Adolescent and young women may be able to stay in school longer because they do not become pregnant, and programs which inform youth of contraceptive options and the likely consequences of their behavior may delay childbearing [33].

In one study in Awassa by Samson and Mulugeta (2009), educational status of women was mainly found to be associated with high fertility, even after adjustment for other basic socio-demographic variables. Mothers with educational status of above primary school had less risk of having 5 or more child ever born. Those mothers below primary school not showed a significant difference with illiterate mothers in their level of fertility [2].

It has been proposed that in the developing country, the negative relationship between women's employment and fertility level is only present when higher status occupations of the urban sectors are considered. The relationship between women's participation in the paid labor force and their fertility and contraceptive behavior is commonly conceptualized in two ways. The first main perspective emphasizes the opportunity cost of child bearing, focusing on how the prospect for career development and higher income may depress the women's fertility. The second perspective centers on the work child care conflict, postulating that the less flexible the women's work schedule and arrangements are the more difficult it is for her to provide adequate care for her children. Therefore she more likely tries to limit her fertility [34, 35]. Two studies conducted in Senegal and Togo were examined the impact of female employment on fertility and found that women in both places who were employed had a longer birth interval than those who were unemployed, especially those who worked outside their homes. Another study confirmed that

unemployed women were more likely to have higher pregnant frequency than employed women [36, 37].

Women who lived in the urban area were more likely to use contraceptives than those who lived in rural areas. The fertility levels in urban and rural areas tend to be different. Fertility levels of women in the urban area were lower than women who lived in the rural area, because of differences in contraceptive use [38].

Religion continues to be associated with variations in the intermediate variables contraceptive because large differences by religion remain in contraceptive choice [11]. Traditionally one of the indisputable generalizations in demography has been that Orthodox Christians have higher fertility rates than the Muslim [35].

Income affects fertility through its effect on child survival which in turn affects maternal mortality, environmental contamination, nutritional status, personal illness, and controlling the use of medical services. The 2005 EDHS showed that Ethiopian women in the lowest wealth quintile have twice as many children as those in the highest wealth quintile. The fact that "...84 percent of women in the lowest quintile have no education compared with 38 percent in the highest quintile" shows the obvious fact that wealth and education go hand-in-hand and, together, make the biggest fertility impact. It is no wonder, then that the wealthy countries of the world have low fertility while most African countries plagued by poverty and illiteracy have, as a group, the highest fertility in the world [11]. The lower the income levels the higher the child mortality. Higher child mortality is followed by a higher fertility in individuals [39].

Fertility is said to be affected by ethnicity. In various ethnic groups, the proximate and remote determinants of fertility do not operate by the same route. The observed difference in fertility and its determinants can be understood in the wider context of the inequalities and differences in socio cultural and economic position. Ethnicity as fertility differential acting through patterns of postpartum abstinence which intern is affected by education, urbanization, changes in marriage and religions tradition, they tend to have a lower rate of contraceptive use due to their limited knowledge of birth control [29].

Age at first marriage has significant bearing on the number of children ever born alive. It is an important factor influencing fertility in countries like Ethiopia where level of contraception is very low. Similar results are documented in Nepal, Egypt and Morocco. The earlier age at marriage exposes to an early first intercourse with a consequence to earlier age at first birth. Mothers with an earlier age at first birth are likely to end up in having many children. study conducted on adolescent fertility show that teenagers whose age was between 18 and 19 years were about eight times more likely to be fertile than the younger once. It was evidenced that more older age group were married than younger teenagers indicating that as the age increased the probability of getting sexual intercourse and marriage increased which were the proximal determinants of fertility [1,19].

Women who marry early, for example at age fifteen, have roughly twice as many years of productivity as those marrying at age 30. But their productivity is more than twice that of those marrying age 30. This is because even though those marrying at 30 expose themselves to pregnancy half as many years as those marrying at age 15, their reproductive years are not as productive as the 15 years between age 15 and 30 due to reduced fecundity (biological potential to reproduce). In Ethiopia, the median age at marriage among women aged 25 – 49 was 16.1 years, and 79 percent of them were already married by age 20 and 49% were married at age 18 [11]. Woman who live in urban areas and completed lower secondary school tended to have a higher age at first marriage than those who lived in the rural area and had lower education [38]. General, woman's age is a significant factor involved with the probability for her to get pregnant. Increasing infertility with age is a well-documented and very apparent problem in modern society. The longer women wait to have children, the higher the chance is for them to have fertility problems due to the quality of the eggs and other related issues [29].

The fertility inhibiting effect of contraception has been demonstrated by several studies. It is another substantial proximate factor affecting fertility among countries. Although somewhat small at present due to low prevalence and high use of less effective methods, in line with the experience of other countries, the fertility inhibiting effect of contraception can be expected to increase as levels of contraceptive use increase, especially if there is a shift to more effective methods. At the same time, culture and socio-economic condition have significant roles in the use of contraceptive method. By and large, it is found that an increase in contraceptive

prevalence rates is consistent with an increase in the proportion of woman who needs to avoid pregnancy, which then leads to a decrease in fertility [40]. The prevalence of use of contraceptive methods increases with the increase in the number of living children as well as education level of the respondent [32, 41].

According to the study conducted in Ghana the fertility behavior is influenced by a multitude of socio-demographic and economic, and cultural factors. These factors, in turn, affect contraceptive practice in a variety of ways. The outcome of the analysis appears to support the view that knowledge of, and contraceptive adoption is gradually making an impact on fertility behavior in Ghana. Every use and current use of contraceptives is not significantly associated with the level of fertility [2, 27, 42].

Separating replacement and physiological effects using data on the death of an index child is difficult to accomplish in populations where breastfeeding is common: many infant deaths are closely followed by the return of menstruation and thus an increased risk of conception will occur simply because of the termination of breastfeeding [17]. It is generally known that breast-feeding is the major factor influencing the duration of postpartum infertility. The inhibitory mechanism by which breast-feeding acts to delay ovulation was not fully understood, but there is evidence that both the frequency and the duration of suckling play an important role [43]. Similar studies conclude that the fertility-inhibiting effect of postpartum infecundity resulting from prolonged breast-feeding is by far the most important proximate determinant of fertility. The duration of breast-feeding showed a significant difference between the two fertility profiles. Those mothers with prolonged breast-feeding showed a lower fertility status [1].

The inhibiting effects of breast-feeding on fecundity, particularly during the first twelve months after a birth, are well established. In the absence of breast-feeding the postpartum amenorrhea period is about two months. Prolonged breast-feeding can extend the amenorrhea period for up to 19 months or more. Even after the return of menstruation, breast feeding can continue to depress a woman's fecundity. The death of breast-fed infant prematurely ends lactation that shortens the length of the postpartum amenorrhea period. In non-contraception populations, the early return of menstruation contributes to a higher risk of conception, and thus a shorter than normal birth

interval. It is more pronounced in societies such as those of sub-Saharan Africa with prolonged breastfeeding practice and low contraceptive usage [25].

The impact of abortion on fertility has also been documented. An increase in abortion rate has usually been accompanied by a decline in fertility especially in high to medium fertility populations; particularly where the contraceptive use remained low and women expressed their demand to control fertility. Another study found that abortion was a significant factor that influenced fertility decline. It affects the women's decision to use contraception. However, in societies where abortion is illegal, the information on abortion is very difficult to obtain. Therefore, the impact of abortion on fertility reduction may not be explicit [44, 45].

A family size norm plays an important role in defining fertility behavior. In countries where family size preferences are below fertility levels, successful implementations of reproductive goals readily lead to fertility decline. It can be argued that the differential between the desired family size and actual family can be attributed to the socio-economic status. The desire to have lower children usually precedes the actual decline in fertility [25]. A strong preference of one sex can be a constraint on fertility decline if a couple that achieved their preferred family size continues to bear child until they achieve their desired number of sons or daughters. Evidence from several countries suggests that parents respond to the absence of sons with continued child bearing. There could be several reasons for this preference including the differences in the costs of raising boys and girls. For one, parents' expected benefits from investing in sons could be larger than the benefits of investing in daughters if men earn higher wages in the labor market or if female labor force participation is low. Parents might also expect higher benefits from investing in boys because sons are the providers of old age support. In some cultures, the practices of dowry and exogamous marriage effectively reduce girls expected contribution to their natal homes. Finally, parents may also value sons more not just for their economic contribution but also for the role they play in customs and in maintaining the family line [3, 35].

2.3. Rationale of the Study

The fertility level of Ethiopia especially in the rural area is unacceptably high. The higher the fertility of women, the more the risk associated with each birth. The reproductive role on top of the productive role of woman put her in a poor social and economic status. In developing country like Ethiopia, pregnancy and child birth is 18 times more likely to end in the woman's death than in developed countries [46]. Understanding of the factors responsible for the fertility status will help in designing strategies to effectively implement any program to tackle uncontrolled fertility and in raising the status of women. Identifying, factors responsible for high fertility levels in the Gilgel Gibe Field Research Center (GGFRC) would imply identifying factors in other similar settings of the country and important in detecting relevant variables of interest for intervention. For the above point out reasons undertaking this study at the district level which try to cover as many differential factors as possible would be important.

Conceptual Framework on Determinants of High Fertility Status

The conceptual framework of the study that deals with the determinants of high fertility status is showed in figure1. The selected socio-economic and demographic factors in the model list the proximate determinant variables. These factors can also determine high fertility of married women. This conceptual framework is constructed based on the peer reviewed published literatures.

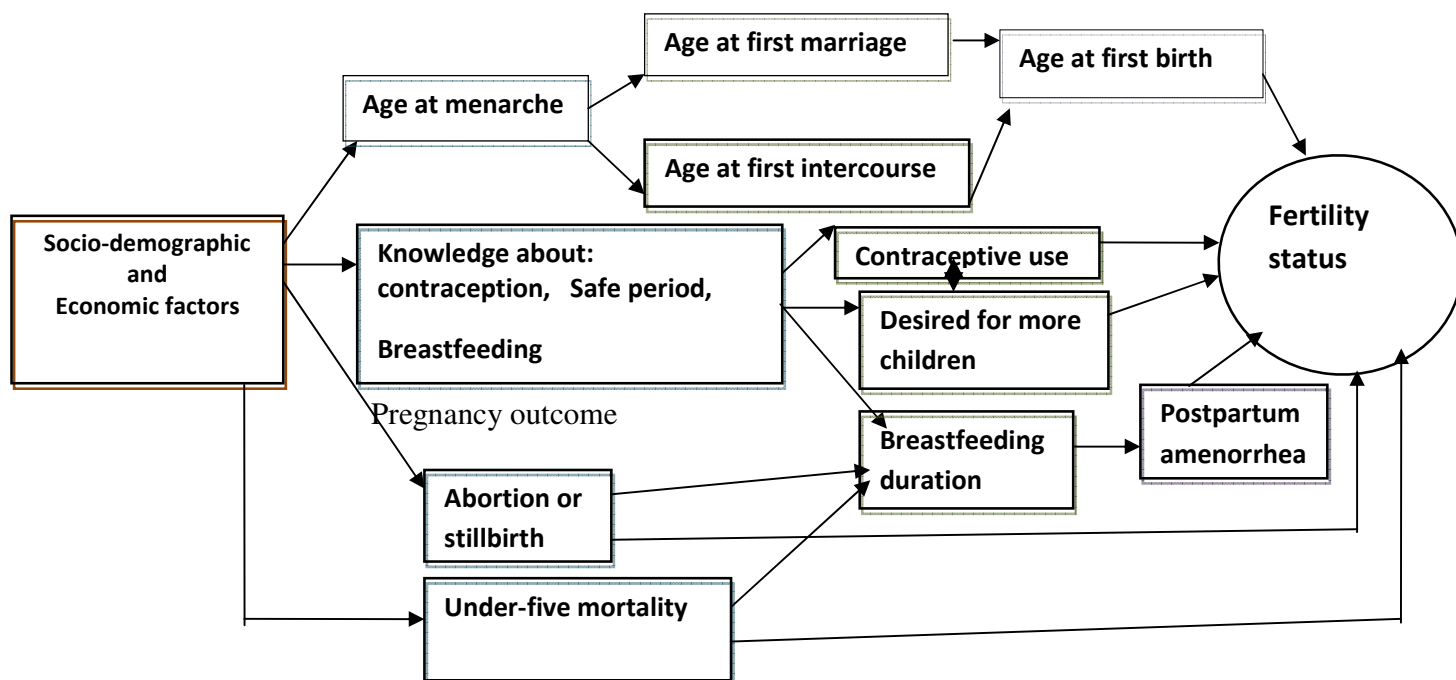


Figure 1: Conceptual framework on determinants of high fertility status in Gilgel Gibe Field Researcher Center, 2012 [30].

Research question

- Why do some married women value having more children than others?

3. Objectives

3.1. General objective

The ultimate objective of the study was to assess the risk factors of high fertility status among married women in Gilgel Gibe Field Research Center of Jimma University, Oromia Region.

3.2. Specific objectives

- 1) To identify socio-demographic factors that influence high fertility status among married women in the area.
- 2) To identify socio-economic factors that influence high fertility status among married women in the area.
- 3) To identify intermediate factors that influence high fertility status of married women in the area.

4. METHOD AND SUBJECTS

4.1. Study Area and Period

This study was conducted from 1-15/Feb., 2012 at Gilgel Gibe Field Research Center. The Gilgel Gibe Field Research Center (GGFRC) setting was identified by Jimma University considering South-West Ethiopia's physical features, bio-social factors and the newly built dam as a field research and learning setting for CBE. The Gilgel Gibe Hydroelectric project is one of the largest dams in Ethiopia, which has a reservoir covering 60 km². The project is located in Jimma Zone of the Oromia Region about 260km south west of Addis Ababa and about 55 km north-east of Jimma. The reservoir of the dam is bounded by four Woreda: Sekoru, Omo-Nada, Tiro Afeta and Kersa. In the four Woredas, ten Kebeles (8 rural and 2 urban) which are found within 10 Km of the reservoir are selected as project area by Jimma University. The total estimated population of these Kebeles is close to 50,000 residing in about 10500 households [47].

4.2. Study Design

A community based unmatched case-control study design was utilized.

4.3. Population

4.3.1. Source Population

The source population was all women who are married and living in surveillance area of Gilgel Gibe Field Research Center.

4.3.2. Study population

The study population consists of all women who are married and aged from 20 to 49 years during the study period in the Gilgel Gibe Field Research Center. Study population for cases were all high fertile groups of women aged 20 to 49 years and for controls were all low fertile groups of women aged 20 to 49 years in the area during the study period. Where cases are women with 5 or greater (high fertility) number of children ever born alive (CEB) and controls

are women with less than 5 (low fertility) numbers of children ever born alive (CEB). The study subjects were selected from the Gilgel Gibe Field Research Center database.

4.3.3. Eligibility criteria

Inclusion criteria: Women aged 20-49 and who are married for 5 years and above. This group of women was taken for this particular study by taking into account the fact that women in the Oromia region are married at an early age and could have more than four children before they celebrate their twenty-fifth birthday [11]. The minimum age was therefore set at 20 to give an equal chance for both the high and low fertile groups.

Exclusion criteria: women with cognitive impairment and women who have hearing or speaking disability were not included in the study.

4.4. Sample Size Determination

As the investigation was unmatched case-control study, sample size was calculated by taking into account the major determinant factor and using the STATCALC program of the openepi statistical package of EPI INFO. In this regard, a minimum detectable OR (Odds Ratio) of **2** for under five mortality among cases as compared to controls, a **5%** level of significance (two-sided), a power of **80%** and a two to one allocation ratio of low fertile group to high fertile group (**2:1**) were assumed. An additional 5 percent was also added for non-response. The prevalence of important factors to be studied, which is the proportion of married women who have an experience of under-five mortality among the low fertile group, is assumed 29.7% [1]. This exposure variable was selected for sample size calculation because recent evidence show that improved child survival is the most powerful stimulant of fertility decline and hence under-five mortality is the most powerful determinant of fertility status [14]. Based on the above assumptions, the total sample size is 360 with 120 for cases and 240 for controls.

4.5. Sampling Technique

Total number of women who are married and aged 20 to 49 years of both cases and controls were identified from Gilgel Gibe Field Research Center database. Then the study subjects were selected by using simple random sampling technique from a list of case and control groups obtained from Gilgel Gibe Field Research Center database. Cases were included in the study up

on fulfillment of the case definition criteria for high fertility group. Controls were also obtained up on the fulfillment of the control definition criteria for low fertility group. Two controls were included for one case and misclassification of cases as controls was checked during selection as much as possible to ensure representativeness of the population from which they would have been drawn. The address (house number) of selected cases and controls was used during interview from the database of the research center to get them easily. Women in the specified age range were enrolled into the study after cross checking their age.

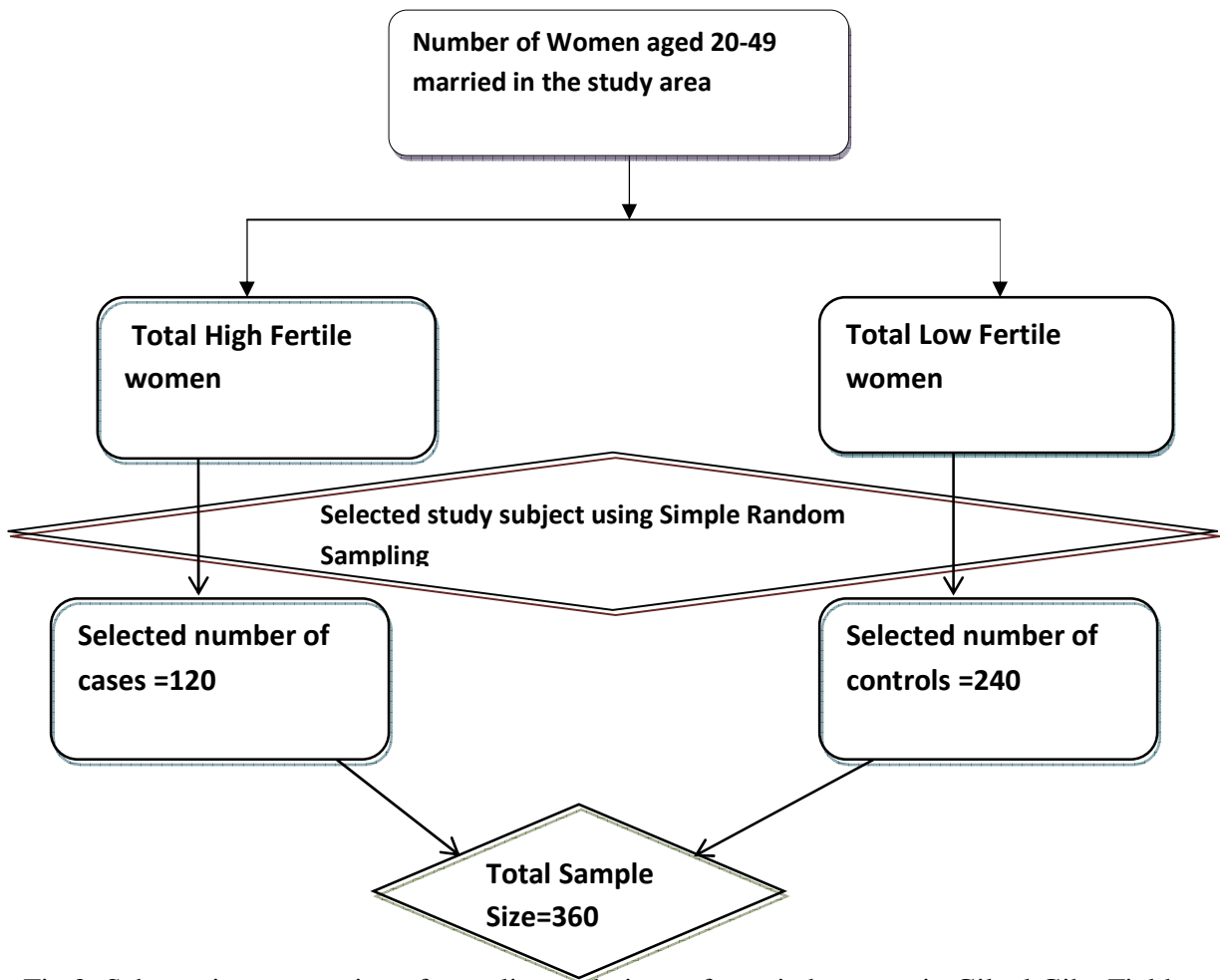


Fig.2: Schematic presentation of sampling technique of married women in Gilgel Gibe Field Researcher Center, 2012.

4.6. Data Collection Procedures

4.6.1. Data collection instrument

The questionnaire was adapted from Ethiopian Demographic Health Survey (EDHS) and World Fertility Survey (WFS) English version. The questionnaire was further developed by using peer reviewed published literatures to include determinants of high fertility status. The questionnaire was translated into Afan Oromo and which was again translated back into English and comparisons was made on the consistency of the two versions. Different domains were included in the questionnaire including the respondent's background, reproductive health and contraceptive information.

4.6.2. Pre-testing

A pretest was carried out in Serbo kebele which was one of a rural village adjacent to the study area on similar age group of married women. It was conducted on a total of 36 respondents which was 10% of sample. There were 9 data collectors and each interviewer administered 4 questionnaires. Necessary corrections were made on the tool based on the findings from the pretest before final use. For instance, one inapplicable item was removed from the final questionnaire.

4.6.3. Data collection

Data was collected by interview using pre-tested structured interviewer administered questionnaire. The data collectors were recruited from the Gilgel Gibe Field Research Center. The data collectors who are the employees of the Research Center had prior training and experience on data collection. Refreshment training was given to the data collectors by the principal investigator about the objective of the study. They were also familiarized with the tool of data collection and the methods of data collection with respect to the study for two days. There were 8 data collectors and two supervisors. Incomplete questionnaires were filled by callback while on the fieldwork. The principal investigator supervised the overall activities.

4.7. Variable and Operational Definition

4.7.1. Variables

Dependent Variable:

- ❖ **Fertility status**, which is categorized as low when CEB alive is less than 5 and high when CEB alive is greater or equal to 5.

Independent Variables:

- ❖ **Socio-economic and demographic variables:** income, education level, place of residency, religion, ethnicity and women occupation.
- ❖ **Reproductive variables:** Age at first marriage, age at first birth, age at last birth and contraceptive use.
- ❖ **Biological variables:** Duration of breast-feeding, duration of post-partum amenorrhea, history of still birth or abortion experience.
- ❖ **Sexual variable:** Age at first coitus.
- ❖ **Knowledge /attitude variable:** Knowledge about contraception (knowledge about the existence of services and where the service is given, knowledge about the safe period for coitus and desired number of children.
- ❖ **Under-five mortality.**

4.7.2. Operational Definitions of Variables

- ❖ **Contraceptive knowledge** - Knowledge of at least one of the any family planning methods.
- ❖ **Fertility status measured by a number of children ever born (CEB) alive:** It is categorized as
 - Low fertility when CEB alive is < 5
 - High fertility when CEB alive is ≥ 5

The cutoff point of 5 is taken because the medical and obstetric risk for mothers with a number of CEB greater or equal to 5 is significantly higher compared with those with less than 5 [1]. It is also based on the population policy of Ethiopia which aims to have less than five children per women a low fertility, and greater or equal to five children per women as high fertility [48].

4.8. Data Quality Assurance

To assure the quality of data, different mechanisms were used. The following measures were undertaken including pre-testing of the questionnaire with 10% of the sample size among women that was not included in the actual study population before the actual data collection takes place. Correction on the instrument was done accordingly. The final version of the questionnaire was translated into the local language of the respondents (Afan Oromo language) and used for the data collection. A total of two days of intensive refreshment training on how to administer the data collection process was given for all data collectors during the process of data collection.

Two field supervisors from Gilgel Gibe Field Research Center were assigned for supervision of which one supervisor was assigned to supervise five kebeles. The principal investigator performed immediate supervision on a daily basis. Each and every completed questionnaire was checked for completeness. Moreover, visiting randomly selected 5% of households were made each day to ensure the reliability of the collected data. Incomplete questionnaires were filled by making re-visits while on fieldwork. The overall activity was monitored by the principal investigator. Data was entered using Epi data version 3.1 with double entry to minimize data entry error.

4.9. Data Processing

The data was entered in EPI data version 3.1 computer program. Prior to the analysis, the whole data was cleaned and the data was doubly entered. The completeness of the data was checked. Errors related to inconsistency were verified using cross tabulation. The data was exported to Statistical Package for Social Sciences (SPSS) version 16. Then recoded, categorized and sorted to facilitate its analysis.

4.10. Methods of Statistical Analysis

The data was analyzed using SPSS version 16.0 and descriptive analysis was used to describe the percentages and number distributions of the respondents by socio-demographic characteristics. Furthermore, logistic regression, specifically univariate and multivariable analysis, was used to identify factors that affect high fertility status. Logistic regression was used to analyze the data by using backward logistic regression variable selection techniques to controls the adverse

effects of confounding variables and to controls the problem of multicollinearity. All explanatory variables that were associated with the outcome variable (fertility status) in univariate analysis with p-value of 0.25 or less were included in the initial logistic models of multivariable analysis. The crude and adjusted odds ratios together with their corresponding 95% confidence intervals were computed. A P-value ≤ 0.05 was considered to declare a result as statistically significant in this study. Efforts were made to assess whether the necessary assumptions for the application of multivariable logistic regression are fulfilled. In this regard, the model summary statistics, and Hosmer and Lemeshow's goodness-of-fit test were considered. This statistic is computed as the Pearson chi-square from the contingency table of observed frequencies and expected frequencies. A good fit as measured by Hosmer and Lemeshow's test will yield a large P-value. Interaction effects were checked and their significance was measured. We believe that covariate is an effect modifier only when the interaction term added to the model is both meaningful and statistically significant.

4.11. Ethical Considerations

The study protocol was approved by the College of Public Health and Medical Sciences by the Health Research and Postgraduate Coordinating Office. Since we were use the Gilgel Gibe Field Research Center database and Gilgel Gibe Field Research Center, prior permission was also obtained from the program managers. Study subjects were told about the purpose of the study and verbal informed consent was secured. There is no potential hazard to the study subjects. The outcome of the study is expected to fill the gap on knowledge concerning differential of high fertility in Gilgel Gibe Field Research Center and in other similar settings and can serve as an entry point of intervention. In order to protect the confidentiality of the information, names and house numbers was not recorded on the interviewer-administered questionnaire.

4.12. Disseminations of finding

The finding of this study will be disseminated to Jimma University, Gilgel Gibe Field Research Center office, Oromia Regional State Health Bureau, Jimma zonal health department and NGO's working on a similar area with the copy of the research. Furthermore, the finding will be presented at appropriate seminars, conference and workshops, and also Publishing in a scientific journal will be considered.

5. RESULTS

5.1. Socio-Demographic and Economic Characteristics of Respondents

A total of 120 women in the cases and 240 women in controls were included in this study of which 117 cases and 237 controls were willing to participate with overall response rate of 98.3%.

This study indicated that among total respondents of cases and controls 103(88%) and 178(75%), respectively, cannot read and write while 14(12%) of cases and 59(25%) of controls can read and write or had attended formal education. This study indicated that only 4 (1.1%) of the responding women have (age 20 – 49years) had above secondary education. Concerning education status of their husbands, 80(68%) of cases and 147(62%) controls had husbands that cannot read and write whereas 22(19%) of cases and 21(9%) of controls had partners with informal education. On the other hand, 15(13%) of cases and 69(29%) of controls had partners with formal education. Of total respondents of cases and controls, 102(87%) and 183(77%), respectively, were residing in rural area. Among total number of cases respondents 90(77%) of cases and 180(76%) among controls were residing in a family with a monthly income less than 640 ETB; 8(7%) of high fertile groups (cases) and 27(11%) of low fertile groups (controls) were residing in a family with a monthly income between 640 ETB and 840 ETB. A comparable proportion (16%) of high fertile groups and (13%) of low fertile groups were residing in a family with a monthly income above 840 ETB. Regarding income source, the major sources of income were farming and livestock production for the majority of high fertile groups and low fertile groups.

The mean number of children ever born (CEB) alive was 4.0 and for older women (age 40-49 years) who are nearing the end of their reproductive period to be 7.26 from parity of 1 to 12 because the mean number of children ever born to older women, who are nearing the end of their reproductive period, is an indicator of average completed fertility. The TFR and the mean number of children ever born for women age 40-49 years would be expected to be similar. It was learned from the present study that the mean number of children per woman in the high fertile group was 6.0 (± 2.0) while it was 3.0 (± 1.0) in the low fertile group. The median age at first sex and marriage was 17.0 and 17.0 for both high fertile group and low fertile group,

respectively. This study has shown that the median age at first birth was 19.0 for both high fertile group and low fertile groups, and the median age at last birth among high fertile group was 32.0 while it was 25.0 among low fertile group. Meanwhile, the mean duration of marriage among high fertile group was 18.0(median = 18.0) while it was 10.0 (median = 9.0) among low fertile groups.

Table1: Mean Number of Children Ever Born across Basic Socio-Demographic Characteristics of Respondents in Gilgel Gibe Field Research Center, Oromia, Ethiopia, 2012.

Exposure variables	Distribution No. (%)		Mean Child Ever Born	
	High n= 117	Low n=237	High fertile (\bar{X}_H)	Low fertile (\bar{X}_L)
Educational status(women)				
Cannot read and write	103(88)	178(75)	7	3
Can read and write and above	14(12)	59(25)	6	3
Educational status (husband)				
Cannot read and write	80(68)	147(62)	7	3
Can read and write(informal)	22(19)	21(9)	7	3
Formal education	15(13)	69(29)	6	3
Place of residency				
Urban	15(13)	54(23)	6	3
Rural	102(87)	183(77)	7	3
Income /monthly				
<640 ETB	90(77)	180(76)	6	3
640-840 ETB	8(7)	27(11)	6	3
≥841 ETB	19(16)	30(13)	7	2

Even though, religion, ethnicity, women's occupation and husband occupation as well as relative socio-economic status are expected to have relationships with the outcome variable, these factors were excluded from further analysis due to their severely skewed distribution. For instance, the majority of respondents were Oromo 335 (94.6%), their religion was Muslim 335 (94.6%), their

occupational status was housewives 330 (93.2%), their relative socio-economic status was medium 272 (76.8%) and the occupation of their husband's 268 (75.7%) and 39(11.0%) were farmer and merchant, respectively. In such a case it will not make sense to include these factors in further analysis.

Apart from identifying the important contributing variables that affect fertility status either positively or negatively, this study had also investigated the considered reasons why some women desire to bear a large number of children. More than half of the respondents approved the benefits of having more children and their main reason for such need was support in old age (26.1%), to maintain posterity (22.5%), children's are honour (20.6%), uncertainty of children survival (19.4%) as the benefits to have a large number of children and the rest proportion of respondents were consider children's are wealth. Of those women desire to bear a large number of children majority of cases desire to bear a large number of children for the uncertainty of child survival while majority of controls desire to bear a large number of children for they believe that children can support in old age an shown in table 5 below with that of their husband's among those who have desire to bear a large number of children for they believe that children can support in old age 9.4% and 16.4% of cases and controls respectively

Table 2: Reasons given for desiring more children of women with their husband in Gilgel Gibe Field Research Center, Oromia, Ethiopia, 2012

Reasons given for desiring more children	Fertility status			
	For women		For their husband	
	High N ₀ . (%)	Low N ₀ . (%)	High N ₀ . (%)	Low N ₀ . (%)
Children's are wealth	12(4.7)	17(6.7)	13(4.4)	20 (6.7)
They can support in old age	18(7.1)	48(19.0)	28(9.4)	49(16.4)
Children may/may not grow	21(8.3)	28(11.1)	19(6.4)	32(10.7)
Children's are honour	20(7.9)	32(12.6)	26 (8.7)	41(13.8)
To maintain posterity	18(7.1)	39(15.4)	26(8.7)	44(14.8)

Moreover, the type of preference they had towards the sex of the first child and their response for such preferences was also examined. In this regard about 68.4% and 31.6% of the women were wanted to have of male and female children, respectively. Specifically of total respondents 77(66%) and 165(70%) women were wanted to bear of male for high fertile groups and low fertile groups respectively while 40(34%) and 72 (30%) women were wanted to bear of female for high fertile groups and low fertile groups respectively.

5.2. Determinant of High Fertility Status

As can be noted from the result of the univariate analysis, six of the twenty three variables did not show a significant association with high fertility status at a 5% level of significance. In this regard, age at first birth, preference of sex of first child, currently living with first husband, Current want additional children, knowledge about fertile period between menstrual cycles and husband's use of contraceptive were not significantly associated with outcome variable at a 0.25 level of significance and were excluded from further analyses. One predictor variable (abortion experience) which fulfilled the minimum requirement for further assessment was considered and entered into the multivariable logistic regression model. Redundancy variables like age at first sex, which has a high correlation with age at first marriage with correlation coefficients of 0.994, and child mortality, which showed an association with history of under-five mortality, were removed from model as redundancy variables despite their association with fertility status. (Tables 3 and 4)

Table 3: Results of Univariate Analysis of Fertility Levels by Each Demographic and Socio-economic and Women's Sexual Behavior in Gilgel Gibe Field Research Center, Oromia, Ethiopia, 2012

Exposure variables	Fertility status [No. (%)]		Crude OR with 95% CI	p-value
	High n= 117	Low n=237		
Educational status(women)				
Cannot read and write	103(88)	178(75)	2.44 (1.30,4.58)	0.006*
Can read and write and above	14(12)	59(25)	1.00	
Educational status (husband)				0.001
Cannot read and write	80(68)	147(62)	2.50 (1.35, 4.66)	0.004*
Can read and write	22(19)	21(9)	4.82 (2.13, 10.92)	<0.001*
Formal education	15(13)	69(29)	1.00	
Place of residency				
Urban	15(13)	54(23)	1.00	
Rural	102(87)	183(77)	2.01 (1.08, 3.74)	0.028*
Income /monthly				0.011
<640 ETB	90(77)	180(76)	0.79 (0.42, 1.48)	0.461
640-840 ETB	8(7)	27(11)	0.47 (0.18, 1.24)	0.127*
≥841 ETB	19(16)	30(13)	1.00	
Age at first marriage				
<18 years	67(57)	119(50.2)	1.33 (0.85, 2.08)	0.212*
18+ years	50(43)	118(49.8)	1.00	
Age at first coitus ^{R/S}				
<18 years	67(57)	119(50.2)	1.33 (0.85, 2.08)	0.212*
18+ years	50(43)	118(49.8)	1.00	

Table 3 Cont'd

Age at first birth					
	<19 years	48(41)	92(39)	1.10 (0.70, 1.72)	0.690
	19+ years	69(59)	145(61)	1.00	
Age at last birth					
	≤30 years	47(40)	218(92)	1.00	
	31+ years	70(60)	19(8)	17.09 (9.41, 31.04)	<0.001*
Post partum amenorrhea (last birth/m)					
	<6 months	15(13)	46(20)	0.44 (0.22, 0.88)	0.020*
	6-10 months	14(12)	38(16)	0.49 (0.24, 1.02)	0.054*
	11-15 months	16(14)	35(15)	0.61 (0.30, 1.24)	0.170*
	15+ months	27(23)	58(24)	0.62 (0.34, 1.13)	0.118*
	Don't know	45(38)	60(25)	1.00	
Duration of breast feeding (last birth/m)					
	0-6 months	12(11)	22(10)	1.12 (0.52, 2.34)	0.780
	7-12 months	12(11)	34(15)	0.72 (0.35, 1.48)	0.371
	13-18 months	2(2)	9(4)	0.45 (0.10, 2.16)	0.320
	19+ months	71(62)	145(63)	1.00	
	Don't know	16(14)	21(9)	1.56 (0.77, 3.16)	0.222*
Currently living with first husband					
	Yes	98(84)	204(86)	1.00	
	No	19(16)	33(14)	1.20 (0.65, 2.21)	0.563

*In univariate analysis significant association ($p \leq 0.25$), $-2 LL_0$: 435.575, (Null model by intercept only), R/s set as redundancy variable.

Table 4: Results of Univariate Analysis of Fertility Levels by Under-five Mortality and Pregnancy Outcome, Women's Reproductive Knowledge, Attitude, Use of Contraceptives in Gilgel Gibe Field Research Center, Oromia, Ethiopia, 2012

Exposure variables	Fertility status [No. (%)]		Crude OR with 95% CI	p-value
	High n= 117	Low n=237		
History of under-5 mortality				
Yes	61(52)	59(25)	3.29 (2.06, 5.24)	<0.001*
No	56(48)	178(75)	1.00	
Child mortality ^{R/S}				
< 5 years	60(51)	59(25)	2.74 (1.71, 4.37)	<0.001*
Otherwise	58(49)	178(75)	1.00	
History of abortion experience				
Yes	8(7)	9(4)	1.86 (0.70, 4.95)	0.215*
No	109(93)	228(96)	1.00	
History of still birth experience				
Yes	17(15)	15(6)	2.52 (1.21, 5.24)	0.014*
No	100(85)	222(94)	1.00	
Desired sex for 1 st child				
Male	77(66)	165(70)	1.00	
Female	40(34)	72(30)	1.19 (0.74, 1.91)	0.469
Desired number of children				
<5 children	6(5)	32(13)	0.37 (0.15, 0.95)	0.038*
≥ 5 children	6(5)	38(16)	0.31 (0.12, 0.79)	0.014*
As God give	54(46)	66(28)	1.62 (0.99, 2.65)	0.055*
Don't know	51(44)	101(43)	1.00	

Table 4 Cont'd

Current want additional children				
Yes	48(41)	83(35)	1.29 (0.82, 2.03)	0.272
No	69(59)	154(65)	1.00	
Current husband need additional Children				
Yes	58(49.6)	93(39)	1.52 (0.97, 2.38)	0.065*
No	59(50.4)	144(61)	1.00	
Ever heard of Contraceptive				
Yes	106(91)	203(86)	1.00	
No	11(9)	34(14)	0.62 (0.30, 1.27)	0.192*
Ever use Contraceptive				
Yes	23(20)	64(27)	1.00	
No	94(80)	173(73)	1.51(0.88, 2.59)	0.133*
Do you know fertile period(b/n cycle)				
Yes	65(56)	144(61)	1.00	
No	52(44)	93(39)	1.24 (0.79, 1.94)	0.349
Husband use contraceptive				
Yes	6(5)	19(8)	1.00	
No	111(95)	218(92)	0.62 (0.24, 1.60)	0.322

**In univariate analysis significant association ($p \leq 0.25$), $-2 LL_0$: 435.575 (Null model by intercept only), R/s set as redundancy variable.*

Consequently, the multivariable logistic regression analysis was used by taking all the fifteen factors into account simultaneously and only six of the most contributing factors remained to be significantly and independently associated with high fertility status and have an overall significant effect on women fertility status at 5% level of significance. In the final model, it was observed that educational status of women and ever heard of contraceptive were marginally associated with the outcome variable when controlling other variables.

Ever heard of Contraceptive and Educational status of women considered to have effects on fertility status and these factors were kept in the multivariable analysis table based on the existing fact. The simplest way to assess Wald test is to take the significance values and if less than 0.05 rejects the null hypothesis as the variable does make a significant contribution. In this case, it was noted that all selected variables contributed significantly to the prediction of p-value, which is less than level of significant at $\alpha=0.05$. The women educational status and ever heard of contraceptives turned out to be marginally significant $p=0.054$ and 0.056 in multivariable analysis respectively. As it was indicated at α -value of 0.2 (choice of removal variables from the model) both ever heard of contraceptive and educational status of women shown association with fertility status when controlling other variables. Based on the existing fact that indicated educational status of women is an important controlling variable of fertility status. Thus taking into considerations of subject matter and based on the existing fact ever heard of contraceptive and educational status of women were included in the model (Table, 4).

Table 5: Multivariable analysis results that adjusted for significant variables ($p \leq 0.25$) in univariate analysis in Gilgel Gibe Field Research Center, Oromia, Ethiopia, 2012

Exposure variables	Fertility status No. (%)		Adjusted OR with 95% CI	p-value
	High n= 117	Low n=237		
Educational status(women)				
Cannot read and write	103(88)	178(75)	2.45 (0.98, 6.01)	0.054
Can read and write and above	14(12)	59(25)	1.00	
Income /monthly				0.035**
<640 ETB	90(77)	180(76)	0.32 (0.12, 0.83)	0.019*
640-840 ETB	8(7)	27(11)	0.20 (0.05, 0.79)	0.022*
≥ 841 ETB	19(16)	30(13)	1.00	
Age at first marriage				
<18 years	67(57)	119(50.2)	2.66 (1.35, 5.21)	0.005*
18+ years	50(43)	118(49.8)	1.00	

Age at last birth					
≤30 years	47(40)	218(92)	1.00		
31+ years	70(60)	19(8)	25.65 (11.89, 55.31)	<0.001*	
History of under-5 mortality					
Yes	61(52)	59(25)	1.91 (1.01, 3.62)	0.047*	
No	56(48)	178(75)	1.00		
History of still birth experience					
Yes	17(15)	15(6)	3.80 (1.49, 9.65)	0.005*	
No	100(85)	222(94)	1.00		
Desired number of children					
					0.002**
<5 children	6(5)	32(13)	0.45 (0.13, 1.47)	0.185	
≥ 5 children	6(5)	38(16)	0.58 (0.17, 1.98)	0.382	
As God give	54(46)	66(28)	2.68 (1.36, 5.28)	0.004*	
Don't know	51(44)	101(43)	1.00		
Ever heard of Contraceptive					
Yes	106(91)	203(86)	1.00		
No	11(9)	34(14)	0.39 (0.15, 1.02)	0.056	

*-2 LL_f: 275.893, p<0.001, * significant association only one category ** for variables having more than two categories, the overall significance is given by their corresponding P – values.*

Monthly income of the family has shown a significant association with fertility status of women in the study area. Women residing in a family with a monthly income above 840 ETB were 3.14 and 5.13 times more likely to have a high fertility status as compared to those women from the family had monthly income less than 640 ETB and 640 ETB to 840 ETB, respectively (p = 0.019, p = 0.022).

Age at first marriage and age at last birth showed a significant association with fertility status of women in the study area. Women who get married at early (less than 18 years) were 2.66 times

more likely to have a high fertility status as compared to mothers who get married at 18 years and above with 95% CI of AOR (1.35, 5.26). The variation in the number of children ever born alive between the women age at last birth less than or at 30 years and those greater 31 years is significant with adjusted OR of 25.65 and 95% CI (11.89, 55.31).

The history of under-five mortality was found to have an association with fertility status of women. As the number of under-five children who had died increased, there appeared in increasing trend in the number of children ever born alive (X^2 for trend=19.80, df =2, p <0.001). Women who experienced under five death were 1.91 times more likely to have a high fertility status as compared to mothers who didn't experienced under five death with 95% CI of AOR (1.01, 3.62).

In the same way history of still birth experience among the married women in this study found to have an association fertility status of women. Women had history of still birth experience were 3.80 times more likely to have a high fertility status as compared to those who hadn't such experience with 95% CI of AOR (1.49, 9.65),(p = 0.005).

The number of children desired before marriage indicated a significant association with fertility status of women. Women who have no intention of limiting their number of children were more likely to have high risk of uncontrolled fertility and to have high fertility status, with the adjusted OR of 2.68 (p = 0.004) and 95% CI (1.36, 5.28).

As the number of under-five children who had died increased, there appeared in increasing trend in the number of children ever born alive (X^2 for trend=19.80, df =2, p <0.001. (Table 5)

Table 6: Trend analysis for under mortality Gilgel Gibe Field Research Center, Oromia, Ethiopia, 2012

No of under five mortality	Frequency distribution		X^2 - value and p-value
	High fertile	low fertile	
1	38	51	X^2 for trend=19.84 P <0.001
2	19	7	
3+	4	1	

6. Discussion

The demographic pattern of developing countries is characterized by the co-existence of high fertility and high infant, and child mortality. Fertility is the most important component of population dynamics and plays a major role in changing the size and structure of the population of a given area over time [1, 2]. High fertility is defined as a total fertility rate (TFR) of 5.0 or higher. The high-fertility countries lag in many development indicators, as reflected for example in their rate of progress toward achievement of the Millennium Development Goals (MDGs). These countries have also received less development assistance for population and reproductive health than countries more advanced in their transitions to lower fertility [14].

In order to successfully tackle the uncontrolled population growth and associated problems in Ethiopia in general and in the present study areas in particular, there appears a need to investigate the contribution of a number of factors influencing high fertility. Accordingly, this study has tried to look into determinants of fertility status in the study area by incorporating as many risk factors as possible. According to international standards the median age at marriage for those married women age 20-49 years of 17.0 in Gilgel Gibe Field Research center is relatively young. This is earlier than that of the legal age at first marriage in Ethiopia which is 18 years. However, compared to Ethiopia as whole, women in Gilgel Gibe Field Research center tend to get married at slightly similar ages and slightly similar to the oromia region. The median age at first marriage for women age 20-49 years of Ethiopia and oromia region is 17.1 and 17.4 respectively [6, 10].

The educational status of women has show an insignificant effect on the fertility status of women. A similar finding was also reported in Rural Butajira where education of the mother didn't show statistically significant difference among the low and high fertile group when adjusted for socio-demographic variables [35]. In contrary, other study showed that uneducated Ethiopian women have three times as many children as their educated counterparts with at least secondary education. Those educated women's have lower fertility compared to those uneducated women [6]. Other similar study indicated that educational status of women was mainly found to be associated with high fertility, even after adjustment for other basic socio-

demographic variables. Mothers with educational status of above primary school had less risk of having 5 or more child ever born. Those mothers below primary school not showed a significant difference with illiterate mothers in their level of fertility [2].

Educated women are more likely to postpone marriage, have smaller families' more than uneducated women [31]. As this study shown that majority of the women were uneducated and attended only primary level education which requires the development of an enabling condition to increase female student's participation in school attendance and to reduce those who fail to continue their education. It is to be noted that education is instrumental not only to reduce uncontrolled fertility, but also to enhance many other developmental activities [38].

Monthly income of the family was shown a significant association on fertility status of women in the study area similar to fact in the EDHS of 2011 in which Fertility status has also strongly associated with wealth quintiles [10]. Women residing in a family monthly income above 840 ETB were 3.14 and 5.13 times more likely to have a high fertility status as compared to those women from the family had monthly income less than 640 ETB and 640 ETB to 840 ETB respectively. But the reverse is true from the fact that in the EDHS of 2011 while Women in the lowest wealth quintile have a TFR of 6.0, more than twice as high as women in the highest wealth quintile, at 2.8[10] and also reverse from study conducted on the effect of Education, income, and Child Mortality on Fertility in South Africa in which the lower the income levels the higher the child mortality. Higher child mortality is followed by a higher fertility in individuals [39]. The possible explanation for this traditionally in rural setting people tend to have more children as their income and asset increase special agrarians society believe that children help them in farming and rearing their livestock.

Age at first birth didn't show significant effect on the fertility status of women both in univariate and multivariable analysis in this study. This is slightly different from results of other study while those women who get married at early age exposed to an early sexual intercourse and early first give birth, which in turn leads to too many teenage pregnancies. A study undertaken in Ethiopia revealed a situation in which mothers with an earlier age at first birth are likely to end up in having many children [19]. The possible explanation for this might be in this study there was no such a great variation in age at first birth for both high fertile and low fertile group. And

age at first birth for both groups (high and low fertile women) was relatively the same with the median age at first birth was 19.0 for both high fertile group and low fertile groups.

Age at first marriage did show a significant effect of on the fertility status of women. This effect is persisted after controlling the confounding factors. This is similar to other findings where age at first marriage highly a significant effect on fertility [38]. Similar results are documented in Nepal, Egypt and Morocco. The earlier age at marriage exposes to an early first intercourse with a consequence to earlier age at first birth. Mothers with an earlier age at first birth are likely to end up in having many children. Study conducted on adolescent fertility show that teenagers whose age was between 18 and 19 years were about eight times more likely to be fertile than the younger once [1,19]. In this study area, marriage is acceptable culture of nearly all people. However, age at first marriage has an important factor to control age at first birth. Since early marriage has a major effect of early child bearing, they tend to have a lower rate of contraceptive use due to their inadequate know how of birth control. Women who marry early have on average a longer period of exposure to pregnancy and a greater number of lifetime births.

The history of under-five mortality was found to have an association with fertility status of women. As the number of under-five children who had died increased, there appeared in increasing trend in the number of children ever born alive. This requires a strong interventional effort in reducing under-five mortality, such as, vaccination, provision of safe water, maternal education, practice and perception of mothers on severity of common illness etc. to reduce fertility. Where similar result indicated that high infant and under-five mortality causes high fertility through the insurance and replacement effect [24, 25].

Study on analysis of data from rural Ethiopia supports under-five mortality had a strong significant effect on the number of children ever born. An increase in the number of children who have died raises the probability of attaining higher fertility [1]. Similarly the relation between fertility and child mortality experienced by mothers was found to be very strong and positive, in which it illustrated that under-five mortality, had a significant positive effect on fertility status. That is, an increase in the under-five mortality rate increases fertility significantly. As the number of children who died increased, women were exposed to a higher risk of uncontrolled fertility [26].

Reducing under-five mortality, beside from giving mothers and fathers limit number of children they would like to have, will also increase the life expectancies of women to a greater extent. Moreover, women will have the opportunity to be occupied in many other activities that would eventually lead them to gain a greater empowerment. A similar finding was obtained in the South and North Gonder [28]. In India, the fear of under-five mortality and their own experience of the child /infant death tend to be increased the size of family, which the mothers considered to be replace the lost child. The death of an infant in an index birth interval and the death of a child immediately prior to the index interval elevate subsequent fertility [27]. High rate of under-five mortality is a contributing factor to a couple's decision to have more children.

History of still birth experience among the married women in this study was found to have an association with fertility status of women which contrary to other finding was obtained in the Butajira study of Central Ethiopia and Awassa whereas the occurrence of stillbirth didn't contribute for significant difference among the low and high fertility profile group [1, 2].

The number of children desired before marriage indicated a significant association in the fertility status of women. This is similar to other studies where the desire to have lower children usually come firsts for decline in fertility [26]. This finding is in contrary to other similar studies in Butajira while the number of children desired before marriage did not show significant difference among the two-fertility profile group [1, 35]. The insignificant association seen in butajira might be due to the fact that the study was done in old age (30-49 years) women were desire more child is relatively more common and also difficult to remember desired children before marriage at this age group (recall bias). This study was conducted on both young age group and old age group respondents aged 20-49 which make this study different from study that conducted in Butajira.

Knowledge about contraception assessed by asking whether the women ever heard of contraceptive didn't show significant difference between the low and high fertility group this could be due to more than 85% of respondents have heard of contraceptive. Therefore, there was no such strong evidence at 5% level of significance to reject the null hypothesis of no significant association between ever heard of contraceptive and fertility status of women because there was no such a great variation in ever heard of contraceptive. It is analogous results were documented

in Butajira and Awassa where knowledge about contraception whether the woman knows the existence of contraceptives didn't show significant difference between the low and high fertility group [2, 35].

Ever use of contraceptives was not found to have a significant effect on fertility status of women. There was no such strong evidence at 5% level of significance to reject the null hypothesis of no significant association between ever use of contraceptive and fertility status of women again because there was no such a great variation in using contraceptive. As it can be noted from the study result both groups (high and low fertile women) were about the relatively the same in using contraceptives (20% vs. 27%). Similar findings were documented in the Gondar studies that both groups (high and low fertile women) were about the same in using contraceptives (22% vs. 25%) [28]. It could be due to women intended to use contraception when they reach or exceed the total number of children ever born alive they would like to have. More than 80% of respondents were living in rural area and poor educational status (even lower than elementary education class) which could be directly or indirectly affect their contraceptive use. Similar findings were found from Awassa, Bangladesh and Ghana while Ever use and current use of contraceptives is not significantly associated with the fertility status of women [2, 27, 42]. Other similar findings were documented in the Gondar and Butajira [1, 28]. In contrary studies where the use of contraception is significantly higher like Pakistan where contraceptive use was found to be directly associated with the fertility desire and fertility status and the fertility inhibiting effect of contraception has been demonstrated by several studies in developing countries was significant [32,40,41]

7. Concussions and Recommendations

7.1. Concussions

Various reasons were mentioned as reasons that kept the fertility rates still high in Ethiopia. In GGFRC, the number of children ever born alive is high. This study has tried to come up with the conclusion; the following factors are contributed to this experience of high fertility. These factors are: - family monthly income, under-five mortality and stillbirth, age at first marriage, age at last birth and desired number of children before marriage were the most contributing factors. Among these factors, under-five mortality and stillbirth as well as age at last birth considerably stand as controlling predictors of fertility. More than half of the respondents approved the benefits of having more children and their main reasons for such need were children support in old age, to maintain posterity; children's are honour and uncertainty of children survival.

7.2. RECOMMENDATION

Based on the findings of the study, the following recommendations are made:

- Measures taken to decrease under-five mortality and stillbirth will indirectly help in reducing fertility. Such strong measures can be vaccination, impregnated bed nets (ITN), access and provision of safe water, reducing maternal infection etc should be put in place to reduce fertility. Incorporating the basic disease prevention methods in primary schools could also be considered. All stakeholders including health extension workers should exert maximum efforts should be trained to practice those mothers, the key child survival interventions like antenatal care follow-up, skilled-based delivery, use of oral rehydration salt and homemade fluids.
- In Ethiopia in general and in the present study areas in particular, marriage is the destiny of nearly all people. The legal age at first marriage in Ethiopia is 18 years. However, this minimum age at first marriage is not implemented particularly in the present study areas. Hence, all responsible bodies including the remotest Kebele administrations, community, community leader and religious' leaders should be in a position to ensure the practicability of this marriage law.
- It was understood from the present study that there was some evidence regarding the negative influence of current use of contraceptives on high fertility. In this regard, the family planning programs of the region should be strengthened to the extent that they could play significant roles in bringing down the prevailing high fertility. Accordingly, the main stakeholders including health extension workers should exert maximum efforts to make the method of choice available and accessible to the users.
- Thus community conversation should include education department, women affair, health extension workers and social ritual groups giving emphasis on couple's knowledge, approval and use to family planning to reduce fertility. Low fertility women's should encourage about small desired children.

Strengths and Limitation of the Study

Strengths

- The study is done in the community, thus results can be generalizable to similar setting.
- To minimized selection bias, the study subjects selected from GGFRC database.
- All of the 10 Kebeles of the Field Research center were represented in the study so the study is representative of the whole area.

Limitations

- Some of the events may be difficult to remember and hence the effect of recall bias may exist.
- Selection bias might introduce due to incompleteness of database concerning variable of interest for selection.

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ANNEX

ANNEX I: DATA COLLECTION INSTRUMENTS

JIMMA UNIVERSITY, COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES

DEPARTMENT OF EPIDEMIOLOGY AND BIostatISTICS

FORMAT FOR COLLECTION OF INFORMATION ABOUT DETERMINANTS OF

HIGH FERTILITY STATUS AMONG MARRIED WOMEN IN GILGEL GIBE

RESEARCH CENTER OF JIMMA UNIVERSITY

1. Consent Form for participants on data collection

To the interviewer, please inform the respondent about the aim of the study as described below. If the respondent is not at home, you should take appointment for second and third visit.

Dear respondent my name is _____ and I am working with researcher from Jimma University. The main aim of this study is to identify the determinants of high fertility status among married woman in Gilgel Gibe FRC. After the results of the study the researchers will inform the health policy makers on the leading causes of high and low fertility. The study will provide statistics on fertility and the determinants of high fertility status that are reliable and useful in guiding priority interventions in the locality as well as in the nation. The interview will take about 30 minutes you have the right not to participate or withdraw at the middle of the interview and there is no payment for the participation. All the information you will give us will be used for research purposes only and kept confidential. Your name or other identification related with you will not be revealed for anybody. Thank you for your responses and your cooperation to the questions.

Do you agree to participate?

1. Yes _____

2. No _____

If yes your signature _____

2. QUESTIONNAIRE

Questionnaire prepared for married women aged 20-49

Title: Determinants of high fertility status among married women in Gilgel Gibe FRC.

This study will be conducted to identify the determinants of high fertility status among married women in the Gilgel Gibe FRC.

General Information			
Name of interviewer: _____		Kebele name _____	
Interviewer Signature: _____		Kebele code _____	
		Gote _____	
Name of supervisors: _____			
Supervisors signature _____			
Sex of head of the household		1.Male 2.Female	
Date of interview (ETC): Day/Month/Year _____/_____/_____		Record the time at start of interviews _____	
Part I: Socio-demographic and economic information			
No.	Questions	Choice/coding	Skip
101	How old are you? (Completed years)	_____Years	
102	For most of the time until now, did you live in a city, in a town, or in the countryside?	1) City/town 2) Countryside	
103	What is head of the household's religion?	1) Muslim 2) Orthodox 3) Protestant 6) Other (specify) _____	
104	What is the ethnicity of head of household?	1) Oromo 2) Amhara 3) Tigire 4) Yem 5) Dawaro	

		6) Keffa 7) Gurage 66) Other (specify)_____	
105	What educational status have you achieved?	1) Cannot read and Write 2) Read and write/adult literacy 3) Formal education; specify the completed grade_____	
106	What educational status has your husband achieved?	1) Cannot read and Write 2) Read and write/adult literacy 3) Formal education; specify the completed grade_____	
107	What is your occupational status?	1) House wife 2) Government Employ 3) Farmer 4) Merchant 5) Private employee 6) Daily laborer 66) Others (specify)_____	
108	What is your husband's occupational status?	1) Government Employ 2) Farmer 3) Merchant 4) Private employee 5) Daily laborer 66) Others (specify)_____	
109	What do you think of your socio-economic status relative to others in the neighborhood?	1) High 2) Medium 3) Low	
		1) Farming	

110	What is your income source?	1. Yes 2. No 2) Livestock, 1. Yes 2. No 3) Trading, 1. Yes 2. No 4) salary/pension, 1. Yes 2. No 5) support 1. Yes 2. No 6) Others (specify)_____	
111	What is your monthly income?	(ETB) _____ in birr	
112	How much was your monthly expenditure last month?	(ETB)_____ in birr	
Part II:-Reproductive health information			
201	At what age were you married first?	_____ Years	
202	Are you living with your first husband currently?	1) Yes 2) No	
203	How long have you been married?	_____ Years	
204	What was the duration of your previous marriages? (From past to recent in order)	_____ Years _____ Years	
205	At what age did you start sexual relations?	_____ Years	
206	Have you ever given birth throughout your life?	1) Yes 2) No →	Q215
207			

	How old were you when you first gave birth?	_____Years	
208	How old were you when you last gave birth?	_____Years	
209	How many male and female children did you deliver alive?	Male _____ Female _____	
210	What is the sex of your first child?	1) Male 2) Female	
211	Which type of sex did/would you want for your first child?	1) Male 2) Female	
212	Have you ever given birth to a child who was born alive but later died?	1) Yes 2) No _____ →	Q215
213	If yes, How many?	_____.	
214	How old was your child, when he/she died? Probe: if less than 1 month; record days if 'less than 1 year; record months	_____ Days _____ Months _____ Years	
215	Have you ever had a pregnancy that miscarried, or was aborted?	1) Yes 2) No	
216	Have you ever had a pregnancy that ended in a still birth?	1) Yes 2) No	
217	If you were able to go back to the time when you didn't have any children and	Child number _____. Male _____.	

	decide the number of children you wanted to have then how many children would you prefer?	Female _____. As God give_____. Don't know_____.44	
218	How many children did/would you prefer to have? (For those control who are not give birth before)	Child number _____. Male _____. Female _____. As God give_____. Don't know_____.44	
219	Do you want more children?	1) Yes 2) No—————→	Q221
220	Why do you want to have more children?	1) Children's are wealth 2) They can support in old age 3) Children's may/may not grow 4) Children's are honor 5) To maintain posterity	
221	Does your husband want to have more children?	1) Yes 2) No —————→	Q223
222	Why does your husband want to have more children?	1) Children's are wealth 2) They can support in old age 3) Children's may/may not grow 4) Children's are honor 5) To maintain posterity	
223	Do you know the fertile period between your menstrual cycles?	1) Yes 2) No	
224	After the birth of your last child, for how	_____.Day _____.Month	

	long were you been amenorrhea?	44. _____. Don't know	
225	Did you ever breastfeed your children?	1) Yes 2) No →	Q301
226	For how long did you breastfed the last child?	_____.Months _____.Year 44._____.Don't know	
Part III: Contraceptive Information			
301	Have you ever heard of contraceptive?	1) Yes 2) No	
302	Have you ever used contraceptive methods?	1) Yes 2) No	
303	Are you or your husband currently using contraceptive?	1) Yes 2) No	
304	For how long have you used the current a contraceptive you are using?	_____.Months _____.Year 44._____.Don't know	

Thank you very much.

TRANSLATED QUESTIONNAIRE
UNIVARSIITII JIMMAA, MUMMEE EPIDIMOOLJII FI BAAYOOSTAATISTIKSII
UNIVARSIITII JIMMAATTI NAANNOO QORANNOO GILGAL GIBEETTI GUCA
SABABOOTA SADARKAA IJOOLLEE BAAY'EE HORACHUU DUBARTTOOTA
HEERRUMAANIIF GAHEE TAPHATAN SAKATTA'UUF QOPHAAYE

1. GUCA WALII GALTEE

Ragaa sasabaaf, yammu raga kennaatti dhihaattu kaayyoo qorannoo akka armaan gaditti ibsameetti hubachiisuu hin dagaatiin. Yoo raga kennaan mana hin jiruu ta'ee guyyaa isaa lammaffa ykn sadaffaaf beellamaa qabuu hin dagaatiin.

Maqaan kiyyaa _____ yommu jedhamu, ani raga sasabaa ta'ee barataa Eegumsa Hawaasummaati Yuuniivarsiitii jimmattii diigrii maastreetiidhan barataa isa waggaa dhumaa Wajjiin hojjadha. Kaayyoon qoraannoo kana sababoota sadarkaa ijoollee baay'ee qabaachuu dubarttoota heerrumaaniif gahee taphatan naannoo qorannoo gilgal gibeetti qorachuu dha. Kanaafu, gaafiileen isin gaafadhuuf ifaa fi amanamaan deebiisuudhaan gargaarsii isin gotan baay'ee kan dinqiisifamu yammu ta'uu, kaayyoon qo'anno kana galmaan gahudhaaf qooda ofii ni qaba. Iccitii deebii debiistaniif eegudhaaf jecha fuula kamirrayu maqaa keessan barreesuun barbaachisaa miti. Akkasumas deebii barataa qo'annoo kana irratti hirmaate malee dhaabbata kamiifiyyu dabarfame hin kennamu. Gaafiilee kanneen keessaa gaafii deebii debisu kan hin barbaadne ykn gaafiilee hundaa deebii kennu yoo hin barbaadne mirgii keessan kan eegame dha. Gafiilee deebiisuudhaan walta'iinsa keessani yoo agarsiistan fixaan ba'iinsa qo'anno kanaatiif qooda keessan baataniittu jechuu dha.

Gaafiilee deebiisuuf fedhii ni qabdu?

Eeyyee yoo jetan, gara fuula itti anuti dabraa

Lakkii/Mitii/ yoo jetan, asuuma irratti dhaabna.

mallattoo _____

Galatooma!!!

2. Gaaffilee

Gaaffilee dubartoota heerrumaa umriin isaan 20-49 ta'aniif qopha'ee

Mataa-duree: sababoota sadarkaa ijoollee baay'ee harachuu dubartoota heerrumaan naannoo dirree qu'annaa Gilgal Gibeetti.

Odeeffannoo walgala			
Maqaa ragaa sasabaa_____		maqaa gandaa_____	
Mallattoo ragaa sasabaa_____		Koodii gandaa_____	
		Gooxii_____	
Maqaa supeervasara_____			
mallaattoo supeervasara_____			
Sala itti waamamaa manaa		1. Dhiira	2. Dhalaa
Guyyaa ragaan sasabamuu (ETC)		Yeroo	ragaa sasabuun itti
Guyyaa/Ji'a/Waggaa ___/___/_____		jalqabamee_____	
Kutaa-I: Ragaa haala walgala			
Lakk.	Gaaffilee	Filannoo/koodi	Irraa taruu
101	Umriin kee meeqaa(waggaa guutuu)	_____waggaa	
102	Yeroo baay'eef hamaa ammaatti,eessaa jiraattee? Magaala/baadiyyaa	1) Magaala 2) Baadiyyaa	
103	Amaantaan itti waamamaa manaa maalii?	1) Muusilimaa 2) Ortoodoksii 3) Proteestantii 66)Kan biraa(ibsii)_____	
104	Qomoon/sanyiin itti waamamaa manaa	1) Oromoo	

	maalii?	2) Amaaraa 3) Tigree 4) Kafaa 5) Dawaroo 6) Yam 7) Guraagee 66) kan biraa(ibsii)_____	
105	Sadarkaan barnootaa kee akkam?	1) Homaa hin baranne 2) Barumsa al-idilee 3) Barumsa idilee kutaa meeqa xumurte? Kutaa _____	
106	Sadarkaan barnoota abba mana kee akkam?	1) Homaa hin baranne 2) Barumsa al-idilee 3) Barumsa idilee kutaa meeqa xumurte? Kutaa _____	
107	Yeroo amma kanaa dalagaan kee maaali?	1) Haadha warraa 2) Hojjetaa mootummaa 3) Qotee bulaa 4) Daldaltuu 5) Qaccaramtuu dhuunfaa 6) Dafqaan bulaa 66) Kan biraa (ibsi)_____	
108	Yeroo amma kanaa dalagaan abba warraa kee maaali?	1) Hojjetaa mootummaa 2) Qotee bulaa 3) Daldalaa 4) Qaccaramaa dhuunfaa 5) Dafqaan bulaa 66) Kan biraa (ibsi)	
109	Yoo olla keeti waliin of madaltuu sadarkaan jireenya hawaassummaa kee maali fakkaataa?	1) Ol'aanaa 2) Giddugaleessaa 3) Gad'aanaa	

110	Maddi galii keeti maali?	1) Qonnaa 1. Eeyyee 2. Miti 2) Horsiisuu 1. Eeyyee 2. Miti 3) Daldala 1. Eeyyee 2. Miti 4) Mindaa 1. Eeyyee 2. Miti 5) Gargaarsa 1. Eeyyee 2. Miti 66) Kan biraa (ibsi)_____	
111	Galiin ji'a kee meeqa?	Qarshii? _____	
112	Basiin kee ji'a darbbee hammami?	Qarshii? _____	
Kutaa-II: odeeffannoo fayyaa hormaataa			
201	Jalqabaa yeroo heerumttu umriin kee meeqa ta'a ture?	Waggaa _____	
202	Yeroo ammaa kana abbaa manaa kee issa jalqabaa waliin jirtaa?	1. Eeyyee 2. Miti	
203	Erga heerumte waggaa meeqa ta'eerraa?	Waggaa_____	
204	Isaa jalqaba heerumte waliin waggaa meeqa turte? Kan amma hoo? (isa darbe kaasee hamma ammaatti)	Waggaa _____ Waggaa_____	
205	Umrii meeqatti wal-quunanti saalaa jalqabde?	Waggaa_____	
206	Hangaa ammaa baraa jireenya kee keessatti Mucaa deessee beektaa?	1) Eeyyee 2) Miti →	215
207	Yeroo jalqaba deessee umrii kee meeqa ture?	Waggaa_____	

208	Mucaa kee isaa dhumaa umrii meeqatti deessee?	Waggaa_____	
209	Ijoollee dhiiraa fi durbaa lubbun jirani meeqa deesseetaa?	dhiiraa _____ dhalaa _____	
210	Saalii mucaa kee jalqabaa deessee maali?	1) Dhiiraa 2) Dhalaa	
211	Mucaa kee jalqabaa saalaa kam osoo ta'ee hawwaa turte?	1) Dhiiraa 2) Dhalaa	
212	Mucaa lubbuun dhalatee, booda si duraa du'ee jiraa?	1) Eeyyee 2) Miti	
213	Eeyyee yoo ta'a, meeqa?	_____	
214	Mucaa kee du'ee/dute suni umrii meeqatti du,ee/dutee? Mirkanessii,yoo ji'a tokkoon gadi ta'ee guyyaa,yoo waggaa tokkoon gadi ta'ee ji'a fi waggaa galmeessa.	_____guyyaa _____ji'a _____waggaa	
215	Ulfi sirraa ba'ee beekaa? Jechuu ji'a torba osoo hin geenye sirraa baye beekaa?	1) Eeyyee 2) Miti	
216	Ijoollee du'a deesse beektaa? Ulfooftee ji'a torbaan booda du'aa deesse beekta?	1) Eeyyee 2) Miti	
217	Garaa booda deebitee yeroo ijoollee tokkoollee hin qabnee fi lakkoofsa ijoollee horachuu barbaadu murteessitu ,ijoollee meeqa horachu barbaadaa turte?	Lakk.ijoollee_____	
		Dhiiraa_____	
		Dhalaa_____	
		Hamma rabbiin kenne_____	
		Hin beeku_____44	
218	Ijoollee meeqa horachuu barbaadaa? (dubartootaa kanaan duraa dhalan hin jirree)	Lakk.ijoollee_____	
		Dhiiraa_____	
		Dhalaa_____	
		Hamma raabbiin kenne_____	
		Hin beeku_____44	
219	Ijoollee baay'ee horachuu barbaadaa?	1) Eeyyee 2) Miti_____→	221

220	Maaliif ijoollee baay'ee horachuu barbaadaa?	1) Ijoolleen qabeenyaa 2) Yeroo dulummaa keenyaatti nu gargaaruu 3) Ijoolleen guddachuuykn guddachuu dhabuu danda'u 4) Ijoolleen kabajaa dha 5) Dhaloonni akka itti fufiinsa qabattuf.	
221	Abbaan warraa kee ijoollee baay'ee horachuu barbaadaa?	1) Eeyyee 2) Miti _____ →	223
222	Maaliif inni ijoollee baay'ee horachuu barbaadaa?	1) Ijoolleen qabeenyaa 2) Yeroo dulummaa keenyaatti nu gargaaruu 3) Ijoolleen guddachuuykn guddachuu dhabuu danda'u 4) Ijoolleen kabajaa dha 5) sanyiin akka itti fufiinsa qabattuf.	
223	Gidduu marsaa xurii keetitti yeroo ulfa'uu dandeessuu ni beekta?	1) Eeyyee 2) Miti	
224	Mucaa kee isaa dhumaa ergaa deessee,yeroo hamammamiif xurii hin argiin turte?	_____guyyaa _____ji'a 44_____hin beeku	
225	Ijoollee kee harmaa ni hosiftaa?	1) Eeyyee 2) Miti _____ →	301
226	Mucaa kee isaa dhumaa yeroo hammamiif harmaa hosiftee?	_____ji'a _____waggaa 44_____hin beeku	
Kutaa-III: Odeeffannoo mala ittisa da'uumsa			

301	Waa'ee mala ittisaa da'uumsa dhageesse beektaa?	1) Eeyyee 2) Miti	
302	Mala ittisaa da'uumsatti fayyadamtee beekta?	1) Eeyyee 2) Miti	
303	Yeroo amma kana abbaan warraa kee mala ittisaa da'uumsatti ni fayyadamaa?	1) Eeyyee 2) Miti	
304	Mala ittisa da'uumsa amma itti fayyadama jirtu yeroo hammamiif itti fayyadamtee?	_____ji'a _____waggaa 44_____hin beeku	

Gaaffii Koo xumureera
Hirmaannaa keessaniif guddaa galatooma!