EXAMINATION OF THE LEVELS AND DETERMINANT FACTORS OF FERTILITY AND CONTRACEPTIVE USE IN NORTHWEST ETHIOPIA:

With special reference to the application of the Bongaarts' model

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This thesis is dedicated
to my mother, the late w/o
Neteru Beyene

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ABSTRACT

Background: Nearly two million people are added to the population of Ethiopia each year. It is the second most populous country in Africa (next to Nigeria) and usually quoted as one of the demographic giants on the African continent. It has now become clear that uncontrolled fertility has adversely influenced the socio-economic, demographic and environmental situations of Ethiopia. Rapid population growth has hampered its development making the eradication of extreme poverty and hunger difficult. The country has experienced many man made and natural disasters. This undesirable situation is further aggravated by rapid population growth. In spite of the rapid population growth in Ethiopia in General and in the Amhara region (especially in the two Gondar Zones) in particular the contraceptive prevalence rates are reported to be low.

Objectives: A number of distinct objectives that addressed several issues which ultimately led to the examination of fertility and the use of family planning methods were employed. Efforts were made to estimate the fertility rates and quantify the contribution of each of the proximate determinants of fertility that bring fertility below its biological maximum in North and South Gondar Zones of Northwest Ethiopia. It was also aimed at identifying the factors influencing fertility and investigating the perception of the study subjects towards rapid population growth. Moreover, efforts were made to closely explore the current practices and future intentions of the study subjects towards contraception.

Methods: The study had two components. The first one was a quantitative study which involved 3512 women aged 15 to 49 years. The second component was a qualitative study which consisted of five focus group discussions and ten key informant interviews.

I) Quantitative study: A multi-stage cluster sampling technique was applied to select the required study units from the urban and rural areas of the study zones. Ten *Weredas* (eight rural and two urban *Weredas)* were included in the present study. A total of 2756 women were drawn from the randomly selected rural *Woredas* while the remaining 756 were taken from the two big towns of Gondar and Debre Tabour. These towns have the status of Woreda administrations. Because the present study had a number of different outcome variables it was necessary to calculate the respective sample sizes separately. Among the various sample sizes computed on the bases of different assumptions, the one with the greatest value was taken as the final sample size.

A structured questionnaire with closed and open ended questions was used to collect the quantitative data. A questionnaire which encompassed 7 different sections was first prepared in English and then translated into the local language, Amharic. Among others, the questionnaire included questions relating to the socio-economic and demographic characteristics, population pressure, history of marriage, contraception, pregnancy and fertility preferences of the women.

The whole questionnaire was tested prior to collecting the actual data in order to standardize the flow and content of the questions. Accordingly, amendments were made depending on the results of the pre-test that was conducted in the nearby similar areas. Data collection was carried out by twenty health professionals (health officers, nurses and environmental health technicians) who were given a three-day intensive training with practical exercises. Five health officers/sanitarians were assigned to supervise the data collection process. The various statistical and demographic techniques such as, multivariate logistic regression (unconditional) and the Bongaarts model were applied to analyze the given data and to estimate the required fertility rates and proximate determinants of fertility depending on the specific nature of the variables under consideration.

II) Qualitative study: This part of the study was aimed at substantiating and complementing the main quantitative study. The selection of participants and the formation of the focus group discussions were facilitated by the community leaders of the respective *kebeles* (*Woredas*) under consideration. Three Woredas, Dembia and Dabat in North Gondar and Fogera in South Gondar were identified for the conduct of the five focus group discussions. Some of the key informant interviews were also undertaken in these *Woredas.*

Results: The overall total fertility rate of the two Gondar zones was computed as 5.3. Among the three major proximate determinants in reducing fertility in the two zones, postpartum infecundability (C_i=0.55) stood first followed by contraceptive use (C_c=0.75) and non-marriage (C_m=0.83). On the other hand, the analysis made on the examination of the association of different variables with the fertility level came up with some interesting findings. In this regard, among the 25 variables considered in this study, only 9 of them were found significantly and independently associated with the level of fertility. Women with at least secondary education were at a lower risk of high fertility with OR=0.37 (95% C.I., 0.21 to 0.64) compared to those with no formal education. However, women with primary education did not show any significant difference when compared with the same baseline group. Age at first marriage was inversely associated with the number of children ever born alive. Place of residence, household expenditure, number of children who have died, attitude towards using contraceptives, women's knowledge on the safe period, and current marital status were the other variables that showed significant associations with the level of fertility.

Over 90% of the women who participated in the quantitative study and nearly all of the focus group discussants and interviewees felt that something should be done to keep the population from growing too fast. Surprisingly the overwhelming majority of the participants showed their approval of the government passing a law regarding the maximum number of children that couples should have in their lifetimes.

The contraceptive prevalence rates among all women and currently married women were 22% and 27.3%, respectively. The unmet need for family planning was 38% among currently married women. Educational status of the women, discussion with partner about family planning and possession of functional radios were amongst the factors that showed significant associations with the practice of contraception. All married men and the majority of religious leaders who participated in the qualitative study were in favor of the use of contraceptives.

Conclusion: The fertility-inhibiting effect of postpartum infecundability resulting from prolonged breastfeeding is by far the most important proximate determinant in the entire study areas. A substantial role on fertility decline (particularly in urban areas) is played by contraceptive use. The promotion of breastfeeding should continue by all concerned bodies and the region should give much emphasis to make the majority of the rural population (both women and men) users of modern contraceptive methods. Female education beyond the primary level, reduced infant and child mortality, delayed marriage and correct knowledge on the safe period during the menstrual cycle were amongst the main factors that had a bearing on high fertility.

Both the quantitative and qualitative components of the study showed encouragingly positive attitudes of women, married men and religious leaders towards contraception. However, the unmet need for family planning is still very high necessitating rigorous promotional and counseling activities besides making the method of choice available and accessible to the clients.

Overall, the present study has shown the very fact that things on the ground are changing and it is timely for the responsible bodies to exert maximum effort and commitment in responding to the emerging attitudes of the people by making the population problem a priority.

***Key Words**: fertility rates, contraception, North and South Gondar zones, Ethiopia, determinants, Woreda, rapid population growth, perception*

ABBREVIATIONS

AAU	Addis Ababa University
ADA	Amhara Development Association
AIDS	Acquired Immune Deficiency Syndrome
ANC	Ante Natal Care
ASFR	Age Specific Fertility Rate
CBR	Crude Birth Rate
CBRHA	Community Based Reproductive Health Agents
CDR	Crude Death Rate
CHA	Community Health Agents
CI	Confidence interval
CPR	Contraceptive Prevalence Rate
CSA	Central Statistical Agency
DH	District Hospital
DHS	Demographic and Health Survey
EDHS	Ethiopia Demographic and Health Survey
FGD	Focus Group Discussion
FM	Family Planning
GFR	General Fertility Rate
GRR	Gross Reproduction Rate
HIV	Human Immunodeficiency Virus
HP	Health Post
HSDP	Health Sector Development Program

ICPD	International Conference on Population and Development
IEC	Information, Education and Communication
IUD	Intrauterine Device
MDGs	Millennium Development Goals
MOH	Ministry of Health
NGO	Non-Governmental Organization
NRR	Net Reproduction Rate
OR	Odds Ratio
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
PHCU	Primary Health Care Unit
RH	Reproductive health
SH	Specialized Hospital
SPSS	Statistical Package for Social Sciences
TFR	Total Fertility Rate
TPFR	Total Period Fertility Rate
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
USA	United States of America
VSC	Voluntary Surgical Contraception
WHO	World Health Organization
ZH	Zonal Hospital

ORIGINAL PAPERS

This thesis is mainly based on the following four papers:

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IV. Alene GD, Worku A, Davey G. Examination of the attitudes and practices of contraceptive use among fertile women and some social groups in North and South Gondar zones, Northwest Ethiopia. Submitted

Table of contents **Page**

List of Tables

List of Figures

1. INTRODUCTION

1.1 Fertility

1.1.1 Definitions and measures of fertility

Fertility refers to the actual number of births in a population (1). It is one of the three principal components (births, deaths and migration) of population dynamics that determine the size and structure of the population of a country, and has a powerful effect on its health and economic success (2). There are a number of measures of fertility such as, crude birth rate (CBR), General fertility rate (GFR), age specific fertility rate (ASFR), total fertility rate (TFR), Gross reproduction rate (GRR) and Net reproduction rate (NRR). Among these measures, the total fertility rate, also called fertility rate or total period fertility rate (TPFR) of a population is a common measure of fertility and is defined as the total number of births a woman would have by the end of her childbearing period if she were to pass through those years bearing children at the currently observed age specific fertility rates and no mortality during this period (3-6).

The TFR is a synthetic rate, not something that is actually counted. It is not based on the fertility of any real group of women, since this would involve waiting until they had completed childbearing. It is based on the age-specific fertility rates of women in their “childbearing years,” which in conventional international statistical usage is ages 15-49 (4). It is a better index of fertility than the general fertility rate (annual number of births per thousand women of childbearing age). An alternative fertility measure is the net reproduction rate which measures the number of daughters a woman would have in her lifetime if she were subject to prevailing age-specific fertility and mortality rates in the given year. When the NRR is exactly one then each generation of women is exactly reproducing itself. The NRR is less widely used than the TFR, and the United Nations stopped

reporting NRR data for member nations after 1998 (4). Overall, the TFR is a reasonable summary of current fertility rates (3, 4).

1.1.2 The Global situation

The population of the world at the beginning of the last century was 1.6 billion. At the end of the century, those two digits had exactly reversed. That is, human population entered the 20th century with 1.6 billion people and left the century with 6.1 billion (7). Throughout the 20th century, each additional billion has been achieved in a shorter period of time (7).

Each year, about 80 million new people join the human race. This is roughly equivalent to adding the size of the Ethiopian population to the world annually, a rate of growth that will swell human numbers from today's (mid-2008) 6.7 billion to about 8.0 billion by 2025 and to 9.4 billion by 2050 (8,9). Developing countries in Africa and Asia will account for about 90% of the increase in world population projected by 2050, while the populations of most developed countries will decrease (9, 10). Even among developing countries, fertility is highest in Sub-Saharan Africa, at an average of 5.4 children per woman, and lowest in Asia and Latin America (the Caribbean) at 2.5 (8). This indicates that, although the population of the developing world is growing substantially every year, the pace of growth varies dramatically from one country to another. Some countries have aging populations and, as a result, face future population decline, while others still have young and rapidly growing populations. Each situation is associated with its own set of social, economic, environmental, and political challenges (10). There is a wide variation in child bearing patterns in the world today. Fertility (average number of births per woman) ranges from 1.0 in a number of industrialized countries to 7.1 in Niger (8, 11).

Since the introduction of modern medicine from the developed countries, Africa has seen a fall in death rate (although it is still high by world standards) and an

increase in life expectancy. It is true that HIV/AIDS has reversed many of the gains in a number of sub-Saharan Africa countries. However, there is still a marked excess of births over deaths leading to a rapid expansion in population (12, 13). Continued high fertility rates and rapid population growth could prove to be more serious obstacles to poverty reduction than AIDS in most, although not all, African countries. Population growth also threatens food security in already malnourished states, makes long-term dependence on international assistance more likely, and increases the pressure for international migration." (13).

At the beginning of the twenty first century, sub-Saharan Africa is still characterized by a high population growth rate. The population of this region in mid-2008, was around 809 million (8). The projected populations (based upon reasonable assumptions on the future course of fertility, mortality, and migration) of sub-Saharan Africa are 1.16 and 1.7 billion by 2025 and 2050, respectively (8). In other terms, the populations of most sub-Sahara African countries which have grown rapidly in the last 50 years are expected to continue with this pattern in the 21st century (8, 10).

While sub-Saharan Africa has begun a transition to lower mortality, fertility has remained stubbornly high, which touched off rapid population growth in the region. Smaller declines in fertility have been observed recently in many African countries. Nevertheless, fertility rates generally remain well above five children per woman, and the question of whether Africa is more resistant to fertility change than other regions of the world is a topic of considerable debate (8, 14). The Population Reference Bureau (2008) report estimates, that population growth in sub-Saharan Africa amounts to 2.5% per annum, while for example population in Asia is growing at an annual rate of 1.5% (China excluded). Growing populations exert pressure on resources, thus hampering economic development that is crucially needed. Several policies have been implemented all over the region in order to slow down population growth, although with mixed results (14). As a whole, 43% of the current population of the region is under 15

years of age (8) showing very little change from what it was in 1997. Only a 2% reduction had been observed during the last decade. This youthful age structure affects economic development. A disproportionately large share of resources must be allocated to meet the immediate needs of these young people for years before they can contribute to the national income (14). The large number of children also creates momentum for future population growth because these children eventually will begin their own families. Even if women were to have only slightly more than the two children needed to replace themselves and their husbands, births would still outnumber deaths in the sub-Saharan region for the next forty or more years (14).

Compared with earlier demographic transitions elsewhere, the transition in Sub-Saharan Africa is much slower. Many factors, such as, cultural, economic, political, and demographic help explain the difference. Many researchers point to continued strong cultural preference for large families, to large rural populations relying on subsistence farming, and to low levels of economic development (15). In addition, continued high rates of infant and child mortality have contributed to high fertility levels, because many couples may have "extra" children to make up for those who die young (15 - 17).

It is now widely accepted that control of fertility, like the prevention of avoidable deaths, is a public health responsibility. Both lay people and public health professionals have become increasingly concerned about the recent unprecedented growth of population. This ever increasing population growth is mostly characterized by a very high proportion of young population which is in the unproductive age group (9, 18, 19).

Within Africa, the well known examples of countries experiencing sustained fertility declines are, among others, Mauritius and Tunisia. The success of Mauritian population management has been largely attributed to full commitment of government both for logistic support and financial backing. The easy

acceptance of family planning programmes by the population facilitated the fertility decline. The fertility rate in Mauritius reached replacement level in the late 1980s. In Tunisia, the steady decline in fertility observed during the last two decades has been attributed to joint action to raise the age at marriage and to promote the use of contraception during the past three decades. The success of the fertility transition in Tunisia can also be explained by the fact that the country's population policy is not only clear and well planned, but is also backed by relevant legislation and by political will at the highest level (19).

Today, to think of population is to think of sustainable growth. It is the phenomenon of growth that commands the attention of the current world. In this regard, it is usually said that less developed countries like Ethiopia could grow economically only if population growth is held in check (18-20). Accordingly, Western donors argue that to improve the living standards of their citizens, Sub-Saharan African governments should encourage birth control by putting effective mechanisms in place (9).

On the other hand, the assumption that rapid population growth hampers the economic development of a given Sub-Sahara African country is challenged by economists such as Julian Simon (21). According to this scholar, it is free market capitalism that can solve any problem including over population. Furthermore, he argues that more people create more demand for food, which stimulates production. This generates larger markets, putting more wealth into the hands of many more people, and leading to higher national standards of living.

The debate on the relationship between population and economic growth started over 200 years ago by the pioneering work of Robert Thomas Malthus in his *"First Essay on Population, 1798".* The basic tenets of his essay state that population grows at a geometric rate (1, 2, 4, 8, …) because of lack of conscious restraints on fertility while food production grows at an arithmetic rate (1, 2, 3, 4, …) due to diminishing returns from the increasingly scarce and fixed factor of

production, land (7, 18). Things, however, did not go exactly the way Malthus predicted. Malthus failed to predict correctly mainly because he did not take into account the role of human ingenuity to control fertility and increase food production through technological progress (18).

In fact, population size in most developing nations continued to increase though not mainly because of unrestrained fertility but because of decreasing mortality. In that sense, one can say the Malthusian problem still exists (18). This has given impetus for the continuation of the debate. Studies in the 1980's argued that the population effect could be positive or negative depending on the level of development of a nation. In essence they stated that a level of population growth lower than some specific level would be an asset while a level higher than that would retard development (18). The debate around the relationship of population and economic growth is still going on in the development literature (12).

From the preceding conflicting arguments, one could easily understand the two fundamental thoughts in relation to rapid population growth among the poor Sub-Saharan African countries (12). The first group (usually the majority) assisted by the western donors strongly believe that "Africa's ability to slow current high rates of population growth is key to achieving its full potential for development". In this regard, this group is not in favor of rapid population growth. The second group that dwells on the opposite school of thought sees rapid population growth as a blessing (22).

1.1.3 The Ethiopian situation

Ethiopia, situated in the Horn of Africa, is one of the oldest states in Sub-Saharan Africa, with a history that traces back to Biblical times. The total area of the country is approximately 1.1 million square kilometers and borders Djibouti, Eritrea, Sudan, Kenya and Somalia. It is a country with great geographical diversity. Its topographic features range from the highest peak Ras Dashen, at 4,620 meters above sea level down to the lowest point at the Afar (Danakil)

depression at 110 meter below sea level. It is a multi-ethnic state with more than 80 languages. The majority of the population lives in the highland areas of the country. The main occupation of the settled population is farming, while in the lowland areas, the mostly pastoral people move from place to place with their livestock in search of grass and water.

Currently, Ethiopia is a federal republic, consisting of 9 Regional States and two City Administrative States. The regions are divided into zones, which are divided further into *Woredas* (districts). The health policy of Ethiopia reflects commitment and general directions towards decentralization and democratization focusing on preventive and promotive components of health care and development of equitable and acceptable standard of health services to reach all segments of the population (23).

Map of Ethiopia highlighting the Amhara region.

Map of Amhara region highlighting the two Gondar zones

The health service delivery in Ethiopia is arranged in a four-tier system: consisting of Primary Health Care Units (PHCU), District Hospitals (DH), Zonal Hospitals (ZH) and Specialized Hospitals (SH). The PHCU is composed of a Health Center with five satellite Health Posts (HP) and it is intended to serve a population of 25,000 located within a 10 km radius catchment area. Next is the DH, each to serve a population of 250,000 and acts as a referral and training centre for 10 PHCUs. The ZH provides specialized services and training to a population of 1 million; and the SH gives comprehensive/unitary specialist services and acts as a centre for research and post-basic training. The health service of the country is decentralized and *Woreda* health offices have the right and responsibility of managing the health services delivery and control their budget (24).

Currently, Ethiopia is implementing the third (2005/06-2009/10) Health Sector Development Program (HSDP). The HSDP is the health chapter of the wider national framework for development and poverty reduction; the Plan for Accelerated and Sustained Development to End Poverty (PASDEP), designed to achieve the Millennium Development Goals (MDGs) (24).

Ethiopia, being one of the sub-Sahara African countries, shares most of the problems associated with population issues described in the previous section. It ranks 2nd only to Nigeria with a projected population of 79.1 million in mid-2008 (6, 8). However, according to the recent census (2007), it was estimated at 77 million in November 2008. In any case, evidences show that the population of Ethiopia is one of the fastest growing populations in Africa. Nearly two million people are added to the country's population each year (25, 26). Uncontrolled fertility has adversely influenced the socio-economic, political, demographic and environmental development of the country. Poverty, war and famine and associated low levels of education and health, weak infrastructure, and low agricultural and industrial production have exacerbated the problem of over population (5, 27).

The population of Ethiopia in 1900 was estimated at 11.8 million. It took 60 years for this figure to double to 23.6 million in 1960. After 28 years (i.e., in 1988), the population doubled to 47.3 million (27). Its current population is close to 80 million (8) showing about a seven fold increase in the last century. The current national population growth rate of 2.7% (28) indicates that the population of Ethiopia is growing rapidly and will double in size in about 26 years if the present growth rates persist. In line with this, in about 12 years, the country will hit the 100-million mark (28).

Ethiopia contains one of the largest concentrations of poor people on the planet and ranks 169th out of 177 countries in the United Nation's Human Development

Report (29). About 40% of the population lives on less than a dollar a day. Over 80% of the Ethiopian people live below a poverty line of $2 a day (30).

Similar studies undertaken within the country have also documented the fact that quite a significant proportion of the population survives under extreme poverty (31-36). High fertility and rapid population growth exert negative influences on economic and social development and low levels of economic and social development provide the climate favoring high fertility and hence rapid population growth (27).

About 45% of the population of Ethiopia is below 15 years of age while only 3% is above 65 years. Even without taking into account many factors, such as, unemployment, under employment and a high prevalence of physical disability in the population, an economically active person in Ethiopia is obliged to carry one inactive individual. This shows that the age dependency burden is very high in this country (8). According to the 1984 census, the proportion of the population below 15 years of age was 48%. This indicates that there had been a minimal (slight) reduction in the percentage of dependent children in the past 23 years (from 1984 to 2007).

The life expectancy at birth in Ethiopia (49 years) is one of the lowest in the world (8). The infant and under 5 mortality rates are 77 and 123 per 1000 live births, respectively (28). The maternal mortality ratio is 673 per 100, 000 live births and the total fertility rate (TFR) is 5.4 (28, 37). It is usually said that the rural fertility has not changed much since the adoption of the National Population Policy. This could partly be due to the fact that in rural areas marriage is virtually universal and takes place at younger ages. Average age at first marriage in rural Ethiopia is very low. The contraceptive prevalence rate is also very low. The reported median age at first marriage in most regions is by far less than the legal age in the country. The legal age at first marriage in Ethiopia is 18 years (38). As

indicated earlier, infant and child mortality rates that could affect fertility levels are also the highest (17, 28).

In addition to the demographic factors shown above, a number of socio-economic and cultural factors could be stated to explain the reasons for high fertility in Ethiopia. First and foremost the status of women in Ethiopia is extremely low. The majority of the female population is illiterate and dependent on their spouses. This has negatively affected most Ethiopian women in making decisions regarding the number of children she would like to have in her life span (38, 39).

Unlike that of fertility levels in rural Ethiopia, fertility in urban areas has shown a declining trend since the mid 1980s. It declined from 6.2 in 1984 to 5.3 in the early 1990s and further decreased to 4.2 in 1998. The 2005 EDHS had also shown a total fertility rate of 2.4. This rate of course includes Addis Ababa which is noticeably quoted as having a fertility rate of below replacement level (i.e., a total fertility rate of 1.4) (37, 40). The decline in total fertility in urban Ethiopia could partly be attributed to the improvement in the health of mothers and children as a result of the better provision of reproductive health and related services by government and non-government organizations. Other socio-economic and demographic factors, such as, increased cost of living, high contraceptive prevalence rate, increased age at first marriage, increased level of women education, high rate of unemployment and the like are possible causes for fertility transition in urban Ethiopia (40).

Ethiopia has developed a population policy (although it does not have an action plan) which aims to reduce the total fertility rate to 4.0 by the year 2015 (27). However, this policy is very loose in a number of ways and may not be able to meet most of its objectives. For example, the formation of population councils at the national and regional levels has not been materialized. The formation of such organizational mechanisms was explained as vital for the implementation of the

population policy (27). Furthermore, as shown by the 1990 National family and Fertility survey findings (TFR=6.4) and the 2005 EDHS report (TFR=5.4), the reduction in the Total Fertility Rates over the 15-year period was not as anticipated. In particular, there was no statistically significant difference between the 2000 (TFR=5.5) and 2005 total fertility rates of the country (36, 37). It is therefore high time to think of a stronger population policy that may bring down the rapid population growth to a level which is compatible with its economic development.

The Amhara National Regional state where this study was undertaken is one of the Federal Regional States of Ethiopia. It consists of ten zones and the special zone Bahir Dar, the regional capital city. It is characterized by poor socio-economic status and most of the people are residing on highland plateaus which have been terribly affected by erosions for the last several decades. It has a population estimated at 19.6 million in mid-2007 (41). The population increases on the average by 500,000 every year. However, according to the recent census, the population of this region was reported to be 17.2 million in 2007. Over 85% of the population lives in rural areas (28). The Amhara people constitute the largest ethnic group in the region (about 91%), and Orthodox Christianity is the dominant faith (81.4%) followed by Islam (18.4%) (42).

According to the available evidence (both from estimates and census results), the Amhara region is experiencing high population growth and a relatively low standard of living with major socio-economic problems such as low adult literacy, high infant and child mortality. The health care delivery service is not compatible with the ever increasing population of the region (43). In this region, land degradation has become an acute problem. Population pressures and inappropriate subsistence farming practices contribute to soil impoverishment and erosion, rampant deforestation, overgrazing of common lands and misuse of agrochemicals (44, 45).

Some of the data collectors with shepherds / cowherds

There are 17 hospitals, 188 health centers, 122 health stations/nucleus health center and 2480 health posts owned by the government in the Amhara region (43). There are also 3 hospitals and 69 clinics under the control of a few NGOs and the private sector working in the Amhara region (28). The potential health service coverage based on the available health centers (including nucleus health centers) is about 30%. When the poorly equipped health posts are taken into account, this potential health service coverage of the region would raise to nearly 90% (28). About a third of its population has access to safe water and nearly 40% has some kind of toilet facilities (43). The infant and under5 mortality rates are estimated to be 94 and 154 per 1000 live births, respectively. The annual rate of natural increase is estimated at 2.7%. The total fertility rate of this region is estimated at 5.1 children per woman (28, 37). The health care delivery service is not compatible with the ever increasing population of the region (42).

The population of the two zones (North and South Gondar – formerly known as Begemider and Semein province) where the present study was conducted was estimated at 5.6 million in mid 2008 (41). This is about 28% of the population of

the Amhara region. The population of these zones had increased by 45% in the last fourteen years (from 1994 to 2008). In 1994, both North and South Gondar zones had a population of 3,857,416 (46). In these zones, early marriage is a typical phenomenon which results in a large number of children at a household level. For example, a study conducted in North Gondar showed that the mean age of women at their first marriage was 13.7 years (47). A similar finding was also observed in the Dabat district of the same zone (31). These zones which account about 40% of the area of the Amhara region are located in northwest Ethiopia and have more or less similar experiences with the other zones of the region in terms of demographic and socio-economic characteristics (48).

Female children fetching water from a distant area

1.2 Family Planning

The institution of family is as old as man himself (49). It is the basic cell of the community. The health and welfare of the family determines the health of the country. It is therefore logical and necessary to give special attention to the provision of health services at a family (grass roots) level.

A reasonable balance between population growth and socio-economic development is crucial to a given country struggling to eradicate extreme poverty and hunger. With rapid population growth, there appears an increasing demand for social services (including the expansion of health and education services) and access to employment opportunities will be very demanding. Moreover, poverty driven human activity will induce the poor to become both agents and victims of environmental degradation (5, 50, 51).

Family planning is a demographic necessity that plays a pivotal role in the harmonization process by easing the socio-economic problems as a result of reduced fertility (50). Expanding family planning services has, therefore, become a priority target of the development program, both as an end in itself and to promote other development goals, such as, the millennium development goals which are directly or indirectly related to the ever-increasing population pressure in poor countries like Ethiopia (50-52).

Family planning programs have been developed and supported to provide people with a means to achieve the number of children they desire and to reduce unwanted pregnancy, as a means of improving the health of women and children, and to contribute to slower population growth and more rapid economic development. Family planning implies that "every child should be a wanted child". Furthermore, family planning services provide a medically sound way to reduce unwanted pregnancies that could otherwise lead to maternal deaths or injury from dangerous abortion procedures (53).

The other important reason for the provision of family health services includes the human right of individuals to determine their reproductive performance. Family planning programs strive to provide couples the resources they need to meet their fertility goals. The failure of individuals to contracept when they would like to forego childbearing results in what is defined as an unmet need for family planning. Unmet need for contraception can lead to unintended pregnancies, which pose risks for women, their families, and societies (54-57).

More than 100 million women in less developed countries, or about 17 percent of all married women, would prefer to avoid a pregnancy but are not using any form of family planning. In these countries, about one-fourth of pregnancies are unintended—that is, either unwanted or mistimed (wanted later). One particularly harmful consequence of unintended pregnancies, as indicated above, is unsafe abortion: An estimated 18 million unsafe abortions take place each year in less developed regions, contributing to high rates of maternal death and injury in these regions. In addition, unwanted births pose risks for children's health and wellbeing and contribute to rapid population growth in resource-strapped countries (54).

Numerous studies reveal that a range of obstacles other than physical access to services prevents women from using family planning. Policymakers and program managers can strengthen family planning programs by understanding and using data on unmet need, considering the characteristics of women and couples who have unmet need, and working to remove obstacles that prevent individuals from choosing and using a family planning method (54, 58, 59).

1.2.1 Contraceptive methods and use

Methods of contraception practiced today include "modern" and "traditional" ones. The former refers to clinic and supply methods such as voluntary surgical

sterilization, the IUD, oral contraceptives, implants, injectables, condoms, and vaginal barrier methods. The main traditional or non-supply methods are periodic abstinence and withdrawal (60-62).

The specific contraceptive methods that women use vary substantially from country to country. The selection of a given method in a country reflects many factors, including the availability of various contraceptive methods and people's awareness of them, their cost, and where they can be obtained. In addition, personal preferences, social norms, and perceived acceptability of family planning use affect contraceptive choices (15, 62).

According to the report of the 2008 Population Reference Bureau, Worldwide, the percentage of married women aged 15 to 49 years using contraception was 62% (8). The same report shows that the percentage of women using contraception is higher in the developed world, at 69%, than in the developing world, at 51% (excluding China). China has maintained the highest contraceptive prevalence rate of 90% (8).The percentage was reported to be 27% in the least developed countries while it was only 21% in sub-Saharan Africa. A contraceptive prevalence rate of 50% was also reported for North African countries (8). On average worldwide, nearly 9 in every 10 contraceptive users rely on modern methods; while only about 1 in every 10 rely on the traditional methods of withdrawal and periodic abstinence (8, 15).

Five modern contraceptive methods, namely, female sterilization , intrauterine device (IUD) , oral contraceptives , condom and injectables are the most widely used methods among married women in developing countries. These methods accounted for over 85% of all contraceptive use in 2007 (62).

Female sterilization: Female sterilization is most widely used in Asia (India, China, Thailand), Latin America and the Caribbean (Dominican Republic, Puerto

Rico, El Salvador, Brazil, Colombia). It is little used in North Africa and Sub-Saharan Africa (15, 62).

The IUD: This method ranks second among family planning methods used by married women in developing countries. The IUD is the most widely used method in North Africa (15, 62).

Oral Contraceptives: Oral contraceptives are the third most widely used contraceptive method among married women in developing countries. They are the most widely used method in Northern Africa and the second most used method in sub-Saharan Africa, South-Eastern Asia, and Latin America and the Caribbean (62, 63).

Condom: This method is widely used in central Africa, Asia and South America (62). Despite the importance of condoms for protection against HIV and other sexually transmitted diseases, reliance on the male condom for family planning was rare among married women in developing countries before a decade. However, with a lapse of time there had been reports showing progress towards the use of this method. According to the Department of Economic and Social Affairs of the Population Division (UN) report, this method was the fourth family planning method used by married women in developing countries.(62).

Injectables: Injecables have become the fifth commonly used contraceptive method among married women in developing countries. They are the most popular modern contraceptive method in Sub-Saharan Africa (15, 62).

Other Modern Methods

In developing countries relatively few women, married or unmarried, use other modern contraceptive methods - including male sterilization, vaginal methods (diaphragm, cervical caps, and spermicides), implants, or female condoms.

A few Asian countries, such as, China, Republic of Korea, Bhutan and Nepal have the highest level of male sterilization while it is virtually nonexistent in most countries of Africa (15, 62).

Traditional family planning methods

Use of the two traditional contraceptive methods, periodic abstinence and withdrawal, varies widely among developing countries. While levels of use generally are much lower than for modern methods, in some countries (e.g. Mauritius) a substantial number of women use such traditional methods (15, 62, 63).

It is usually said that sub-Saharan Africa will constitute the most important family planning frontier of the twenty-first century because fertility is still high in all its sub-regions except Mauritius, Seychelles and Southern Africa with the corresponding total fertility rates of 1.7, 2.2 and 2.7, respectively (8, 9) . Contraceptive prevalence is far lower than that of any other world region, partly because of low levels of socioeconomic development but also partly because of strong cultural resistance to family planning (9, 64, 65).

If family planning programs are to accelerate in sub-Saharan Africa, the minimum requirements suggested are the following (9, 65):

- The heads of state and their ministers should be clear and outspoken in their support for the program. This support should extend throughout the bureaucracy.

- International aid should be maintained and even increased.
- Family planning service-delivery points should be densely located throughout each country.

- Stocks of injectables and oral contraceptives should be available at all times.

- Contraceptives, including the pill and injectables, should be available without prescription from all pharmacies and medical stores.

- Services should be expanded increasingly for an adequate approach to reproductive health care.

- Additional mechanisms, including the use of their own organizations and meeting centers, should be established to meet the needs of adolescents, males of all ages, and unmarried people of either sex.

The Ethiopian situation

In Ethiopia, like any other country in the world, certain contraceptive methods are most preferred by married and unmarried women. For example, if we look into the 2002 statistics of the percentage contraceptive users by type of contraceptive method, those women who used pills constituted 58.5% followed by Depo-Provera (29.6%) and condoms (10.6%). Other contraceptive methods including IUD and Norplant accounted for the remaining 1.3%. However, the 2007 report of the Ministry of Health showed that those women who used Depo-Provera accounted for 38.5% followed by condoms (31.2%), Pills (29%) and the rest methods (1.3%) in 2006 (28). Except differences in the percentages of the contraceptive methods used, Depo-Provera, pills and condoms are the ones in common use in different parts of the country (66-69).

Although clients' preference is supposed to be the main reason for the high percentages of the above contraceptive methods, unavailability of the required methods could also be a possible explanation that leads the individual woman to choose her method among the limited available options. There are reports which confirm this undesirable fact (66-68, 70).

Developing a better understanding of fertility preferences and contraceptive use in Ethiopia is of paramount importance. Ethiopia, a country with the highest levels of fertility, has developed a population policy which aims to increase the prevalence of contraceptive use from the 1993 level of 4% to 44% by the year 2015 (27). To implement the policy regional states established their own Regional Population Councils and Offices of Population during the early stages soon after the development of the population policy. Efforts were also made to replicate the structure downwards at the zonal and *Woreda* levels. The Regional Population Councils were under the direct supervision of the regional governments. However, these institutional arrangements did not last long and there appeared a change that reduced the scope of the Regional Population Councils. In this regard a Department under the Bureau of Finance and Economic Development was formed to follow the population affairs. What ever forms the Organizational structure might take, eager to see the efforts succeed; international donors are giving their support (64).

Efforts have been made to promote family planning services in this country by the Family Guidance Association of Ethiopia since 1966 and by the Ministry of Health since the adoption of the 1978 Alma-Ata Declaration. However, the overall contraceptive prevalence rate in the country is not satisfactory (37, 68, 71-73).

Research has shown that, by preventing "too early, too late, too close and too many pregnancies" over a fourth of maternal deaths could be avoided every year (74). In addition, pregnancy related ill-health will be avoided in thousands of women. UNICEF states that "family planning could bring more benefits to more people at less cost than any other single technology now available to the human race" (75).

Family planning helps everyone in different ways (36, 76-80):

- It protects women from unwanted pregnancies and all negative consequences following the pregnancy.
- It saves children's lives. If children are born two or more years apart, child mortality will drop tremendously.
- The life of the family improves. The men/women would be in a position to care for a smaller number of individuals and this leads to the provision of a better life for the whole family. Parents could send their children to school longer.
- It advances the national development. A decline in fertility leads to an increase in the per capita gross national product.
- It preserves natural resources.

Amhara region

According to the reports of the Planning and programming Department of the Ministry of Health of Ethiopia, there is a greater preference for some kind of contraceptive methods than the other methods in the Amhara region. In this regard, in 2000, the percentage of modern contraceptive users by type of contraceptive method among the women of the Amhara region were: Pills (73.1%), Dipo Provera (19.0%), Condoms (6.6%), IUD (0.2%) and others (1.1%) (81). However, there were tremendous changes in the years that followed regarding the preferences of methods, according to the same source (28).

Reproductive health surveys undertaken in some zones (North Shewa, Oromia and South Wello) of the Amhara region in 2000 showed that pills (46.3%) and injections (42.5%) were the most widely used contraceptives. The same survey indicated that periodic abstinence constituted 3.7% followed by female sterilization (2.8%), condom (1.9%), norplant (0.9%) and male sterilization (0.9%). The use of IUD and withdrawal methods was reported by the remaining 0.9% of the women of the above three zones (82). Similar patterns in relation to contraceptive preference have been observed in some districts of the present study zones. Notable examples are the town of Gondar and its surroundings and the district of Dabat (31, 66).

The 2005 EDHS indicated that injectables were the commonest methods used by 11.6% of the married women in the Amhara region (37). Pills were the second method used by 3.6% of the married women in the same region (37). In fact, it could be easily understood that injectables were over 3 times more likely to be used in this region.

On the other hand, the Amhara National Regional state is experiencing high population growth (about 500,000 births every year) and low use of modern family planning methods (16%). This region is known for the high unmet need for contraceptive services (30%), and the widespread practice of female genital mutilation (80%) and early marriage (37,42). Contraceptive use in the Amhara region is consistent with the low national levels. It is very low, even by Sub-Saharan African standards (8,42).

1.2.2 Determinants of contraceptive use

Differences in contraceptive use are primarily responsible for the differences in fertility among various groups of women. The influence of certain factors on the use of contraceptives varies from region to region and from one country to the other within the same region (15, 83-86).

Age of woman: Contraceptive use among married women usually rises from low levels at age 15 to 19 to peak at ages 30 to 39 and then falls (15, 83).

Parity: Contraceptive use tends to rise with parity (the number of living children a woman has) (15).

Education: Women's education is closely related to contraceptive use. Even after taking account of other factors, researchers consistently have found that better educated women are more likely to use contraception. While a husband's education also has a positive effect, it is less important than the wife's education (15, 84,85,87).

In developing countries, contraceptive use is higher among women with more education. Differences in contraceptive use by education are greatest in sub-Saharan Africa, where total contraceptive use is the lowest of any region (15).

Place of residence (Rural or Urban): The most consistent difference in levels of contraceptive use among groups is between rural and urban women (15). In most developing countries, rates of contraceptive use among married women in rural areas are lower than in urban centers. Jamaica is an example of exception where rural and urban levels of contraceptive use are equal (15).

Desire for more children: The most frequent reason given in sub-Saharan Africa for not using contraceptives. Women and men in sub-Saharan Africa believe that bearing many children will provide a bulwark against poverty during their old age (15).

Fear of side effects associated with contraceptive use: The single main reason given by women in Ghana, Haiti and Philippines (15, 80).

Lack of knowledge of family planning methods or their sources: The best example is sub-Saharan Africa, averaging 10% and as high as 29% in Chad. In developing countries as a whole, about 1% of married women give reasons related to lack of access to family planning, cost, or difficulties obtaining specific contraceptive methods (15).

Women empowerment: Unempowered women are often unable to act on their own behalf to obtain contraceptive services to regulate their childbearing (86, 88).

Marital status: In sub-Saharan Africa, contraceptive use among unmarried sexually active women of reproductive age is at least twice as high as among

married women. More than half of the difference is due to higher levels of condom use among unmarried women (15, 85, 86).

Infant and child mortality: Continued high rates of infant and child mortality have contributed to high levels of fertility (i.e., not using family planning methods), because many couples may have "extra" children to make up for those who die young (84, 86).

Fear of HIV/AIDS infection: Men and women are becoming more and more aware of the routes of HIV transmission and its preventive methods. One of the preventive methods is to use condom and this has to some extent reduced fertility levels (15).

Culture: Cultural preference for large families (mostly among rural people depending on subsitence farming) leads to the low level of contraceptive use (88, 89).

Religion: Some religions (e.g., The Catholic Church) prohibit using modern contraceptives (15, 87,88, 90).

The list of the above factors is not an exhaustive one. There could still be other demographic and socio-economic factors that may influence the use of the various types of family planning methods in different parts of the world.

In Ethiopia, a number of studies undertaken in different corners of the country, have documented the important factors that have impact on the use of family planning methods. Determinant factors, such as, desire for more children, sex, discussion between a woman and her partner concerning family planning were found to be significantly associated with contraceptive use (91). Moreover, place of residence, occupation, age of women, educational status of women and men, high rates of infant mortality, religion, marital status, accessibility to family

planning services, cultural norms, acceptance of family planning services, ethnicity, parity, fear of side effects, knowledge about the methods, etc. were identified to have had some kind of association with contraceptive use (66-68, 82, 92, 93).

1.2.3 Strategies to increase contraceptive use

It is true that there are quite a number of strategies that enhance the use of contraceptives so as to achieve the anticipated health, demographic and other development goals. Some of such strategies could be listed as follows:

Government commitment to family planning programs : The government should be highly committed to facilitate and strengthen the family planning programs along with other poverty-reduction development goals. Development of appropriate policies coupled with a strong leadership in every aspect of the family planning programs are instrumental to meet the targets set by the country. Lack of commitment from the government side usually results in poor performance of activities related to family planning (15,54).

Awareness and availability of contraception: Efforts should be made to increase the awareness of the target population about the various contraceptive methods. Every individual (men and women) residing in rural areas who need to know about the usefulness of contraceptives should be communicated in order to make their own informed decisions. In this regard, radio, television, and other mass media have a powerful role in reaching women and men with family planning messages (15).

Awareness about contraceptive methods and their sources is an important step. However, this should be followed by making the necessary contraceptives available and accessible to those individuals who need them. In Ethiopia, it is reported that there is a serious shortage of contraceptives. When available, the quality of services and limited availability of contraceptive supplies is very inadequate (35,47,54). One tragic consequence of limited supplies has been a

high abortion rate which in turn has contributed to high rates of maternal mortality (57, 69).

Women empowerment: In most developing countries including Ethiopia, women are not in a position to act on their own behalf to get contraceptive services to regulate their childbearing. This points to the urgent need to improve women's education and job prospects if they are to assume greater control over their lives and move out of poverty. Programs that combine social and economic development and family planning services for poor women encourage them to have fewer children and lead a less-dependent kind of life (15,94).

Periodic assessment of contraceptive discontinuation: It is important to assess continuation rates and understand the reasons why women discontinue using contraceptive methods. Such an analysis could provide important information about the adequacy of services targeted to particular women who need special information, counseling and follow-up care. Discontinuation because of contraceptive failure has obvious implications for the number of unwanted pregnancies and the prevalence of induced abortion. Discontinuation may be a particularly significant issue for adolescents, who have more limited access than adults to contraceptive services, and more unpredictable and irregular sexual encounters (57, 63).

Private sector: In Ethiopia, although the public (government) sector is the main supplier of contraception, the private sector should also be encouraged and strengthened to give the service with a reasonable price. The government should play a pivotal role in facilitating and enforcing the private sector to participate in such activities to a wider scale than before (15).

Production of modern contraceptives in the country: Efforts should be made towards the production of modern contraceptives (the most widely accepted ones) in Ethiopia. In addition to this, research activities should also aim at

developing new methods which may be more suitable to Ethiopian men and women. This would undoubtedly solve the shortage of many of the modern contraceptives needed by the users.

Expansion of the health service coverage: The health service coverage in this country is not in line with the needs of the population. Reports from the Ministry of Health indicate that only a third of the population in this country utilizes the actual service (28). Under this situation, it is difficult to address the basic health needs (including family planning services) of Ethiopians particularly those living in rural areas. Therefore, besides to the construction of new health institutions, family planning activities along with other basic health services should be given using mobile clinics and other similar arrangements to a large number of the rural population in need of them.

Reduction of infant and child mortality: Both government and non-governmental organizations should be devoted to working very closely so as to reduce infant and child mortality. This in turn has important implications on fertility and the use of contraceptive methods. Mothers will desire for a small number of children assuming that the loss of such children due to mortality will be very minimal. This tendency will lead mothers to use modern contraceptive methods more than ever (95).

Strengthening of the current IEC activities: The present IEC (information, education and communication) activities geared toward improving the family planning services need to be strengthened. The sufficiency and effectiveness of the IEC materials and methods should be investigated using a standardized system.

Conduct of research focusing on Family planning: Research activities focusing on family planning should be undertaken in a planned manner in order to investigate the periodic progress of contraceptive use. Preference of users to

particular contraceptive methods, shortage, side effects and other barriers of such methods need periodic assessment.

Gender equality and women's empowerment: These were at the heart of the ICPD vision, strongly linked to reproductive health and rights (96). In this regard, the Ethiopian government has adopted national legislation on women's rights. A good example is the development of the "National Policy on Ethiopian Women". However, a great deal of effort needs to be exerted to fully implement the policy so as to achieve the anticipated results that will make women active participants in the labour force.

In total, the relatively high birth rate in Ethiopia which has been accompanied by steady declines in death rates has resulted in an increased number of population growth (8, 28). It is to be noted that the Ethiopian population was 53.5 million in the 1994 census, up from 42.0 million in 1984 (97, 98). Its population was estimated to be 79.1 million in mid 2008 (8) (census, 77 million in 2008). Ethiopia's annual rate of population growth of about 2.7% has been a major cause of concern for population experts and policy makers for some time (26, 27, 99). With an estimated doubling period of about 26 years with the current rate of population growth, the current level of consumption can only be maintained if production of goods and services will also double in about 26 years. Unfortunately, this is almost impossible to achieve as all available evidence indicates that the rate of development of the economy has not been compatible with the rapid population growth of the country as manifested by the worsening standards of living of the broad masses of the Ethiopian population in general and that of the Amhara people in particular (18, 25, 29, 100). On the other hand, it is now generally believed that increased family planning expenditures are an effective, long-term investment in human capital development and family welfare. Political leaders and policy-makers should give family planning programs higher priority, increase their funding, and pursue more supportive policies (18, 36, 101, 102).

In line with the above facts, the population problem in the two zones of North and South Gondar is a widespread and severe one requiring some kind of remedial measures. If the factors favoring high preference of fertility and the low use of the available family planning services are clearly known, then it would be possible to come up with appropriate corrective measures. These measures (solutions) would also contribute tremendously in alleviating many other socio-economic problems (health, education, unemployment, etc.) that the Amhara region is terribly suffering from (36, 80).

It is true that fertility and family planning do matter for poverty reduction - for poor households and poor countries. However, they are not the only factors for poverty reduction. A slower rate of population growth, combined with sound and equitable models of economic development and the reduction of gender inequality, appears increasingly likely to achieve that goal. Efforts should also be made to avoid anti-development conditions such as, bad governance and corruption. Therefore, it is important that policy makers understand the new evidence supporting the view that lower fertility does contribute to poverty reduction, and that public policies that help poor people better manage their reproductive lives have societal as well as individual benefits (27, 80, 85).

In spite of the fact that Ethiopia has a good population policy which was developed in 1993 by taking account of population related problems, success is still low (27, 36). In fact, as pointed out by Haile (population expert, Ethiopia), this population policy is not being implemented according to the plans set at the beginning (36).

On the other hand, the decision to practice family planning is a complex process and it is dependent upon several factors that influence couples or individuals. Although substantial efforts have been placed in an attempt to increase contraceptive prevalence in Ethiopia through family planning programs, the

achievement obtained so far is not satisfactory. Unwanted pregnancy is still known to represent a serious problem in the country (35, 57).

This study is, therefore, the first of its kind to be undertaken in North and South Gondar zones to such a large scale to examine the levels of fertility and contraception and the factors contributing towards high fertility and low contraceptive use. In addition to its significance in investigating the population problems of a large portion of Northwest Ethiopia, its results will largely contribute to the promotion and enhancement of the existing family planning programmes. Its findings are also hoped to contribute to a greater extent in devising a more concrete evidence-based population policy. Moreover, the results of this study will contribute in the refinement of the health and other related policies of the country (27,103, 104).

Health extension workers in remote rural areas (North Gondar)

1.3 The Rationale for the studies

♦ The efforts made to improve the health of the Ethiopian population have resulted in reducing mortality and morbidity (although not compatible to the standards of some African countries) compared to several decades ago. However, this was followed by rapid population growth and Ethiopia is repeatedly quoted as one of the countries having the fastest growing populations in Africa. In fact, Nigeria and Ethiopia are considered the demographic giants of Africa. Therefore, it was necessary and timely to examine the perceptions of women and other social groups at the grassroots level towards rapid population growth in an area with strong religious and cultural backgrounds. This was in line with what was said by Guillebaud, Professor of family planning and reproductive health, ***"...success in death control over the past two centuries must be balanced by adequate voluntary birth control...."*** (75).

♦ The two Gondar Zones formerly known as Begemider and Semein province which consist of the 3 climatic zones, that is, Dega (highland), Woina Dega (mid highland) and Kolla (lowland) are thought to have a wide experience regarding fertility. Accordingly, the findings could be useful to many of the other zones of the region and beyond that to areas with similar characteristics of the two Gondar zones.

♦ The drought that initially appeared in some areas of Tigrai and Wello of Northern Ethiopia is expanding its dimensions to the South. The two Gondar zones are already affected. On top of that, the farmland is getting smaller and smaller over time due to the uncontrolled population growth. It was therefore necessary to assess the attitudes of the inhabitants towards the emerging population-related problems and the means of alleviating (solving) such problems.

♦ To collect baseline information that may assist all concerned bodies and NGOs including researchers to undertake similar studies in other parts of the

country. The cumulative evidence will help the policy makers to update the 15 year old population policy of the country which suffered from the lack of an action plan.

♦ Previous studies have identified factors influencing fertility and the use of family planning methods in other parts of the country (33, 50, 55, 68). However, factors that influence fertility and contraceptive use may vary from place to place. Accordingly, attempts have been made to include new variables or strengthen existing ones.

A woman with her babies responding to the questions of the data collector

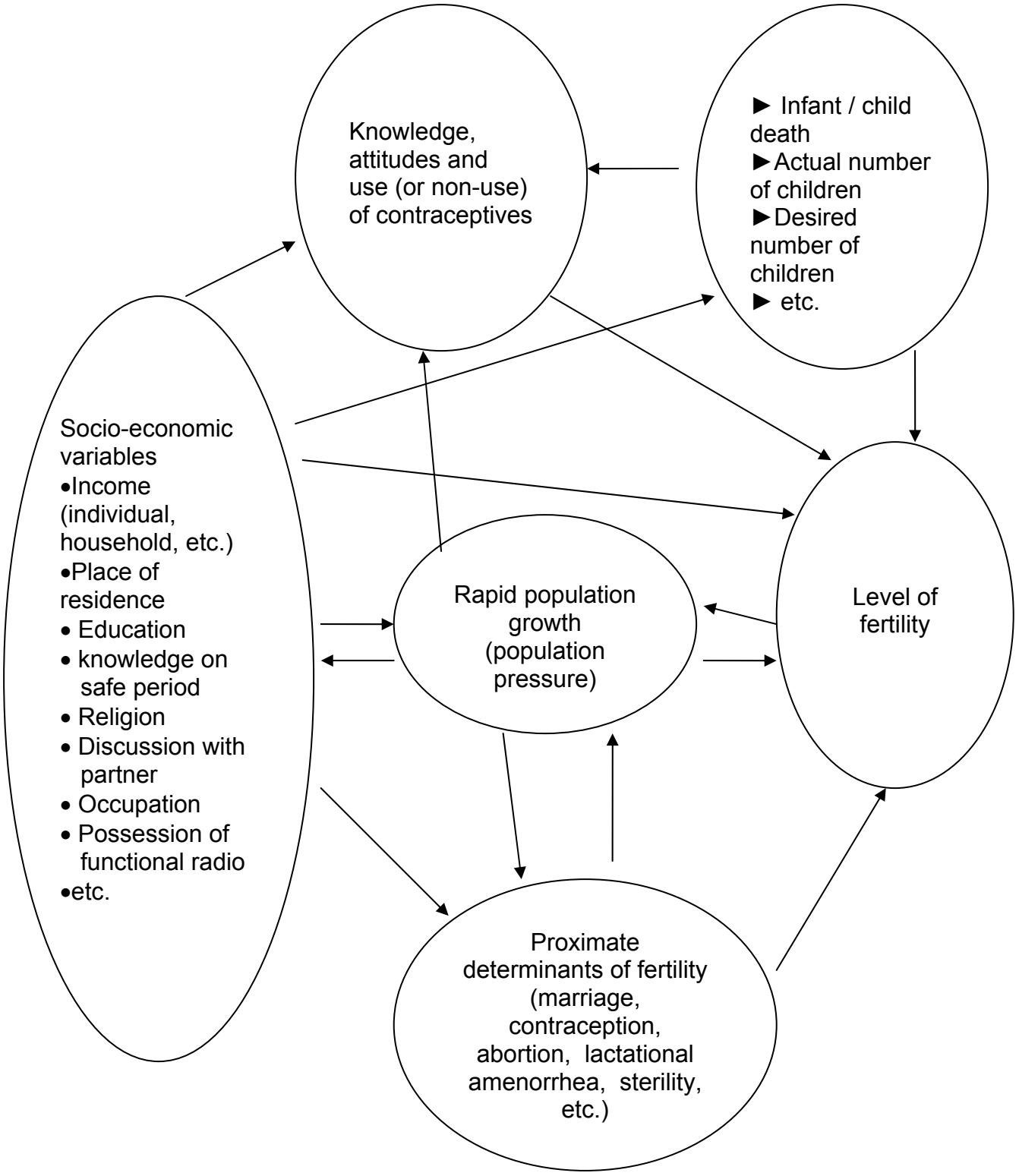

Figure 1: A conceptual framework showing the inter-relationships among socio-demographic and economic variables, proximate determinants of fertility, population pressure, contraceptive (knowledge/attitudes/ use) and level of fertility, North and South Gondar zones, 2007

2. STUDY OBJECTIVES

This research work examines the levels of fertility and use of modern family planning methods and investigates the factors influencing fertility and contraceptive use among women of reproductive age and other social groups in northwest Ethiopia

Specifically, the following issues were addressed in this study.

1. Estimation of the total fertility rates and proximate determinants of fertility by applying the Bongaarts model

2. Investigation of factors influencing fertility behaviour

3. Examination of the perception of women of child bearing age and other social groups towards the population pressure of their surrounding areas and find out their perceived views (positions) in tackling the ever increasing population related problems

4. Investigation of the knowledge, attitudes and practice of women and other social groups towards contraception and identify factors that influence the use of family planning methods among married women

In addition to addressing the above issues, this thesis is devoted to answering the following key research question:

► Is rapid population growth a real problem in the two Gondar zones of the Amhara region?

3. SUBJECTS AND METHODS

The Setting

Both North and South Gondar zones together constituted the former Begemider and Semein province. The province of Begemider and semen was one of the 14 provinces of Ethiopia during the long history of the country prior to the coming of the “administrative regions” with the Dergue regime (44). In 1988 the country was subdivided into 25 regions and 5 autonomous regions by the military government (44). Currently, the former Begemider and Semein province is divided into two zonal administrations known as North Gondar and South Gondar zones. The name Gondar was taken from the city of Gondar which was founded by the Gonderian kings at the beginning of the 17th century. According to Professor Richard Pankhurst, the renowned historian, the city of Gondar was one of the largest cities in the world in the 1670s with an estimated population of over 65,000 and was as populous as Cairo (105). In 1678, the visiting Armenian bishop Hovannes remarked that the city was "twice as big as Istanbul" (105). During the same time period, the French travelers Ferret and Galinier were so impressed by the town that they called it the “Paris of Abyssinia” (105). Many of the buildings from this period have survived to the present day and are popular as a tourist attraction. Gondar is also a noted center of ecclesiastical learning of the Ethiopian Orthodox Tewahedo Church, and known for having 44 churches (Tabots), for many years more than any other settlement in Ethiopia. In fact, Gondar served as the capital of Ethiopia for over 200 years (106).

The City of Gondar

Crowds gather at the Fasilides' Bath in Gondar to celebrate *Timket* - the Epiphany for the Ethiopian Orthodox Tewahedo Church.

On the other hand, the town of Debre Tabour (the capital of South Gondar zone) which was founded much later than Gondar itself (105) used to be the capital of Ethiopia during the reigns of Tewodros the 2nd and Yohannes the 4th. Authorities differ over the facts of its founding. However, Richard Pankhurst gives a detailed account of its foundation by Ras Gugsa (105).

Currently, the towns of Gondar and Debre Tabour have the status of *Woreda* (district) administration in their respective zones. There had been changes in the number of *Woredas* of each zone in the last couple of decades. At the time of the present survey there were 21 *Woredas* including the town of Gondar in North Gondar and 11 *Woredas* (including Debre Tabour) in South Gondar.

The populations of North and South Gondar zones were estimated at 3.06 million and 2.55 million in mid -2008 (as of July first, 2008), respectively (41). These two zones constitute nearly 40% of the area of the Amhara region. About 28% of the population of the Amhara region lives in these zones. Over 85% of the population of the two zones lives in rural areas. Like that of the rest of the zones of the Amhara region, subsistence farming is the backbone of the economy of the rural population of the two Gondar zones. At present, land resources in these zones are under increasing pressure due to rapid population growth and land degradation and the farmers are obliged to penetrate vulnerable environments in order to increase the cultivated area. Nearly all the land is cultivated on a permanent basis giving nature little room for regeneration (44). Fallowing of land which used to be a common practice in these zones has now completely disappeared. This phenomenon is a clear indication of land shortage which is the main natural resource base for the economic and social lives of the rural population. Mountains, valleys, forests, etc. are also used increasingly from year to year which in-turn has facilitated soil erosion (5, 44).

Study Design

This thesis work used a quantitative method that was followed by a qualitative study (focus group discussion and key informant interviews). The quantitative study which was cross-sectional by its very nature was designed in a such a way that it would answer different but interrelated research questions such as, estimation of important indices of fertility and making comparative analysis between high and low fertile women. The qualitative study was conducted to complement the quantitative study and examine very closely some of the issues that emerged during the household and individual surveys.

3.1 Quantitative study

The quantitative method employed in the present investigation was the principal component designed to collect data useful to have an empirical understanding of the fertility levels, contraceptive usage, population pressure and the factors influencing high fertility and the use of modern family planning methods.

At the time of the survey, the number of women aged 15 to 49 years living in the two Gondar zones was estimated at 1.2 million. All these women 15 to 49 years of age residing in the different clusters and *Kebeles* were eligible to be included in the present study. However, Women of the reproductive age group who were not permanent residents of the given areas were excluded. A woman was taken as a permanent dweller if she had been living in the given selected area for at least six months preceding the survey.

Sampling method

A multi-stage cluster sampling technique was applied to select the required study units from the urban and rural areas of the study zones. From the twenty rural *Weredas* of North Gondar, five *Weredas* were selected by simple random

sampling technique. Together with the town of Gondar, a total of six *Weredas* were considered in North Gondar. Similarly, from the ten rural *Weredas* of South Gondar, three *Weredas* were selected by simple random sampling technique. Together with the town of Debre Tabour, a total of four *Weredas* were considered in South Gondar. Consequently, a total of eight rural *Weredas* and two big urban centers (which could be taken as two *Weredas*) were included in the present study.

Households with women aged 15 to 49 years in both urban and rural areas were considered. After having the two broad divisions (urban/rural), multi-stage and other necessary random sampling schemes (depending on the specific condition of the given area, cluster or simple random sampling techniques) were used to arrive at the actual household that was included in the sample. About two-thirds of the study subjects were from rural *Kebeles* while the remaining one-third was from the urban centers. The urban centers, apart from the two big towns, included the small towns (administrative centers) of the selected rural *Weredas*. In situations where there were two or more women in a given household, all women aged 15 to 49 years living in the same household were interviewed. In this regard, the first woman was the one who was either the wife or the head of the household if she didn't have a partner. It was this woman who was taken as the first responding subject in a given household.

Sample size determination

Because the present study had a number of different outcome variables (with varying proportions) it was necessary to calculate the respective sample sizes separately. Among the various sample sizes computed on the bases of different assumptions, the one with the greatest value (number) was taken as the final sample size. Accordingly, different approaches were used to arrive at the required sample sizes.

A) For the outcome variables having a single proportion, the usual formula, $n = \frac{Z^2_{\alpha/2} PQ}{W^2}$ was employed, where Z is the percentile of the standard normal distribution, P is expected prevalence, q=1-P and W is the desired precision. In this calculation, the corresponding estimated proportion obtained from a previous similar study and a 95% confidence interval were used. Moreover, the level of precision (margin of error) was taken as 2.5%. Some 5% was also added for non-response and other contingencies.

B) For the comparative study, the sample sizes were calculated considering female education and current use of family planning methods as major determinant factors of fertility using the STATCALC program of the EPI INFO statistical package. In this regard, a minimum detectable OR (Odds Ratio) of 2, a 5% level of significance (two-sided), a power of 90% and a one to one allocation ratio of the two groups (high fertile : low fertile) were assumed. Here also, some 5% was added for non-response and other contingencies.

C) In a situation where there was no a possible proportion of a given outcome variable due to the unavailability of a previous similar study, the calculation of the required sample size was carried out by taking account of 50%. It is to be noted that a proportion of 50% gives the maximum possible sample size when the other parameters are kept constant.

D) In all cases, as the sampling scheme was multi-stage, a design effect of 2 was considered and the computed sample sizes were multiplied by two. This was done to increase the precision by reducing the amount of sampling error which was brought by the design of the sample (that is, multi-stage). The details are given in the following table.

Table 1: Summary of main outcome variables and procedures used to calculate the required sample sizes, North and South Gondar zones, 2007

Paper	Main outcome variable	Single Proportion (%)	comparative studies (high fertility = n1, low fertility = n2)	The number of women proposed to be included in the sample*	The number of women who actually participated in the study	Remarks
I	Estimation of total fertility rates and proximate determinants of fertility using the Bongaarts model	-	-	Not less than 2000 (that is, (not less than the sample size of 2005 EDHS for the Amhara region)	**3512**	The experience of similar studies was taken into account**
II	High vs. low fertility levels (Identification of factors influencing fertility)	-	a) Maternal illiteracy rate among low fertile group taken as 82% b) The proportion of non-users of family planning methods among women having ≤ 4 children taken as 83.5%	n1= 853 n2= 853 n1= 922 n2= 922	**n1=1011** **n2=1413**	
III	Opinion of responding subjects on population pressure (population too large)	50.0	-	3228	**3512**	**Recently conducted similar studies not available**
IV	Attitude of women to use family planning methods in the future Current users of family planning methods (among the overall women aged 15 to 49 years)	56.0 10.3	- -	3181 1193	**3512**	

N.B. The quantities (assumptions) used to compute the above sample sizes were taken from the results of the 2005 EDHS.

* The level of precision was taken as 2.5% while calculating the sample sizes for the outcome variables having a single proportion.

* The sample sizes were computed by taking account of the design effect and the 5% additions for non-response and other contingencies. However, there were 3547 women aged 15 to 49 in the selected study areas (clusters and *Kebeles*) and data were collected from 3512 of them which gave a response rate of 99%.

** Ref. nos. 93 and 121.

As shown above, by taking different background information and assumptions into account, a number of different sample sizes were calculated. Accordingly, the required sample size (that is, with the highest value) was computed as 3228. This sample size, being the largest one, appropriately satisfies in answering the research questions shown in the earlier sections of this thesis. It is this sample size that has the least random error compared to the others.

However, in the process of data collection from the randomly selected clusters and urban *kebeles* it appeared that it was necessary to go beyond the computed sample size. This phenomenon was encountered due to the increased number of households with the eligible women in the selected clusters. A total of 3547 women aged 15 to 49 years residing in both urban and rural areas of the randomly selected clusters and *kebeles* were registered and data were collected from 3512 of them. In line with the initial proposal, about two-thirds of the respondents (2277 out of 3512) were from the typical rural areas of the two Gondar zones. The schematic representation of the sampling procedure is given on the next page.

A cluster in this study was defined as a small area called *Gote* in the local language (Amharic) which consisted of 150 to 200 households. This definition of cluster was used during the 2007 census as the smallest unit of enumeration area. Accordingly, all the rural *kebeles* were divided into 2 or more clusters depending on the size of the given rural *kebele*. Except the *Dembia woreda* which had about 260 rural clusters, the rest of the *woredas* were observed to have had between 150 and 200 rural clusters.

Although during the operation of the Ethiopian census each cluster was expected to comprise 150 to 200 households, in this particular study a small modification was made so as to suit the set objectives of the present research work. Accordingly, all households in the selected rural clusters with no women of reproductive age group were excluded and this reduced the number of

households within a cluster. All houses with women aged 15 to 49 years in the selected clusters were numbered and every member of the household was registered. As might be expected, the number of households having the required study subjects ranged from 120 to 170 across all clusters included in the study.

In urban centers, the sampling technique followed to select the study subjects was different from that of the typical rural areas. In Gondar town, among the overall 21 *kebeles*, 5 of them were randomly selected to be included in the present study. By making visits to each of the selected *kebeles*, the list of households was taken and by applying the simple random sampling technique the required sample sizes ranging from 80 to 100 were identified. Data were collected from all women aged 15 to 49 who were residing in the already identified houses. A total of 453 women were interviewed in Gondar town. By following a similar approach, among the 10 urban *kebeles* of Debre Tabour town, 3 of them were randomly selected and data were collected from a total of 303 women of child bearing age (about 100 women from each *kebele*). The procedure of selecting of the households and hence the study subjects in the small towns (*woreda* capitals) was not an exception. Data were collected from 479 women of the eight small towns (each contributing 50 to 70 women).

Over the course of data collection, it was learned that the task of collecting data was relatively more difficult in urban centers than the rural areas. Some of the houses in the urban areas were found closed at the time of data collection and hence making re-visits inevitable. The presence of two or more women within the reproductive age group in the same household was also more frequently observed in urban centers than the rural areas. The second responding subject who was most probably a daughter or a relative of the family under consideration was in most cases unavailable during data collection. This also necessitated making re-visits in order to collect data from the woman not available during the first (previous) visit. Although such rigorous efforts were made, there were still a few missing study subjects.

For the comparative study (Paper II), the facts obtained from the 2005 EDHS data (which consisted of women aged 15 to 49 years) were taken into account during the time of sample size calculation for high and low fertile women. In this regard, from the women data of the Amhara region, it was learned that at least 30% of them were 25 and above years of age and had more than four children ever born alive. The group of women aged 25 and above having four or less children was also observed to constitute about 30% of the overall women population. The remaining women were below 25 years old. Having such information about the distribution of the women population by age and number of children ever born alive was of paramount importance to estimate the number of women with the same characteristics in the present study. Accordingly, from the initially proposed sample size of 3228 women aged 15 to 49 years, a minimum of 922 subjects that would fulfill the requirements of each comparison group (high or low fertile group) were expected to be drawn. Consequently, in line with the prior expectations, the study subjects (women aged 25 and above) in the high and low fertile groups were 1011 and 1413, respectively. The number of study subjects actually obtained in each fertile group was quite above the minimum sample size proposed at the beginning. In fact, the number of subjects within the low fertile group was considerably higher than the other group. Apart from incurring some additional cost, the large number of sample sizes which could be obtained in such type of studies would increase the precision of the findings by reducing the level of the sampling error (107).

Moreover, all women included in both comparison groups were observed to have come from different households. That is, there were no two women aged 25 and above years who had come from the same household. All of the 2424 women were representing their own distinct households. This was so because all the remaining women were below 25 years of age and were removed from this particular analysis as a matter of fact.

Some of the data collectors (Dabat Woreda, north Gondar)

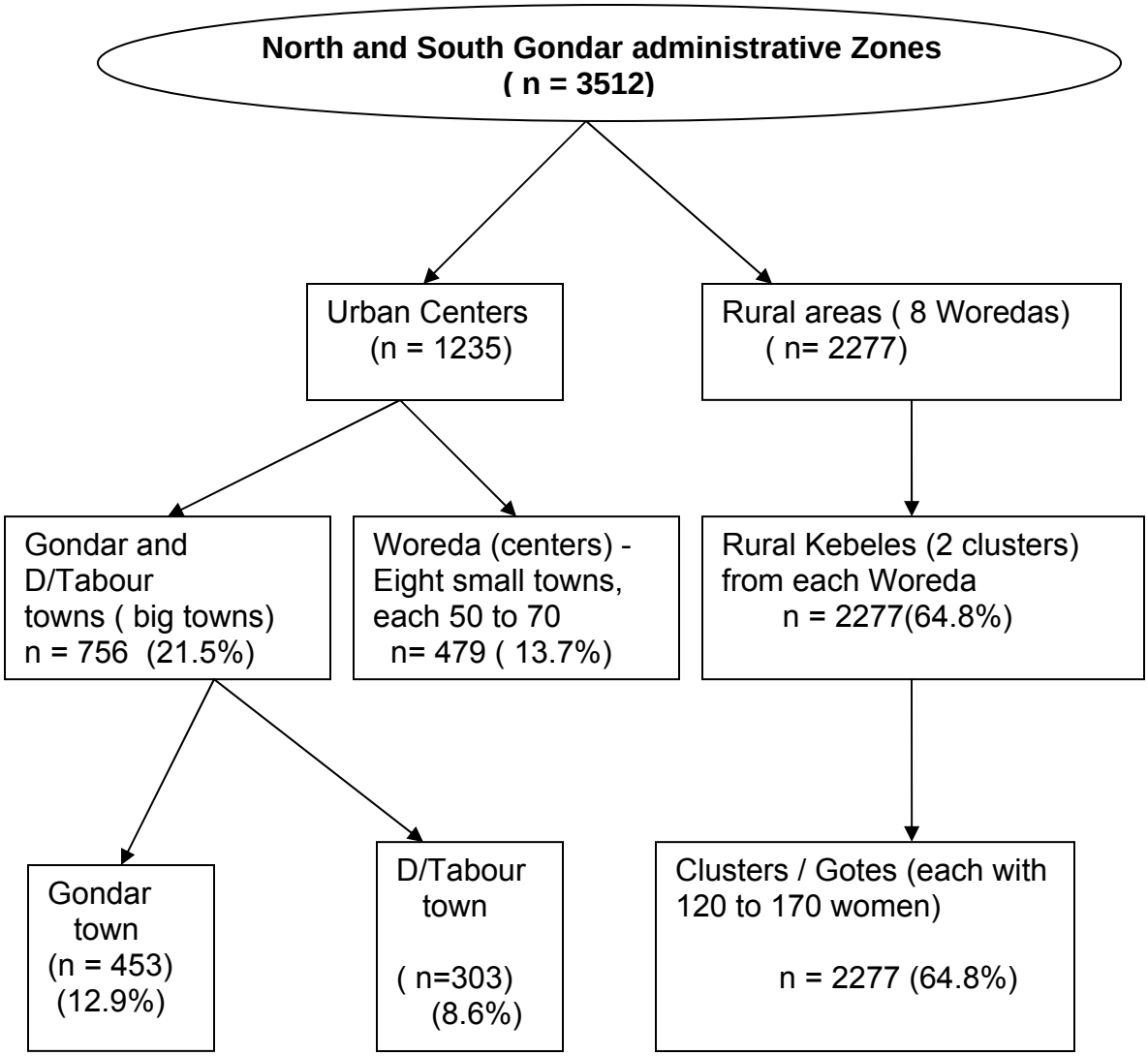

Figure 2: Schematic representation of the sampling procedure showing the number of women aged 15 to 49 years in each of the selected areas, North and South Gondar zones, 2007

Data collection

A structured questionnaire with closed and open ended questions was used to collect the quantitative data. A questionnaire which encompassed 7 different sections was first prepared in English and then translated into the local language, Amharic. The first section of the questionnaire was about the socio-economic and demographic characteristics of the households and individual responding subjects. The second section was all about the population problem (pressure) now and after ten years. The third and fourth sections dealt with the history of marriage, sexual activity, pregnancy and fertility preferences of the woman. The fifth and sixth ones were about contraception and the health services the woman received before, during and after the delivery of her last child in the past five years, respectively. The last section was about the harmful traditional practice of female circumcision.

Some of the data collectors

Data collectors struggling with dogs in Fogera woreda (South Gondar)

One of the farmers who served as a guide was bitten by a dog and his jacket was torn.

The whole questionnaire was tested prior to collecting the actual data in order to standardize the flow and content of the questions. Accordingly, amendments were made depending on the results of the pre-test that was conducted in the nearby similar areas. Data collection was carried out by twenty health professionals (health officers, nurses and environmental health technicians) who were given a three-day intensive training with practical exercises. Five health officers/sanitarians were assigned to supervise the data collection process and the overall coordination was handled by the investigators of the research project. To facilitate the process of data collection, a manual containing a detailed description of the questions and other administrative issues was used. This same manual was used during the training of data collectors and supervisors.

Data analysis

Data entry into the computer was carried out using the Statistical Package for Social Sciences (SPSS) for Windows version 15. Data analysis was also undertaken using the same statistical package. The various statistical and demographic techniques such as, multivariate logistic regression (unconditional) and the Bongaarts model (details given below) were applied to analyze the given data and to estimate the required fertility rates and proximate determinants of fertility depending on the specific nature of the variables under consideration.

Efforts were also made to assess whether the necessary assumptions for the application of multiple logistic regression were fulfilled. In this regard, the Hosmer and Lemeshow's goodness-of-fit test was 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. In all situations, results were presented in the form of tables, graphs and texts (descriptions).

Determinants of Fertility: Factors influencing fertility can be classified into two groups, namely intermediate fertility variables (proximate determinants of

fertility) and socio-economic variables. Studies of the causes of fertility levels and their changes often seek to measure directly the impact of socioeconomic factors on fertility. Such procedures have a broad appeal to policymakers, offering as they do to pinpoint mechanisms susceptible to manipulation by official policy. However, substantial insights can be gained if, in addition to the socioeconomic factors influencing fertility, the specific mechanisms through which these factors operate are identified (93, 108).

Several models have been developed in the past decades to describe a population's fertility transition. Economists argued that fertility motivation is influenced primarily by changes in the actual or perceived economic costs and benefits of children. Their framework approaches fertility behaviour in terms of household resources and cost of desired goods as competing with desired and actual number of children (18, 109). Others emphasize the institutional and normative aspects of fertility behaviour. They maintain that fertility reflects a more complex set of individual and social interaction in which decisions concerning reproduction are subject to the social constraints regulating reproduction on top of individual preferences for children (18, 109).

The term intermediate fertility variable was first introduced in the mid-1950s by Kingsley Davis and Judith Blake. They proposed a set of 11 intermediate fertility variables (a set of biological and behavioral factors) through which social, economic and cultural conditions can affect fertility. They systematically grouped the eleven fertility variables into three: factors affecting exposure to intercourse; factors affecting exposure to conception; and factors affecting gestation and successful parturition (108, 110).

Although the Davis and Blake framework for analyzing the determinants of fertility has found wide acceptance, it has proven difficult to incorporate into quantitative reproductive models. Moreover, the set of intermediate variables identified by Davis and Blake does not include breastfeeding, which is now

recognized as a principal source of variation in fertility among societies. Model builders now use a set of intermediate fertility variables that is different from, but closely related to, the Davis and Blake set. Among such models the one developed by John Bongaarts (1978) has got a wide acceptance and it is this conceptual framework that is used in the present analysis relating to the estimation of total fertility rates and indices of proximate determinants of fertility (108 -110) (Paper I).

In view of that, Bongaarts (1978) reclassified the list of determinants into seven variables, including marriage pattern, contraceptive use, induced abortion, lactation infecundability, spontaneous abortion, frequency of coitus and sterility. However, after various studies, Bongaarts realized that some of these factors are more relevant than others in determining the magnitude of fertility change. In fact, only four of them (proportion married, contraceptive use and effectiveness, induced abortion and postpartum infecundability) are the most important in explaining fertility variation, accounting for up to 96% of fertility change in some populations. The fertility-inhibiting effects of the most important determinants are quantified in Bongaarts model by four indices, each of which assuming a value between 0 and 1 (108).

Accordingly, the four indices (marriage, contraception, postpartum infecundability and induced abortion) useful for the application of the Bongaarts model were emphasized in this study. The Bongaarts' model expresses the impact of each of the four proximate variables in terms of the extent to which it reduces overall fertility (108, 109). As might be expected, the index of induced abortion was not estimated mainly because of data limitation.

The Bongaarts' model for predicting the total fertility rate (TFR) is given by the following equation:

$TFR = TF \times C_m \times C_c \times C_a \times C_i$, Where:

TF is the level of fertility in the absence of all proximate determinants. In this study the value of TF was taken as 15.3 as suggested by Bongaarts.

C_m = index of marriage

C_c = index of contraception

C_a = index of induced abortion

C_i = index of postpartum infecundability

These indices were estimated using the following equations (108, 110):

I) $C_m = \frac{\sum m(a)g(a)}{\sum g(a)}$

Where m(a) = age-specific proportions of women currently married; g(a) = age-specific marital fertility rate

II) $C_c = 1 - 1.08ue$

Where, u = the average proportion of married women currently using contraception; e = the average contraceptive effectiveness; and 1.08 is the sterility correction factor. In this study, 0.85 was used as the average contraceptive effectiveness as recommended by Bongaarts for developing nations (108, 109).

III) $C_i = 20 / (18.5+i)$, where, i = the mean duration of postpartum infecundability measured in months. According to Bongaarts, without lactation, a typical average birth interval is estimated at 20 months, and with lactation it equals the average total duration of the infecundable period plus 18.5 months (108)

IV) Because of lack of reliable data for induced abortion, no attempt was made to estimate the index of abortion. The difficulty of getting such data was reported by Bongaarts himself and many other researchers (109, 110). As deliberate abortion is uncommon in the rural areas of the two Gondar zones, the absence of this index from the model could not substantially affect the overall estimates.

When the index is close to 1, the proximate determinant will have a negligible inhibiting effect on fertility, whereas, when it takes a value very close to 0, it will have a large inhibiting effect (108, 110). That is, the complement of the index tells us the reducing effect of the level of fertility.

Data quality assurance

Various appropriate measures were taken to ensure the quality of the quantitative data collected from the proposed study areas. In this regard, the following points were given high emphasis.

♣ The data collection tools (questionnaire) were prepared by taking account of the culture, language , etc. of the study populations.
♣ The data collection tools were pre-tested and standardized.

♣ A training and data collection manual was prepared and was given to each of the data collector and supervisor.
♣ Operational definition of certain terms and variables were given as required.

♣ The data collectors were given a three-day intensive training on how to collect the required data. Practical exercises were also given as part of the training.

♣ The supervisors randomly selected 5% of the already surveyed households and re-interviewing took place. Whenever errors were found, corrections were made on the spot. As the process of cross-checking continued, no errors associated with the collected data were found. This cross-checking mechanism was intended to ensure the validity of the collected data. In fact, the data collectors were repeatedly informed at the time of training that there would be a strict supervision during data collection. Moreover, they were told about the cross-checking that would be undertaken on randomly selected households during the period of data collection.

♣ In general, the strong procedures employed during the recruitment of data collectors and supervisors which were followed by a three day intensive training together with the strict supervision which included a cross-checking mechanism at the time of data collection were some of the guiding principles adhered to ensure the reliability and validity of the collected data.

3.2 Qualitative study

The qualitative study (i.e., focus group discussions and in-depth interviews) was not a separate one but a part of the cross-sectional survey that aimed at substantiating and complementing the main quantitative study. In this regard, the necessary preparations were made during the design stage to undertake a qualitative study that would include other social groups such as, married men and experts working in the area of population affairs and family planning. The justification behind such an additional arrangement was to get a complete and comprehensive picture of the intended objectives. In fact, the need for the undertaking of a qualitative study became evident as a result of the emergence of new phenomena requiring further inquiry into some of the issues which were not captured by the quantitative research methods.

Accordingly, this part of the study included five focus group discussions and ten key informant interviews. The selection of participants and the formation of the focus group discussions were facilitated by the community leaders of the respective *kebeles* (*woredas*) under consideration. Three *woredas*, Dembia and Dabat in north Gondar and Fogera in south Gondar were identified for the conduct of the five focus group discussions. Some of the key informant interviews were also undertaken in these *woredas*.

Focus group discussion with married men (farmers)

Married men and religious leaders (Orthodox Christians and Muslims) were the participants of the focus group discussions. Residence, sex, marital status, and religion were the main criteria used in the formation of the different groups. Among the ten key informant interviews, four of them consisted of issues relating to both family planning and population pressure. The other four key informant interviews focusing on family planning were made with health workers and

experts working in zonal and regional health departments. The remaining two key informant interviews which were devoted to exploring the roles played by some government organizations regarding population related activities were carried out with experts in North Gondar Education Department and Department of Population Affairs (Bureau of Finance and Economic development) in the center of the Amhara region (Bahir Dar).

During the focus group discussions and key informant interviews, the following major areas were considered: The perception of the focus group discussants and key informant interviewees on the population pressure of their respective areas, the maximum number of children that couples should have, the position to be taken by religious leaders and married men if the government passes a law regarding the maximum number of children that couples should have in their entire life time, the attitudes of husbands and religious leaders towards the use of contraceptives, barriers of contraceptive use, preference of sex of first child and wife beating. The focus group discussions and key informant interviews were supported by flexible guidelines (checklist).

The process of data collection continued until more or less saturation or redundancy was reached. This actually took a number of cycles of inquiry based on the leads that were generated during the discussions and interviews. Most of the discussions and interviews were recorded on tape. After the collection of the required data with a tape recorder and by taking notes, the task of transcribing was performed in Amharic and later was translated into English.

Sampling

In this qualitative study, in order to understand the lived experiences and attitudes of different social groups, a number of sampling methods which complement each other were used. In this regard, the sampling methods used were: homogeneous sampling (for the selection of the FGD participants), deviant sampling (for the selection of extreme cases in order to highlight and understand

characteristics of more typical situations – health workers at lower and higher levels, ordinary religious fathers and scholars at the regional level) and intensity sampling (experts rich in population related information and reproductive health). As expected, information representative of the range of experiences and attitudes relevant to the set research questions was collected.

Data analysis

The five principles that guide qualitative data analysis were strictly followed. These principles could be briefly stated as (111):

- People differ in their experiences and understandings of reality
- A social phenomenon cannot be understood outside its own context
- Theory both guides qualitative research and results from it
- Exceptional cases may yield insight into a problem or new leads for further inquiry
- Understanding of human behavior emerges slowly and nonlinearly

Accordingly, the analysis began as data were collected and preliminary working hypotheses were generated. This led to more focused data collection activities. The main data analysis took place immediately following the completion of each interview. In this regard, the usual principles that guide qualitative analysis were taken into account and a sequence of interrelated steps (reading, coding, displaying, data reduction and interpreting) were employed while analyzing the data (111). In short, as can be noted from the above explanations, the procedure that was used to process the raw data for the purposes of classification, summarization and tabulation was thematic analysis. The basic idea here was to identify the extracts of data that were informative in some way and to sort out the important messages hidden in the mass of each key informant interview and focus group discussion.

The key statements, ideas, and attitudes expressed by the participants were listed for each topic. This was done using the participants own words.

Categorization of statements for each topic was undertaken and a sort of comparison of responses of different subgroups was carried out. The most useful quotations that emerged from the focus group discussions and key informant interviews were selected to illustrate the main ideas.

Trustworthiness

In order to enhance the credibility of the data, the technique of triangulation which took place in data sources and data collection methods was used (111, 112). Triangulation in data sources entailed collecting data from married men, religious leaders (both Orthodox Christians and Muslims), health workers and experts in different disciplines. Triangulation in data collection methods included the combination of in-depth interviews with focus group discussions. The quantitative research method employed earlier in the same study areas could also be taken as the other important method of ensuring triangulation.

3.3 Ethical considerations

Ethical clearance was obtained from the School of Public Health and the Faculty of Medicine of Addis Ababa University. Written consent was obtained from the responsible Zone and *Woreda* government organizations by explaining the objectives of the study. Verbal consent was obtained from each study subject included in the study. The participant who was included in the study was given enough information in order to make an informed decision. The possible benefits of the study and the right to withdraw at any time were communicated to the study subjects. Each piece of information that was given by every responding subject was strictly confidential. A statement that addressed this issue was shown on the first page of each questionnaire. It was only when the respondent gave his/her verbal consent that the interviews or discussions took place. In fact, there was no individual subject who refused to participate in the study after getting the necessary information about the purposes of the investigation.

4. RESULTS

4.1 Demographic and socio-economic characteristics

A total of 3512 women (response rate, 99%) responded to the questionnaire on fertility and family planning. This study which consisted of women aged 15 to 49 showed that most of them were devoid of modern education. The lack of modern education was progressively higher as we move from the big towns to the typical rural areas. In the big towns the number of women with no modern education was 259 (34.3%) followed by 191 (39.9%) in small towns and 1950 (85.6%) in rural areas. In general, slightly over 68% of the entire women population was unable to read and write and about the same percentage of women were observed to be housewives. The number of families whose monthly household expenditure fell below Birr 320 (the minimum monthly salary given to civil servants by the Ethiopian government) was about 30% in each of the big and small towns while it was over 40% in rural areas. Nearly half of the rural population was also observed to be residing in houses with corrugated iron roofs. About 53% of the rural people used to get drinking water from unprotected sources and over 70% either didn't have modern toilet facilities or didn't use them. It was also noted that about 7% of the typical rural households did not own any farmland. On the other hand, nearly 99% of the urban dwellers (both big and small towns) reported that they fetch drinking water from protected sources (pipe and protected spring/well). However, 10.3% of them claimed that they had to spend over 30 minutes to fetch drinking water. The situation in rural areas was reported to be worse than the towns as nearly two-thirds of the households had to spend more than 30 minutes to bring their drinking water from any sources. Over one-tenth and about a third of the households in big and small towns, respectively, didn't have toilet facilities. In this regard, over 53% of the rural and urban households (all surveyed households) either didn't have toilet facilities or didn't use them. It was also learned that only 1 out of 8 of the households of small towns had farmland (Tables 2 and 3).

Table 2: The socio-demographic characteristics of the study subjects, North and South Gondar zones, Northwest Ethiopia, 2007

Characteristics	Big towns		Small towns		Rural areas		Total	
	frequency (n = 756)	%	frequency (n = 479)	%	frequency (n = 2277)	%	frequency (n = 3512)	%
Age (years)								
15 – 19	115	15.2	87	18.2	285	12.5	487	13.9
20 – 24	168	22.2	83	17.3	350	15.4	601	17.1
25 – 29	189	25.0	94	19.6	475	20.9	758	21.6
30 – 34	99	13.1	72	15.0	435	19.1	606	17.2
35 – 39	95	12.6	75	15.7	381	16.7	551	15.7
40 – 44	51	6.7	41	8.6	217	9.5	309	8.8
45 – 49	39	5.2	27	5.6	134	5.9	200	5.7
Educational status								
No education	259	34.3	191	39.9	1950	85.6	2400	68.3
Primary	207	27.4	145	30.3	279	12.3	631	18.0
Secondary and above	290	38.3	143	29.8	48	2.1	481	13.7
Occupation								
Farmer (subsistence)	0	0.0	4	0.8	257	11.3	261	7.4
Trade (sales-service)	64	8.5	36	7.5	17	0.8	117	3.3
Civil servant	74	9.8	24	5.0	6	0.3	104	3.0
housewife	380	50.3	261	54.5	1776	78.0	2417	68.8
Student	90	11.9	70	14.6	117	5.1	277	7.9
Daily laborer	63	8.3	17	3.6	20	0.9	100	2.8
Commercial sex worker	13	1.7	23	4.8	26	1.1	62	1.8
Jobless	61	8.1	29	6.1	46	2.0	136	3.9
Other	11	1.4	15	3.1	12	0.5	38	1.1
Marital status								
Never married	136	18.0	76	15.9	146	6.4	358	10.2
Married	461	61.0	310	64.7	1875	82.4	2646	75.3
Divorced	108	14.3	60	12.5	162	7.1	330	9.4
Widowed	41	5.4	30	6.3	82	3.6	153	4.4
Separated	10	1.3	3	0.6	12	0.5	25	0.7
Religion								
Orthodox Christian	677	89.6	385	80.4	2217	97.4	3279	93.4
Muslim	72	9.5	93	19.4	57	2.5	222	6.3
Protestant	4	0.5	1	0.2	1	0.0	6	0.2
Other	3	0.4	0	0.0	2	0.0	5	0.1
Ethnic group								
Amhara	722	95.5	462	96.5	2216	97.3	3400	96.8
Tigrai	27	3.6	15	3.1	7	0.3	49	1.4
Oromo	5	0.6	0	0.0	2	0.1	7	0.2
Agaw	0	0.0	2	0.4	34	1.5	36	1.0
Gumuz	0	0.0	0	0.0	18	0.8	18	0.5
Other	2	0.3	0	0.0	0	0.0	2	0.1

Table 3: The socio-economic characteristics of the households from which the study subjects had come from distributed by type of living place (big towns/small towns/rural villages), North and South Gondar zones, Northwest Ethiopia, 2007

Characteristics	Big towns (n = 659)		Small towns (n = 422)		Rural areas (n=2097)		Total (n=3178)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Monthly expenditure of the household								
≤ 320	189	28.7	122	28.9	901	43.0	1212	38.1
321 – 500	209	31.7	156	37.0	663	31.6	1028	32.3
501 – 999	182	27.6	110	26.1	425	20.3	717	22.6
≥ 1000	79	12.0	34	8.0	108	5.1	221	7.0
Type of roof								
Grass/bamboo	8	1.2	28	6.6	1072	51.1	1108	34.9
Corrugated iron	646	98.0	393	93.1	1020	48.7	2059	64.8
Other	5	0.8	1	0.2	5	0.2	11	0.3
Source of drinking water								
Pipe	609	92.4	394	93.4	527	25.1	1530	48.1
Protected spring/well	43	6.5	23	5.4	459	21.9	525	16.5
Unprotected spring/well	7	1.1	3	0.7	514	24.5	524	16.5
River water	0	0.0	2	0.5	597	28.5	599	18.9
Time taken to fetch water (round trip)								
Less than 15 minutes	543	82.4	295	69.9	355	16.9	1193	37.5
15 - <30 minutes	59	8.9	73	17.3	370	17.6	502	15.8
30 – 59 minutes	38	5.8	42	10.0	675	32.2	755	23.8
60+ minutes	19	2.9	12	2.8	697	33.2	728	22.9
Availability of toilet facilities								
Yes and use it	584	88.6	289	68.5	602	28.7	1475	46.4
Yes, but don't use it	0	0.0	6	1.4	170	8.1	176	5.5
No	75	11.4	127	30.1	1325	63.2	1527	48.1
Availability of radio in the HH								
Yes, functional	536	81.3	315	74.6	543	25.9	1394	43.9
Yes, but non-functional	40	6.1	24	5.7	265	12.6	329	10.3
No	83	12.6	83	19.7	1289	61.5	1455	45.8
Availability of farm land	17	2.6	52	12.3	1960	93.5	2029	63.8
Yes	642	97.4	370	87.7	137	6.5	1149	36.2
No								

4.2. Estimation of the total fertility rates and proximate determinants of fertility: An application of the Bongaarts' model (Paper I)

The total fertility rates of the rural areas for the 3-year period preceding the survey on the women population were observed to be over two times greater than the two big towns of Gondar and Debre Tabour combined. It was learned that there had been a substantial decrease in the mean number of children in the last 30 years among the women of the urban centers of the two Gondar zones (from 5 to 3.5 children/woman). That is, the mean number of children ever born to older women residing in towns who are nearing the end of their reproductive period (women aged 45 to 49 years) which is indicator of average completed fertility was computed as 5. When this average completed fertility is compared with the current fertility, it was noted that fertility had fallen by about 1.5 children per woman during the past three decades, from 5 children per woman to 3.5. However, such noticeable reductions were not observed in the typical rural areas of the two zones during the same time period of the past 3 decades (from 7 to 6.3 children per woman).

The analysis performed to quantify the contribution of each of the proximate determinants of fertility showed that the fertility–inhibiting effect of the postpartum infecundability resulting from prolonged breastfeeding was by far the most important proximate determinant in the rural areas of the two Gondar zones. However, this was not true in the urban centers where the index of contraception played the leading role in inhibiting fertility.

Measures of current fertility are presented in Table 4 and Figure 3 for the 3-year period preceding the survey. Table 4 shows the total fertility rates and the Indices for proximate determinants of fertility while Figure 3 indicates the age specific fertility rates by rural-urban residence.

Fertility begins at early age and increases to a peak of 241 births per 1,000 among women aged 25 to 29 years and declines thereafter. Although the pattern of fertility across each age group in all urban and rural areas is similar, one could easily take notice of the fact that the ASFRs are much higher in the rural areas than the urban dwelling centers. The total fertility rate of the rural areas was computed as 6.3 while that of the zonal towns (Gondar and Debre Tabour) was 2.9. When all towns were combined irrespective of their status (either zonal or woreda centers), a TFR of 3.5 was obtained.

Table 4: Indices for proximate determinants of fertility, North and South Gondar zones, Northwest Ethiopia, 2007

Index / Measure	North and South Gondar zones	Gondar and Debre Tabour towns	All towns	Rural areas
C_m	0.83	0.72	0.75	0.88
C_c	0.75	0.53	0.56	0.83
C_i	0.55	0.59	0.58	0.54
Predicted TFR[1]	5.24	3.44	3.73	6.03
Observed TFR[2]	5.34	2.93	3.52	6.31

[1] Predicted by Bongaarts formula
[2] Estimated using births in the last 3 years preceding the survey.

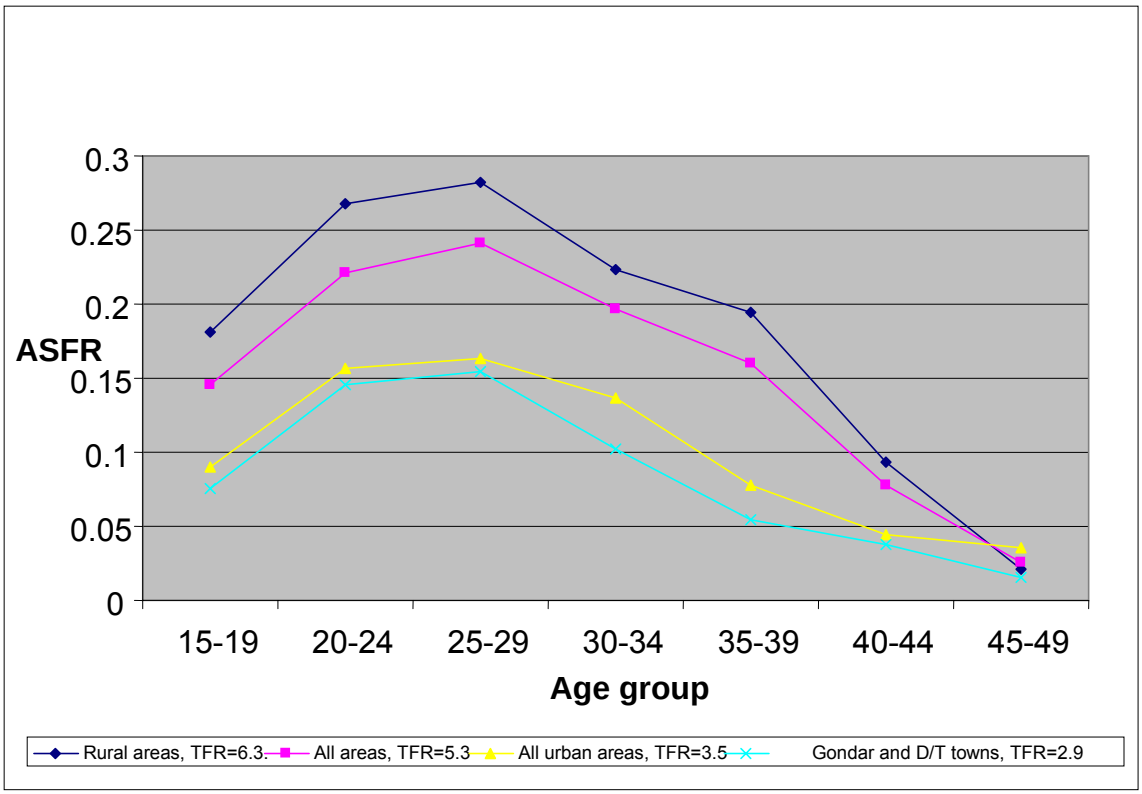

Figure 3: Age specific fertility rates (ASFRs) by rural-urban residence, North and South Gondar zones, 2007

Note: The age – specific fertility rates were calculated by dividing the number of live births to women in a specific age group by the number of woman-years lived in that age group.

4.3. Identification of factors influencing fertility (Paper II)

The examination of factors which had a bearing on the fertility status of women aged 25 and above started with a long list of covariates identified at the initial stage of the study. During the exploratory phase, several bivariate analyses were performed to investigate the association of each factor (covariate) with the outcome variable (high vs. low fertile groups). In this regard, among the initially identified 25 variables, each of the four variables (religion, ethnic group, treatment seeking behavior when a family member gets sick and the observation of the respondent towards population increase within her dwelling area) did not show a significant association with the level of fertility at an α - value of 0.3.

Therefore, these variables were excluded from being considered in the subsequent analysis.

The 21 variables that fulfilled the 1st minimum requirement for the subsequent analysis were entered into the multivariate logistic regression model and only nine of them turned out to be significantly and independently associated with the outcome variable at a 0.05 level of significance. In this multivariate analysis, both the backward and forward stepwise regression methods ended up with the same number and type of variables that had some kind of significant influence (positive or negative) on the fertility level of women. Accordingly, place of residence, educational status, current marital status, age at 1st marriage, history of child death and monthly household expenditure were among the covariates that showed significant associations with fertility status of women in the two Gondar zones. Most of the cultural, social and economic-related variables including availability of radio in the household, source of drinking water, decision on own health care, preference of sex of first child and occupation of the responding woman showed significant associations with the level of fertility in the bivariate analyses could not persist in maintaining such associations in the multivariate analysis at a 0.05 level of significance.

Current use of contraceptives which showed a significant association with the fertility level of women in the bivariate analysis (P=0.04) turned out to be marginally significant (P=0.08) in the multivariate analysis. In fact, the computed contraceptive prevalence rates of high and low fertility groups were very close to each other (22% vs. 25%). On the other hand, the attitude of women towards future use of contraceptives remained to be significantly associated with the outcome variable after controlling for many other socio-economic variables (P=0.03).

In this study it was learned that the educational status of women had an overall significant effect on the number of children that women would have in their life time (P = 0.002). However, it was only women with a high school or above education that had a significant negative impact on high fertility compared with those without modern education (OR=0.37, 95% CI: 0.21, 0.64). On the other hand, those women with a primary education didn't show a significant difference from those with no formal education (OR=0.92, 95% CI: 0.67, 1.27).

Interviewers collecting data from rural women

Table 5: Results from the multivariate analysis - adjusted for demographic, socio-economic and reproductive variables, North and south Gondar zones, Northwest Ethiopia, 2007

Explanatory variable	Fertility level		OR (adjusted)	95% C. I.		P-value
	High	Low		Lower	Upper	
Place of residence						< 0.001*
Big towns	84	389	1.00			
Small towns	79	230	1.27	0.86	1.90	0.235
Rural areas	848	794	2.79	2.01	3.87	< 0.001
Age at first marriage						< 0.001*
< 15 years	635	553	1.00			
15 – 19 years	353	638	0.65	0.53	0.80	< 0.001
20 and above	23	200	0.21	0.13	0.36	< 0.001
Current marital status						
Married	889	1088	1.62	1.20	2.19	0.002
Others	122	325	1.00			
Educational level						0.002
No education	884	989	1.00			
Primary	104	214	0.92	0.67	1.27	0.613
Secondary and above	23	210	0.37	0.21	0.64	< 0.001
Monthly household expenditure						< 0.001*
≤ 320 Eth Birr	256	556	1.00			
321 – 500 Eth Birr	309	487	1.48	1.16	1.88	0.001
501 – 999 Eth Birr	327	292	3.39	2.60	4.43	< 0.001
≥ 1000 Eth Birr	119	78	6.97	4.54	10.71	< 0.001
Number of children who have died						< 0.001*
none	513	1235	1.00			
1-2 children	382	166	4.31	3.42	5.42	< 0.001
3 and above children	116	12	19.87	10.45	37.77	< 0.001
Knowledge of the respondent regarding the period of pregnancy						
Correct	92	274	1.00			
Wrong	919	1139	1.42	1.04	1.93	0.027
Attitude towards using contraceptives in the future						
Yes	552	860	1.00			
No	459	553	1.26	1.02	1.55	0.030
Total number of children born alive from the mother of the respondent						< 0.001*
1 – 4 children	150	321	1.00			
5 – 9 children	650	929	1.27	0.97	1.64	0.079
10 and above	211	162	2.16	1.55	3.03	< 0.001

* For variables having more than two categories, the overall significance is given by their corresponding P-values

N.B. The combined contribution of the rest 12 variables was very minimal (LRT = 19.67, (df=20), P >> 0.20). This justifies the dropping of these variables so as to have a more parsimonious model that works just as the full model.

4.4. Perception of different social groups towards rapid population growth (paper III)

Ninety one percent of the women (3195 out of 3512) were well aware of the population pressure and gave their recommendations to do something in order to keep the population from growing too fast. In fact, out of ten women, nine of them suggested the use of modern birth control methods as a remedial measure to the ever increasing population growth. This was true in all areas of the two Gondar zones with of course a slight increase in the urban centers than the rural ones.

The overwhelming majority of the responding women (92%) reported that they were in favor of the passage of a law regarding the maximum number of children that a couple should have in the entire life time. The percentage of respondents approving the passage of such a law by the Ethiopian government was about the same across the different dwelling areas. However, the maximum number of children suggested was different among the three different sites. For example, only 20.5% of the rural women approved 3 or less children while the percentages of women from the small and big towns were 44.3% and 56.7%, respectively.

The qualitative study undertaken to complement the quantitative study came up with findings that clearly indicated the stresses and strains of the population as a result of excessive population growth which was not compatible with the economic development of the two Gondar zones.

All farmers (married men) and religious leaders (Orthodox Christians and Muslims) who participated in the focus group discussions and key informant interviews expressed their lived experiences regarding the population pressure and the associated problems. Most of the participants were in favor of 3 children and nearly all of them except the Muslim religious leaders gave their approval for the passage of a law by the government regarding the maximum number of children that a couple should have in the entire life time. Even the Muslim

religious leaders showed willingness to accept the passage of such a law if it is approved by the Federal Islamic Affairs Supreme Council. On the other hand, nearly all of the participants irrespective of their religion approved the use of contraception to control the rapid population growth.

Focus group discussion with religious leaders (priests)

It was also surprising to note that all Muslim religious leaders who participated in the focus group discussions were in favor of female children unlike the Christians. One interesting expression taken from the discussion was: "I have both male and female children. If there were any possibilities, I would change two of my male children with one female child of another family." This statement was forwarded by a Muslim religious leader aged 55 years.

Focus group discussion with religious leaders (Moslems)

Efforts were also made to investigate the lived experiences of experts, such as, the ones working in the Department of Population Affairs (Amhara National Regional State Bureau of Finance and Economic Development) regarding the population-related activities that are being carried out by the different sector organizations. The interviews undertaken with such experts went a bit further and tried to dig out whether they had come across the existing understandings and attitudes of the different social groups (women, men and religious leaders). As a result, it was learned from the responses of the experts that much emphasis is required from the various stakeholders including the regional government in order to tackle the population problem. It was also repeatedly reported that the population of the Amhara region is increasing on the average by half a million every year. In the Amhara region, quite a substantial amount of population-related work is carried out by external assistance. The Organizational structure relating to Population Affairs functioning in the region, zones, and *Woredas* was also reported not to be in line with the set programs documented in the 1993 Population Policy of the country.

Table 6: Respondents' opinion regarding the control of rapid population growth, North and South Gondar zones, Northwest Ethiopia, 2007

Variable (proposed measures)	Big towns		Small towns		Rural areas		Total	
	frequency (n = 756)	%	frequency (n = 479)	%	frequency (n = 2277)	%	frequency (n = 3512)	%
Which do you think would be better for the population of a country in the next ten years?								
Gradually increasing	12	1.6	14	2.9	68	3.0	94	2.7
The same number of people as now	57	7.5	53	11.1	262	11.5	372	10.6
Rapidly decreasing	139	18.4	81	16.9	426	18.7	646	18.4
Gradually decreasing	548	72.5	331	69.1	1521	66.8	2400	68.3
Do you think something should be done to keep the number of people from growing too fast?								
Yes	728	96.3	448	93.5	2019	88.7	3195	91.0
No	28	3.7	31	6.5	258	11.3	317	9.0
If yes, what do you think should be done? (n=3195)								
Use of birth control	687	94.4	415	92.6	1846	91.4	2948	92.3
Teaching the people/schooling	35	4.8	21	4.7	95	4.7	151	4.7
stopping rapid(frequent) births	5	0.7	5	1.1	20	1.0	30	0.9
Others	1	0.1	7	1.6	58	2.9	66	2.1
The government should pass a law regarding the maximum number of children that a couple should have								
Approve	690	91.3	441	92.1	2101	92.3	3232	92.0
Disapprove	66	8.7	38	7.9	176	7.7	280	8.0
If the respondent approves, what is the maximum number of children that a couple should have? (n=3232)								
1 - 2	227	32.9	110	25.0	123	5.9	460	14.2
3 - 4	442	64.1	292	66.2	1246	59.3	1980	61.3
≥ 5	21	3.0	39	8.8	732	34.8	792	24.5

4.5 Family planning and factors influencing the use of contraceptives among married women (Paper IV)

Almost all women (99.9%) included in the study reported that they had heard of one or more methods of family planning. However, the current contraceptive prevalence rate among married women was 27.3%. Regarding the attitudes of the responding women towards using contraception in the future, about two-thirds of them (2247 out of 3512) reported that they would use their preferred methods (mostly injectables). Slightly over a third of the women who had experience of sexual intercourse reported that they had ever used modern family planning methods. On the other hand, only 3.1% of the entire women population was aware of the presence of emergency contraception.

The multivariate logistic regression analysis which was employed to examine the influence of a number of independent variables showed that only 6 of the 15 covariates entered into the model were significantly and independently associated with the outcome variable (use or non-use of contraception among married women). In this regard, discussion between the two partners about family planning, educational status of the women, possession of functional radio, number of living children of the women, desired number of children and age of the responding women were the most important contributing factors that influenced women in their use of modern methods. Except age of women and desired number of children that showed a negative association, the other covariates were observed to have a direct effect on the use of contraceptives. In particular, it was interesting to note that, those women who discussed occasionally and always with their husbands/partners about family planning were about 5 (OR=4.97, 95%CI: 3.86, 6.39) and 9 (OR=9.12, 95%CI: 6.68, 12.46) times, respectively, more likely to use contraceptives compared with women who never had such a discussion. As the educational status of women increased, there was a corresponding increase in the use of contraceptive methods. Women who had a primary education were about 1.4 times more likely to use contraceptives than those women with no modern education (OR=1.38, 95%CI:

1.04, 1.82). Similarly, women who had at least a high school education were nearly two times more likely to use contraceptives when compared with the same reference category of women with no modern education (OR=1.87, 95%CI: 1.33, 2.62).

On the other hand, it was surprising to note that, as the desired (preferred) number of children increased, there was a decreasing trend in the use of modern methods (P = 0.003). A similar pattern was also observed with age although the rate of decrease (2%) in the use of contraceptives was very small as a result of a unit increase in the age of women.

Thirty eight percent of currently married women had an unmet need for family planning, with 23% having an unmet need for spacing and 15% having an unmet need for limiting. The unmet need for family planning was much higher in rural areas (44%) than in big (21%) and small (26%) towns.

According to the reproductive health expert working at the Regional Health Bureau in Bahir Dar, “Family planning activities are undertaken to a greater extent by donors and NGOs. They give contraceptives to the health institutions and the Amhara Development Association (ADA). The ADA distributes the methods to the needy through community based reproductive health agents (CBRHA) with some modest payment. Pathfinder International, Engender Health and ADA are the main organizations working in Amhara region”. The contribution of the regional government in this regard was reported mainly to facilitate the on-going family planning–related activities. For example, the region was reported not to have allocated funding (budget) for such activities (family planning) during the last fiscal year (July 2007-June2008).

The FGDs undertaken with married men (farmers) in the same study areas showed the support of the rural men in the use of contraceptives. The farmers were well aware of the two dominant methods (injectables and pills). However,

the strange issue they mentioned was the possibility of having twin births when a woman discontinues using injectables and pills. They mentioned seven women including the wife of the chairman of the *Kebele* who ended up with twin births when they stopped taking their hormonal methods. This phenomenon was further investigated by arranging a key informant interview with a gynecologist and by making a literature survey from the internet. In this regard, it was learned that hormonal contraceptives (such as, pills and injectables) could have some stimulating effect (for a short period of time) which may lead to twin births following the discontinuation of taking them.

Key informant interview with a religious father (Priest)

The use of contraceptives in the eyes of religious leaders (Orthodox Christians and Muslims) was also investigated by making a number of focus group discussions and key informant interviews. The findings were conflicting as there were a few religious leaders from both religions who did not support the use of modern contraceptives although they knew that the size of the population of their respective areas is increasing beyond the carrying capacity of the arable and grazing land. All participants of the FGDs and key informant interviews mentioned the two usual methods (pills and injectables). On the other hand, the majority of the religious leaders of both faiths reported that they did not have any objections in using modern contraceptives. In fact, one of the priests who participated in the focus group discussion unveiled the fact that he was actively involved in the reproductive health activities (which included family planning) of his area. Throughout the focus group discussions and key informant interviews, the religious leaders repeatedly insisted on having the approval of the higher bodies of their respective religious institutions to safely participate in the teaching of their people about the use of contraceptives.

Table 7: Practice of contraceptives among women who had experience of sexual intercourse, North and South Gondar zones, Northwest Ethiopia, 2007

Variable	Big towns		Small towns		Rural areas		Total	
	frequency (n = 644)	%	frequency (n = 416)	%	frequency (n = 2138)	%	frequency (n = 3198)	%
Ever used any of the family planning methods								
Yes	341	53.0	244	58.7	555	26.0	1140	35.6
No	303	47.0	172	41.3	1583	74.0	2058	64.4
Current use of any of the contraception methods								
Yes	259	40.2	153	36.8	361	16.9	773	24.2
No	385	59.8	263	63.2	1777	83.1	2425	75.8
If currently using, methods in use,								
Pills	65	25.1	23	15.0	24	6.6	112	14.5
Injectables	163	62.9	115	75.2	316	87.5	594	76.8
IUD	6	2.3	0	0.0	0	0.0	6	0.8
Condom	7	2.7	3	2.0	0	0.0	10	1.3
Norplants	0	0.0	10	6.5	14	3.9	24	3.1
Female VSC	14	5.4	2	1.3	5	1.4	21	2.7
Rhythm method	4	1.6	0	0.0	2	0.6	6	0.8
Number of children when first used a method to avoid pregnancy (n=773)								
0	51	19.7	21	13.7	9	2.5	81	10.5
1-2	134	51.7	88	57.5	81	22.4	303	39.2
3-4	66	25.5	35	22.9	117	32.4	218	28.2
≥ 5	8	3.1	9	5.9	154	42.7	171	22.1
For current users, who made the decision to use contraception? (n=773)								
The woman herself	62	24.0	31	20.3	53	14.7	146	18.9
The husband/ partner	5	1.9	6	3.9	27	7.5	38	4.9
Both	192	74.1	116	75.8	281	77.8	589	76.2
For current users, where did you obtain the method the last time you used?								
Public sector	221	85.3	137	89.5	356	98.6	714	92.3
Non-governmental organization or private sectors	29	11.2	16	10.5	5	1.4	50	6.5
Others sources	9	3.5	0	0.0	0	0.0	9	1.2

Table 8: Factors influencing the use of modern contraceptive methods among married women in north and south Gondar zones: Results from the multivariate analysis - adjusted for demographic and socio-economic variables, 2007

Variable/characteristics	Current contraceptive use		Odds ratio (adjusted)	95% confidence interval	P-value
	Yes n=665	No n=1771			
Educational status of the woman					0.001
No modern education	399	1445	1.00		
Primary	138	213	1.38	1.04, 1.82	0.026
Secondary and above	128	113	1.87	1.33, 2.62	<0.001
Discussion with husband/partner about family planning					<0.001
Sometimes	376	620	4.97	3.86, 6.39	<0.001
Always	191	151	9.12	6.68, 12.46	<0.001
Never	98	1000	1.00		
Number of living children					0.006
No living children	22	123	1.00		
1 - 2 children	264	590	2.43	1.41, 4.16	0.001
3 - 4 children	210	527	3.00	1.69, 5.34	<0.001
5 - 7 children	154	459	3.09	1.65, 5.79	<0.001
8 and above	15	72	2.62	1.09, 6.27	0.031
Possession of functional radio					
Yes	399	677	1.68	1.35, 2.09	<0.001
No	266	1094	1.00		
Age in years			0.98	0.962, 0.999	0.044
Desired (preferred) number of children					0.003
1 – 2 children	113	131	1.00		
3 – 4 children	387	919	0.63	0.45, 0.86	0.004
5 and above	165	721	0.53	0.37, 0.76	0.001

Hosmer and Lemeshow test, P > 0.30

4.6 Modern health services and harmful traditional practices

Over two-thirds (2182 out of 3198) of the women who had experience of sexual intercourse reported that they had at least one child in the last 5 years preceding the survey. Nearly 91% (1978 out of 2182) of these women were married while the remaining women (that is, 204 out of 2182) who accounted for slightly over 9% were either divorced or widowed or single at the time of the survey.

About 85% (495 out of 583) and 51% (819 out of 1599) of urban and rural women, respectively, who gave births in the last 5 years preceding the survey, reported that they had received ANC services (or were visited by a health worker including a traditional birth attendant) at least once during their last pregnancies. However, only 28.5% (621 out of 2182) of the deliveries were attended by either health workers or trained traditional birth attendants. In fact, this figure was dominated by the delivery service given in urban centers which was 73% (426 out of 583) while the corresponding service given in rural areas accounted for only 12.2% (195 out of 1599). A further investigation showed that the total number of deliveries attended by a professional (health worker) in the health centers constituted 11.4% (249 out of 2182). When these delivery services carried out in health centers were distributed by place of residence, 32% (185 out of 583) were for women from towns while only 4% (64 out of 1599) of rural women were attended by a health professional in such conventional health institutions. For women living in rural areas, the overwhelming majority of their deliveries in the last five years preceding the survey took place in their own homes.

Regarding female circumcision, the practice is not known among the Christian community in North Gondar. However, 37% (that is, 205 out of 554) of the under-five female children in South Gondar were circumcised. This harmful traditional health practice was mostly performed when the female child was a week old.

About 18% of the responding women of South Gondar (239 out of 1322) expressed their opinion in support of the continuation of this harmful traditional health practice.

During the focus group discussions, participating farmers from North Gondar were surprised and some of them were full of laughter when this issue was raised for discussion. On the other hand, farmers from South Gondar where the practice of female circumcision is common, described lack of the necessary knowledge as the main reason for the undertaking of such harmful practice. Some of the participants of the FGD undertaken in South Gondar reported that they personally prevented their female children from being circumcised. In this regard, a long discussion was also carried out with the Muslim religious leaders. The circumcision of females was thought as an indicator of the greatness of females. However, it was pointed out that the Koran does not force females to be circumcised. The final remark given was to abide by the instructions that would be sent by the higher body of the Council for the Affairs of Islam.

A third of married women living in big towns (33.2%, 153 out of 461), nearly 44% (136 out of 310) of the small towns and over three-fourths of the rural married women (76.1%, 1426 out of 1875) justified wife beating by their husbands when they do something wrong. This traditional practice was critically condemned by all farmers who participated in all focus group discussions. As the discussions were going on, it was observed that the practice of wife beating was common in their areas in the past. In fact, this harmful tradition is now a rare practice. In this regard, the FGD participants of Dembia district reported their experience as follows: "Beating a wife is now becoming a rare phenomenon. Even if the man tries to beat his wife, the consequences will be very bad for the husband if the wife reports the situation to the community police. Very recently, a man who has beaten his wife was caught by a community police and was sent to prison." All married men who participated in the three FGDs expressed their belief that, if the cause of the disagreement between a wife and her husband is very serious

which cannot be settled, ending the marriage by peaceful means would be preferable. Further discussions made with the Orthodox religious leaders also showed that this practice was not supported by their religion.

Moreover, the Muslim religious leaders who participated in one of the FGDs strongly condemned the practice. They said, "According to the Koran, a husband should be kind to his wife. The husband and the wife have to do everything through a joint decision."

A girl child carrying a baby in the rural area of Metema *woreda* (north Gondar)

A girl child fetching water from a distant area (South Gondar)

5. DISCUSSION

The race between population growth and economic development in sub-Saharan Africa is one of the great dramas of the modern world. High rates of population increase and slow-growing or stagnating economies throughout much of the region have thwarted modernization and development efforts (14). In particular the drama remains as emerging and intense as ever, in countries like Ethiopia where the size of the population increases by over two million people each year (14,18). This annual increase is surprisingly greater than each of the populations of four regions and one city administration of the country (41). It is to be noted that, since the undertaking of its first census in 1984 (which included Eritrea), the population of Ethiopia has increased by nearly 35 million in the last 24 years. High fertility rates and declining mortality rates have been instrumental in high growth rates of the Ethiopian population, one of the fastest growing populations in sub-Saharan Africa (113).

On the other hand, the efforts made by the government to harmonize the population growth with the country's economic development through the enhancement of economic growth and gender equity (especially by increasing female education) and recently with the expansion of family planning services are encouraging. However, there still appears a big gap between the ever increasing population growth and the economic development of the country requiring more concerted efforts to vigorously implement the population policy and more rapidly enhance access and quality of family planning services (18, 25, 26, 65). It is usually noted that rapid decline in fertility in poor countries like Ethiopia will be followed by a decline in dependency ratio and young people reaching working age will boost the labour force thereby increasing the rates of savings and investment (25, 96). This is so because a reduction in the proportion of dependent children will open a one-time window of opportunity before dependent older populations become a burden (96). In line with this, the demand for social services will be reduced thereby allowing a rebalancing of public spending on

human and physical capital. Consequently, the demographic transition which takes place along with a change in the age structure provides the country with a demographic bonus improving economic development (25, 114, 115).

This study which used both the quantitative and qualitative research methods had extensively explored the fertility experiences and the use of family planning methods in the two Gondar zones of the Amhara region. Estimation of the most important fertility rates, identifying factors influencing fertility and the use of contraception were highly emphasized. In particular, the perception of different social groups (men, women, religious leaders and experts of population and reproductive health) towards the prevailing population pressure and the actions to be taken such as, the use of contraceptives and the passage of a law regarding the maximum number of children couples should have in their entire lifetimes were thoroughly investigated.

5.1. Estimation of fertility rates

Overall, the study population experiences high fertility. Fertility rates are higher among the population of the rural areas and lowest among urban dwellers (zonal towns) of Gondar and Debre Tabour. This situation matches the overall fertility features of the country (2, 37, 109, 116).

The observed total fertility rates estimated for the two Gondar zones, rural and all urban centers were 5.3, 6.3 and 3.5, respectively. These rates were very close to the ones predicted using the Bongaarts' formula. This suggests that the proximate determinants included in the model are the principal mechanisms by which fertility is reduced below its biological maximum. However, the predicted TFR for the urban population is substantially above the observed (3.44 compared to 2.93). This difference between the model estimate and the observed value is consistent with the omission of an important proximate determinant from the model. The absence of induced abortion from the model is a likely explanation for

such overestimate of fertility (110). Overall, the total fertility rates obtained in this study were relatively higher than the ones estimated by the 2005 EDHS (37). According to the 2005 EDHS, the total fertility rate for the Amhara region was reported as 5.1 in 2005.

Measures of the current fertility (observed total fertility rates) were computed for the three-year period preceding the survey, corresponding to 2005-2007. This type of approach, apart from minimizing (controlling) seasonal fluctuations in the number of births, has the advantage of reflecting the most current information and allows the rates to be calculated on a significant number of events (37). It is to be noted that data on a three-year period preceding the given survey were collected in the 2005 EDHS to compute the total fertility rates of the country in general and the regions in particular (37).

If the present indices of marriage and postpartum infecundability remain constant in the years to come, then, the contraceptive prevalence rate among married women of the two Gondar zones should reach 76% to bring fertility down to its replacement level of 2.1 children per woman. Accordingly, there appears a need to increase the present CPR among married women by about 3 folds to acquire the above estimate. However, such estimates may not work for the very reason that postpartum infecundability prolonged by breastfeeding could not remain constant for a very long time as was the case in the urban areas.

5.2. Factors influencing fertility

As shown in the preceding section, the fertility rates as measured by the TFRs, are excessively high in the two Gondar zones. This required a detailed analysis to find out the factors contributing to the rapid population growth. It was learned from the multivariate logistic regression analysis that place of living, educational status of women, age at first marriage, history of child death and knowledge of

women about the fertile period between the menstrual cycles were amongst the significantly and independently associated variables with fertility.

As explained earlier, history of child death showed a very high association with the fertility level of women (P<0.001). This finding is consistently in agreement with the results of many studies (33, 95, 116-119). On the other hand, because of the problems associated with the living conditions in towns most women residing in urban centers are not encouraged to have many children and this finding is in agreement with earlier results documented in the country (42, 120, 121). Those women who got married in their early ages were at a higher likelihood of having too many children. This phenomenon of early marriage which exposes women to an increased fertility is a typical feature of a sub-Saharan African society including the present study areas (93, 122-124).

The educational status of women beyond the primary level (high school and above) had shown a reducing effect on the number of children that women had had in the present study areas. However, it was surprising to note that women with primary education were not significantly different from those with no formal education (OR=0.92, 95% CI: 0.67, 1.27) regarding to their fertility levels. Previous reports indicated the fact that a short period of schooling could even result in an increased number of children (125, 126).

The association between current contraceptive use and fertility level that turned out to be non-significant was further investigated. In this regard, it was found out that the contraceptive prevalence rates of the high and low fertile groups were 22% and 25%, respectively, indicating the closeness (with a small variation) of the two rates. This shows the nearly equal acceptance of modern family planning methods among women of high and low fertile groups.

On the other hand, a number of socio-demographic variables including source of drinking water were not independently and significantly associated with the level

of fertility. The non-significant association between access to safe water and fertility observed in this study is not in agreement with the reports of Gibson and Mace (127). These researchers, in their studies in Ethiopia in 2006, compared villages that were accessible and non-accessible to safe water and concluded that access to safe water had enhanced fertility (127).

Following the estimation of the most important fertility rates (which are excessively high even by African standards) and the identification of the main contributing factors, it would be logical to explore the responses of the population towards such existing realities. Accordingly, the following section gives a considerable account on the prevailing population pressure and its impact not only on the socio-economic and environmental conditions of the study areas but also on the attitudes of the population.

5.3. Perceptions of rapid population growth

Ethiopia is known unfortunately for its gloomy experience in which significant portions of its people are living under extreme poverty. The emergence of households with no farmland in the typical rural areas is indicative of the seriousness of the population pressure (rapid population growth) and its adverse effect on the local environment of the Amhara region in general and the two Gondar zones in particular. This finding is in agreement with an earlier report that indicated the average land holding per rural person as 0.21 ha in 1999, down from 0.5 ha in the 1960s (5, 25). It is to be recalled that drought-related famine and hunger had been the characteristic feature of Ethiopia over the last three and half decades and the country has been heavily dependent on external food aid each year (5, 25). This situation is partly a result of the ever increasing population pressure together with its negative socio-economic and environmental far reaching consequences.

Studies dealing with the perception of population pressure and the perceived mechanisms to tackle population-related problems are rare in Ethiopia. If there

are any, they are reports of some NGOs or government agencies (27). To speak of government's concern is easier because this requires a simple observation of policy documents and the government institutional arrangements at the national and regional levels established to deal with the problem. The government considered rapid population growth as one of the country's challenges and had adopted a population policy in 1993 to combat it (27).

The rapid population growth has negatively affected the social, economic, demographic and environmental development of the country (18, 25, 26, 29, 30, 31, 36). In particular, since the 1970's which the country has been hit/stricken by five major droughts and famine (1972/73, 1984/85, 1993/94, 1999/2000 and 2007/8), the level of public awareness about population pressure and its negative consequences, such as, environmental degradation has increased (25, 44). On the other hand, because the level of poverty is so severe, migration of people within and outside of the country has been one of the demographic responses which is the characteristic feature of contemporary Ethiopia (5). People are migrating in order to escape poverty not only to relatively peaceful countries, but also to countries where the security condition is dangerous (128). Since those who leave the country are mostly young and energetic ones, the loss of such relatively productive citizens will torment Ethiopia in the years to come. It is true that several possible reasons could be listed as the contributing factors to the present emigration. However, the driving force behind the scenes is extreme poverty that has resulted mainly from excessive rapid population growth.

In line with the population pressure, this study tried to explore the perception of both urban and rural dwellers of North and South Gondar zones. One way of looking at the attitudes of the study subjects was to ask them about their feelings of what the future holds for them in terms of land availability given the ever increasing population size of their own surroundings. Unlike the multifarious spiritual beliefs, superstitions and aspirations of the respondents that might distract them from giving the right answers based on the existing objective reality

of their areas, the majority of the responding women (over 92%) and nearly all of the other social groups who participated in the qualitative study expressed their worries about the ever increasing population growth. In most cases, their fears were backed by taking account of the relationship between population and resources (economic development) to sustain them.

It is surprising to note that the overwhelming majority of the respondents approved the passage of a law by the government regarding the maximum number of children that couples should have. The development of these attitudes in such conservative areas known for their strong cultural and religious positions is a complete reversal of the earlier belief that the population of the two Gondar zones used to practice. From such findings, it could be inferred that people of the present study areas are terribly worried about the ever increasing population pressure and would like to accept harsh measures including limiting of the number of children that would be enforced by law. It is therefore timely and necessary to explore whether similar attitudes are emerging in other parts of the country. The present position of the population of the two Gondar zones, if followed by similar results from other studies, the cumulative evidence could serve as an entry point for the government to undertake bold measures that may alleviate the prevailing population pressure (103,129). In the mean time, the on going activities such as, family planning services, which are aimed at improving the health of mothers (children) and reducing the prevailing population pressure, need to be assessed and strengthened. The following section deals with such issues relating to family planning.

5.4. Family planning and factors influencing the use of contraceptives among married women

The benefits of family planning program touch all levels – individual, family, community, national and global. Family planning enhances the quality of life by reducing infant mortality, improving maternal health, and alleviating pressures on

governments to meet social and economic needs. Access to effective contraception can be seen as a human right and as a means to enlarge women's life options. Family planning is now accepted as the first element of primary health care to be made available in countries with a weak health structure (130). The community –based distribution of contraceptives must therefore be expanded through use of pharmacies, community workers, social marketing programs, etc. (130-133). Family planning is not only good for the people who practise it; it is good for the nation. It contributes to poverty reduction; it contributes to ensuring food security. It is one of the major contributors to the achievement of the Millennium Development Goals that the Ethiopian government is trying to implement (36, 123).

Unlike many previous studies (33, 72, 82, 134), the present investigation has shown that virtually all women (99.9%) and all other individuals who participated in the study including religious leaders had heard of modern contraceptives. It is highly likely that the nearly universal coverage of knowledge on family planning methods was achieved by the deployment of the health extension workers in each rural *kebele* and the corresponding diffusion effects brought by such new endeavours. If this finding holds true for other places of contemporary Ethiopia, it could be appropriately argued that the inclusion of such "knowledge question" in any similar study would be unnecessary.

The contraceptive prevalence rate (modern) among the overall women population of the two Gondar zones was computed as 22%. The corresponding contraceptive prevalence rate (CPR) among married non-pregnant and non-sterile women was also calculated as 27.3%. Regarding the intentions of women to use contraceptives in the future, nearly two-thirds of them (2247 out of 3512) reported their approval. Overall, the current use of family planning methods and the intentions to use in the future are appreciably higher than the findings of earlier studies undertaken in the Amhara region (37, 47, 71, 82). It is to be noted that the 2005 EDHS had come up with a contraceptive prevalence rate (modern

method) of 15.7% among married women of the Amhara region (37). On the other hand, an unmet need of 38% obtained in the present study together with the relatively low level of contraceptive use is indicative of the fact that the family planning programs in this country are lagging behind. In this regard, in order to achieve fundamental changes in the demographic transition (such as, replacement level) there appears a need to increase the current CPR by nearly 3 times. It will not be too difficult to achieve the required results if there is a strong commitment and determination on the government side and other stakeholders involved in population affairs and family planning activities. A good example is the experience of the Islamic Republic of Iran which reduced its TFR by half within a relatively short period of time. The following paragraph illustrates the reality behind Iran's progress towards achieving the desired fertility rate (75).

"IRAN succeeded in halving its TFR in just eight years, from a family size of 5.2 children in 1988 to 2.6 in 1996. This was through a conscious government decision in 1987, after a census, to reduce the country's rapid population growth rate in order to aid its development. Iran's reproductive health success story occurred in part through the removal of obstacles to women choosing to control their fertility, including perceived religious obstacles through Islam, which Iran's own religious scholars issued edicts or ***fatwas*** *to refute. A second key factor was ensuring an efficient supply chain of a good range of contraceptives through a countrywide network of "health houses". Importantly, this was a voluntary "two-child" population policy, yet the rate of decrease in Iran's TFR was just as fast as that of China, whose "one-child" policy began in 1980."* According to the 2008 report of the Population Reference Bureau, the Islamic Republic of Iran has achieved a replacement level of 2.1 children per woman (8).

It is interesting to note that during the literature survey looking for the findings of similar local studies, it was learned that only one scholar had suggested a maximum of two children for Ethiopian couples in their lifetimes (129). In fact, quite a number of Ethiopians, although they did not specify the maximum number

of children, have expressed their worries in various ways regarding the problems associated with the ever increasing population size of the country (25,26,31,33,36,99).

In spite of a considerable improvement in the use of modern contraceptives in the last seven years (that is, since 2000 EDHS), the unmet need for family planning observed in the present study is still very high requiring the close attention and commitment of the regional government. Women need correct information on the different contraceptive methods and the possible side effects. They should be given the opportunity to choose the method that best matches their individual circumstances and intentions and can change methods when they need to. As can be understood from the findings of the present study, the use of long term and permanent contraceptives is very minimal. The expansion of long term and permanent contraceptive methods is unavoidable in areas where the availability of short term methods is not ensured (135). The permanent contraceptive methods (both male and female) were not known by all individuals who participated in the FGDs and key informant interviews. This needs special attention on the part of the service providers and planners working in each *woreda* administration.

The most important barriers to the use of FP were mentioned as desire for more children (particularly, among the rural women) and health problems. Due to the high number of infant and child deaths, mothers (fathers) usually desire for more children to compensate the number of children who die early in infancy and childhood (33, 37, 55,116). This requires strengthening the health service so as to build confidence on the great majority of the population thereby encouraging parents to go for a small family. Regarding the side effects, women need to be counseled on the full range of the available contraceptive methods. This requires making all types of contraceptive methods (short term, long term and permanent contraceptives) available in each facility center (hospital and health center) where the service is given. However, only a limited number of method mixes

were available as reported by a nurse working in one of the oldest health centers (Kola Diba health center, Dembia *woreda)*. On the other hand, the desire for more children is also strongly linked to the economic benefits that children give to their parents both at early age (child labor) and when the parents get old. This is a typical phenomenon in the two Gondar zones where old age pension is nearly non-existent particularly in the rural areas.

The demographic and socio-economic factors that had some kind of impact on the use of contraceptives among married women were also identified. Accordingly, by employing a multivariate logistic regression, educational status of women, discussion with partner about family planning, number of living children, possession of functional radio, age of women and the preferred number of children were found significantly and independently associated with the current use of contraception. It was interesting to note that as the number of living children increased, there appeared a corresponding increase in the use of contraceptives among married women of the study areas. However, the opposite was true with the preferred number of children. That is, as the desire (preferred) number of children increased, there was a progressive decrease in the use of contraceptives. This is in agreement with the earlier finding that non-users reported “desire for more children” as their main reason for not using contraceptives. On the other hand, as could be understood from the qualitative study, all married men and the majority of religious leaders were in favour of the use of contraceptives. Even those religious leaders who expressed their disapproval were willing to accept the use of family planning methods if it is approved by their respective higher religious bodies. This is the untapped area that needs due consideration on the part of the responsible bodies.

The reports obtained from the regional health bureau indicate that family planning activities are undertaken largely by the assistance of donors and NGOs. Many activities including the provision of supplies (contraceptives) and short term trainings on reproductive health were reported to be covered by the external

assistance. If donor funding is either falling or not keeping up with growing demand, it would be the responsibility of the regional government to mobilize resources for providing contraceptive supplies. It should be understood that increased family planning expenditures are an effective, long-term investment in human capital development and family welfare. Political leaders and policy-makers of the country in general and the Amhara region in particular need to consider family planning programs very seriously, increase their funding, and pursue more supportive policies (36, 54).

As shown repeatedly in the different sections of this thesis report, most of the rural people expressed their worries about the ever increasing population pressure in their surroundings. For the time being, they are using every means including ploughing of mountain valleys and hilly areas as a coping mechanism. However, all the available evidence suggests that the present coping mechanism will not last long. This is true mainly because of the increasing population pressure in the rural areas whose means of survival is subsistence farming and the amount of farmland per head is rather decreasing from year to year. If this condition is allowed to continue, it is highly likely that there would be mass migration to other areas inside and outside of the country. The migration of some people (mostly young ones) from the Dabat and Debark rural areas to Gondar town which has already started is a clear indicator of the situation that will take place in the years to come. It is therefore high time to take strong measures that include the use of family planning methods. As the Ethiopian Economic association rightly put it, an aggressive and efficient family planning service is an important front in the battle against poverty in Ethiopia (18). Besides, the ongoing rural development scheme needs to be intensified and strengthened. Unless and otherwise such bold measures are taken, even the external food assistance may not be in a position to avoid or reduce the ever increasing number of people in need of food assistance. It is also to be noted that external food assistance which was in place over 3 decades ago had negatively affected the working habits of

the rural community. In areas where food assistance is routinely given, most communities have developed a type of dependency syndrome.

5.5. Health services and harmful traditional practices

The examination of selected health services and harmful traditions was also considered in this study in order to substantiate the main findings of fertility and family planning discussed in the preceding sections. In this regard, ANC and delivery services and a few harmful practices (female circumcision and wife beating) were taken into account.

The proportion of women who received ANC services was very high compared to what has been documented in the country (136-138). This was partly due to the activities of the health extension workers which unfortunately could not be reported separately in this thesis report. On the other hand, although the proportion of women who received ANC services was appreciably high, it was not followed by a corresponding achievement in the rate of delivery services at health institutions. The proportion of women who delivered in the health centers and hospitals in the last 5 years preceding the survey was very small. In particular, women residing in the rural areas were the most disadvantaged groups who were obliged to stay at home to deliver their children without the assistance of health professionals. The present study showed that the number of mothers who had got delivery services at health institutions was unacceptably very low. The big gap usually observed between the number of women getting ANC and delivery services in the country has been a major concern among reproductive health experts (136-140). The possible reason could be the lack of transport to take the expecting mother (living in rural areas) to the health center where the delivery service is given. In addition to this, in most cases labor takes place suddenly without making any prior preparation on the side of the given family and this increases the risk of maternal death.

The most important mechanism to reduce maternal mortality and morbidity is by expanding and improving the quality of delivery services. However, the progress made in this respect is not satisfactory requiring the concerted efforts of the responsible bodies. The achievement of the 5th Millennium Development Goal (improve maternal health) is strongly linked to the accessibility of women to skilled care during pregnancy, childbirth and the first month after delivery. According to the reports of UNICEF, "A woman in sub-Saharan Africa has a 1 in 16 chance of dying in pregnancy or childbirth, compared to a 1 in 4000 risk in a developed country – the largest difference between poor and rich countries of any health indicator (141). It is to be noted that this Goal which is directly related to the health of mothers will be achieved if the maternal mortality ratio is reduced by two-third from what it was in 1990. However, with the absence of modern delivery services for most women living in the countryside, maternal morbidity and mortality will continue to be the greatest health hazard in Ethiopia. Sadly, the chance of dying for the newborn child who has lost his/her mother is also much higher than the one whose mother is alive.

Regarding female circumcision, although most of the participants of the present study explained their negative attitude towards this malpractice, there were quite a substantial number of under-five female children in South Gondar zone who underwent through the terrible procedure of circumcision. In North Gondar, this malpractice is unknown among the Christian community. However, as could be understood from the focus group discussion made with the Moslem religious leaders, there are indications that this harmful practice is most probably performed secretly among some of the Moslem community. A research undertaken in the same area in 2001 had revealed the presence of such harmful traditional practice among some families of the Moslem community (142). On the other hand, given the diffusion effects of the surrounding zones and the health promotion activities of the community health agents and others working in this area, it is highly probable that this harmful traditional practice will come to an end in South Gondar in the near future.

The attitudinal change observed among most men and religious leaders to the preference of a female child unlike the earlier traditions was very impressive (37, 143). However, the conflicting attitudes between women and other social groups (married men and religious fathers/leaders) regarding the earlier harmful tradition of wife beating is disappointing. It is rather embarrassing to note that there were some women who approved wife beating when she does something wrong. Contrary to the views of such women, virtually all married men and religious leaders strongly condemned the practice of wife beating.

Despite many international agreements affirming women's human rights, girls and women are still much more likely than men to be poor, malnourished and illiterate, and to have less access than men to medical care, property ownership, training and employment. They are far less likely than men to be politically active. Where women are poor, uneducated and have little participation in the wider society, family size tends to be large and the population growth rate high (144). Population and development programs are more effective when they center on improving the education, rights and status of women. It should be known that the roles that men and women play in society are not biologically determined - they are socially determined; often justified as required by culture or religion. It is therefore imperative to exert a concerted effort to ease the journey towards gender equality which gives women equal opportunity as men in the decision making process. This will ultimately lead to the harmonization of population growth with the economic development of the country thereby opening the way to the eradication of extreme poverty and hunger – the unfavorable experience that Ethiopia used to be known for the last three and half decades.

It is interesting to note that in most of the rural *Kebeles* of the Amhara region at least two policemen known as “community police” are assigned to ensure the security of the people. It seems that rural women are becoming more and more advantageous and secured as a result of such new endeavors. It is true that the

presence of community police in a typical rural area could be instrumental in safeguarding the rights of women from being violated by men. However, this needs an all round support including the enhancement of female education to a higher level. At the same time, the community police assigned in the rural localities need to be instructed so as not to aggravate the non-antagonistic contradictions that may arise in a given family. If this newly established system is not properly and carefully managed, the crisis that may arise from the breakage of marriage will negatively affect the livelihood of many families.

The data collectors had to participate in putting out fires – At the time of data collection in the rural area of Farta *woreda* (South Gondar), a house was burning to ashes . . .

5.6 Validity, generalizability and limitations of the study

Over the course of the present investigation, the necessary care was taken so as to maintain the quality of the study at the different stages of the research project. In this regard, the quality control methods instituted at the different phases of the study (data collection, data entry, etc.) coupled with the administrations of FGDs and key informant interviews ensure the validity of the findings. Although the ability to generalize all findings to other zones of the Amhara region or other zones of Ethiopia may be questioned, most of the results can be generalized to all areas of the Amhara region because of the similarities in socio-economic status as evidenced by the findings of many similar studies undertaken within the Amhara region (37, 82). By the same analogy, the findings of the present study could be of paramount importance to other regions of Ethiopia especially to those regions with similar demographic, socio-economic and climatic zones with the present study areas.

It is true that relentless efforts were made to ensure the reliability and validity of the study so as to come up with findings that would add knowledge and contribute to the development schemes of the country by alleviating the present population pressure, a problem which was felt and recognized by nearly all participants of the study. However, it would be difficult to ensure that the study was completely free of any limitations. In this regard, it was taken note of the following situations.

♦ The potential for recall bias regarding the number of children ever-born alive: In order to minimize the extent of recall bias in relation to the number of live births that a woman had, the question on children ever-born alive was asked in different ways. First the respondent was asked to indicate whether or not she had

a live birth. If the answer was affirmative, she was further asked to tell the total number of children she has ever had, the number of children currently alive and dead ones. There were also other different set of questions that dealt with the birth history of the responding woman. Finally, consistency checks were made for any irregularities and if there were any, further examination was made to clear the source of inconsistency. It was only after such investigations that the number of children ever-born alive was recorded. However, with all these efforts to get accurate data, the possibility of missing live-births could not be completely ruled out as some mothers might not be comfortable to remember and report their deceased children.

♦ Measurement of monthly household income is very difficult in developing countries particularly in rural areas. Some earlier reports indicated that the monthly income of many households was very much below what would be imagined to sustain a given family (considerably far from the known threshold of poverty line, such as Birr 30.00 for a family consisting of 5 members) (31). Therefore, in order to avoid such tendencies of under-reporting, attempts were made to get a relatively accurate data by employing proxy indicators. Accordingly, monthly household expenditure was used in place of monthly household income. This approach was used for all households with unknown monthly income (mainly in rural areas where households do not get monthly salaries). Such proxy methods have been serving as a means of getting relatively accurate information although there is still a possibility of introducing some bias.

♦ The establishment of cause and effect relationship between some of the independent variables, such as, number of children died and the level of fertility was difficult to ascertain as the quantitative study was a cross-sectional survey carried out at a specific period in time. In order to fill the information gap special mechanisms that addressed such issues were developed and incorporated in the FGDs and key informant interviews. For example, many participants in the qualitative study confirmed the fact that the fear of child death leads couples to desire for a large number of children. It is also worth noting that there are a

number of sayings in the present study areas that encourage high fertility due to the inevitability of child death. A good example is: “What would be left to me after mortality (child) and a life long health problem (mental deficiency) have taken their big shares?” This popular saying of the population (mainly the rural population) indirectly indicates that a reduction in child death could lead to a reduction in fertility. In fact, some studies have documented the desire of parents to have additional births to make up for a dead child (116). However, it is equally important to realize the fact that the presence of too many children in a given household of poverty stricken society will most probably put the whole family under a serious economic pressure. This situation ultimately increases the chance of infant and child deaths who are vulnerable groups of the given society. In this regard, research has shown that spacing and limiting (which are mechanisms of fertility control) could lead to the reduction of child and maternal mortality (117-119).

In one of the remote rural areas, the data collectors were taking lunch with the farmers.

Children swimming in Gendawuha river, Metema (North Gondar)

5.7 Challenges

While implementing a certain plan (either long or medium or short term) it is a common phenomenon to face one or more challenges. In this regard, in the efforts to harmonize population growth with the economic development by facilitating female education and enhancing the use of contraceptives together with other supporting mechanisms, the following challenges need to be dealt with caution.

I) In the struggle against rapid population growth in Ethiopia, the greatest challenge comes from some people who deny or do not like to accept the far-reaching negative consequences of uncontrolled population growth. This was reflected during the discussion with population experts at Bahar Dar as part of the qualitative study. It is to be noted that rapid population growth in poor populations could result in the unwise exploitation of local environment to meet subsistence needs for food and fuel. Cutting trees (without replacing) for fuel and other purposes has been a common practice in the Amhara region. What is more surprising is not only the destruction of trees but also the recent practice of using (pulling out) the remaining part of the tree for the same purpose (fuel and food) leaving no room for regeneration. All these sequence of undesirable events are directly linked to the prevailing rapid population growth. In line with this, evidences show that the development challenges facing sub-Saharan Africa are made greater by rapid population growth and poor reproductive health services. The population of this region is expected to keep on increasing, even after taking into account the rising deaths from AIDS (13, 145, 146). In fact, the sub-Saharan population is growing at the rate of 2.5 percent per year as compared to 1.2 percent in Latin America and Asia. At that rate, its population would double in 28 years (8, 80). In this regard, it may be of paramount importance to remember what was said by Professor Guillebaud, 'we have not so much inherited the earth from our grandparents; we have borrowed it from our grandchildren' (75).

II) Low status of women: Both religions (Christianity and Islam) tell us that mothers are highly revered and honoured. Among the Ten Commandments in the Bible, the 5th one says, *“Honor your father and mother, and, You shall love your neighbor as yourself." (Matthew 19:16-19).*

The famous sayings of The Prophet Mohammed indicating the high position that is allocated to mothers are as follows (147): *"Paradise is at the feet of mothers. The most perfect believers are the best in conduct and best of you are those who are best to their wives.”*

However, in spite of such inspiring words from both religions, women in Ethiopia are not properly treated. One can imagine the degree of violence that women experience by men in this country (148, 149). It is high time to undertake a cultural revolution in this country to reverse such anti-development positions.

III) Unavailability (shortage) of preferred methods: The unavailability (shortage) of the preferred methods has been reported as a cause for the discontinuation of using contraceptives among some clients. The ICPD’s rights-based agenda clearly stated the importance of family planning. The statement “Family planning enables individuals and couples to determine the number and spacing of their children—a recognized basic human right” shows the strong link between family planning and the right of women and men to get their preferred methods. The unmet need for effective contraception in the country in general and in the present study areas in particular is very high. However, meeting such needs would be costly and makes the country dependent on external assistance (96).

IV) The vicious cycle of poverty and health: A number of factors including rapid population growth were reported as causes of poverty in this study. Different appropriate interventions to go out of the trap have been suggested by different investigators and Organizations (75, 146, 150, 151). However, according to Satoshi Kanazawa, an evolutionary psychologist, it is because of Africa’s low IQs

that life expectancy is low and infant and maternal mortality are high in the continent. He denies the negative contributions of poverty and disease in achieving the desired development in Africa. He concluded that “low IQs are Africa’s curse”. It is very disappointing to see the score (only 63) that Ethiopia was given by his misleading evaluation. Ethiopia is only better than one country, Equatorial Guinea, which received an IQ score of 59. In this regard, according to this wrong calculation, there is no hope for Africans to enjoy the fruits of development even in the years to come (152). It is therefore high time for African countries to struggle not only against poverty and its aggravating factors, such as, rapid population growth coupled with high maternal and child mortality, but also against such racist stereotype.

V) The discrepancy of population figures between the earlier estimates and the recent census results of the Amhara region and the two Gondar zones are the agenda of current discussion among many people. The unexpected reductions observed in the census results may discourage the use of contraceptives and may negatively affect the ongoing activities of the region in this respect.

VI) The nature of the settlement pattern in the rural areas of northern Ethiopia could have contributed to the ever increasing population growth. It is to be noted that rural people in the North lead a sedentary life in which thousands of very small villages are scattered here and there. It has been a usual phenomenon to see many settlements on mountain valleys and hilly areas which used to be uninhabitable in the past. Consequently, each small settled people would be encouraged to have a large group to keep the respective village strong. The development of infrastructure necessary to change the living conditions of such communities has been negatively affected by the scattered nature of their settlements. In addition to this, the unavailability of old-age pension (particularly in rural areas) may lead men and women to have more children as an investment in the future. This is a typical feature in the present study areas where elderly people are entirely supported by their children.

6. Conclusions and recommendations

6.1 Conclusions

Both the quantitative and qualitative components of the present study have clearly shown that rapid population growth is a real problem that has threatened the livelihoods of many of the urban and rural dwellers of the two Gondar zones. In particular, the problem was much more serious in the rural areas where over 85% of the population lives. The emergence of families having no farmland in the typical rural areas was a clear sign of the ever increasing imbalance between the available farmland and the population. Even those families who owned small plots of farmland (below 0.25 ha per head in most cases) were unable to produce crops that would sustain them from one harvesting time to the other. Because the degree of the prevailing population pressure and the accompanying socio-economic and environmental problems were so severe, the overwhelming majority of the study subjects (women, men and religious leaders) expressed their willingness to accept strong measures which included passing a law limiting the maximum number of children that couples should have in their lifetimes.

Fertility in the two Gondar zones begins at early age and increases to a peak among women aged 25 to 29 years. The pattern of fertility among the urban and rural women is similar across each age group. The dependency ratio was also computed as 100%. The age structure was observed to follow a typical feature of a developing country. The total fertility rates among the rural and urban (small and big towns combined) were 6.3 and 3.5 children / woman, respectively. The crude rate of natural increase was computed as 2.7% per annum.

The mean age at first marriage in the two Gondar zones was about 14 years. The corresponding mean ages at first marriage were 13 and 16.5 years for rural and urban (big towns) women, respectively. A similar pattern was also noted

among the women of the different dwelling areas (rural, big and small towns) regarding the mean age at first sexual intercourse.

All the available evidence shows that the population of the two Gondar zones is a young one and grows very fast. With the application of the Bongaarts' model, it was learned that the fertility inhibiting effect of postpartum infecundability resulting from prolonged breastfeeding was by far the most important proximate determinant in the two Gondar zones. This traditional practice of prolonged breastfeeding, which is being eroded in towns, needs special attention not only for demographic purposes but also for the health of the child and the mother.

The analyses made to investigate the factors influencing fertility came up with findings that are compatible with the results of earlier similar studies. Educational status attained by mothers, history of child death, age of women at first marriage, living area (urban / rural) and knowledge of women on the correct period of pregnancy were amongst the factors that had a bearing on the level of fertility. On the other hand, religion and ethnicity were observed to be far from showing significant associations with the outcome variable (high vs. low fertility level). This shows that women of different ethnic and religious backgrounds have developed similar fertility experiences in their generation old coexistence in the two Gondar zones.

Virtually all women and other social groups who responded to the quantitative and qualitative studies, respectively, reported that they had knowledge about one or more contraceptive methods. However, when it comes to practice, only 22% and 27.3% of all and married women respectively, were found to be current users. The unmet needs of married women residing in the rural areas, small and big towns were 44%, 26% and 21% respectively. In general, the unmet need for family planning among married women of the two Gondar zones was 38%. These rates which are more or less in agreement with the findings of the 2005

EDHS (Amhara region) are clear indicators that warn us to work hard in the years to come (37).

Among the various factors that had some kind of impact on the use of contraceptives, educational status of women and discussion with partner about family planning were at the forefront. As the educational status attained by women increased, there was a sharp increase in the use of family planning methods. Discussion about household issues including family planning usually leads to a common understanding between the wife and the husband. This was clearly shown by the finding of the present study that a woman who frequently discussed about family planning with her partner was 9 times more likely to use contraceptives than a woman who had no discussion at all.

The delivery service given to rural women by skilled health professionals was unacceptably very low in the two Gondar zones requiring a concerted effort to be in place in this regard. On the other hand, the finding that most women reported supporting wife beating is unfortunately the greatest obstacle in the struggle against the oppression of women and domestic violence. In contrary, all married men and religious leaders who participated in the qualitative study condemned such harmful traditional practice.

6.2 Recommendations

Based on the findings obtained from the quantitative and qualitative studies, the following recommendations are put forward.

♣ The fertility-inhibiting effect of postpartum infecundability resulting from prolonged breastfeeding was by far the most important proximate determinant in the entire study areas in general and in rural areas in particular. Unfortunately, the practice of prolonged breastfeeding is being eroded in towns. It is a known fact that breastfeeding is not only useful to inhibit fertility; it is also very important for the health of the newborn child. The promotion of breastfeeding should therefore continue by all concerned bodies.

♣ The Amhara region in general and the two Gondar zones in particular are best known by the practice of early marriage. The present study has shown the average age of females at their first marriage as 14 years. On the other hand, 81.5% and 38.9% of the urban and the rural women, respectively, proposed (approved) a minimum age of 18 for girls to be engaged in their first marriage. The great majority of the rural women (61.1%) are still in favour of marriage that takes place at early age (before reaching the recommended age of the region). It is to be noted that this tradition has negatively affected the health of women in the two Gondar zones. Quite a substantial number of women are suffering from fistula that resulted mainly from early marriage. Therefore, the implementation of the family law of the region which asserts the minimum age as 18 years should be ensured particularly in rural areas. Those parents or individuals who break this family law should be fined.

♣ Nearly 68% of the women who participated in this study did not have modern education. About 18%, 12% and 2% were having primary, secondary and college (university) levels of education, respectively. The finding showing no statistically

significant difference between women with primary education and women with no modern education with regard to the level of fertility was somewhat surprising. Although it is not uncommon to come up with such findings, it needs to be explored further. At the same time, female students should be encouraged not to withdraw schooling because of one or another reason. They should be assisted to continue their education beyond the primary level. It is also important to incorporate the basic elements of reproductive health into the primary school (2^{nd} cycle) curricula.

♣ Infant (child) mortality is consistently reported to be associated with high level of fertility. This fact is strongly supported by the findings of the present study. This calls for the strengthening of the preventive and curative services in the two Gondar zones. Incorporating the basic disease prevention methods in primary schools could also be considered.

♣ It was learned from the present study that the use of contraception among women (particularly, urban dwellers) was encouraging. However, the CPR among the rural women is still very low. Therefore, the family planning programs of the two Zones should be strengthened to the extent that they could play significant roles in bringing down the prevailing high fertility in such areas where over 85% of the population lives. Accordingly, the main stakeholders should exert maximum efforts to make the method of choice available and accessible to the users. The availability of method mix (including long term and permanent contraceptives) and counseling of the clients should deserve special attention. The possible side effects and their management need to be properly addressed before and during the course of taking contraceptives. It should be noted that family planning serves both generations (I.e., the mother and the child) by reducing both maternal and child deaths.

♣ As shown repeatedly by the results of the present study, rapid population growth is threatening the livelihoods of many people. In order to have a clear

understanding of the forthcoming population –related problems and identify the type of appropriate measures to be taken, it would be advisable to create forums for public debate. Accordingly, one such important activity would be to organize a national conference in which religious leaders of the highest levels, scholars, ministers, representatives of NGOs and other responsible bodies could participate. Similar conferences could also be carried out at regional, zonal and *woreda* levels. In addition to this, further studies need to be undertaken in different parts of the country to investigate the emerging attitudinal changes in relation to population pressure and its far reaching negative consequences. Consequently, the findings from such studies (including the present one) and the ideas (suggestions) that may be collected from the various conferences on population affairs could assist the government whether passing a law limiting the number of children is worth considering.

♣ Strengthening of the Department of Population Affairs to a level where it could fully function and achieve meaningful changes is vital. The minimum requirement from the regional government is to improve the organizational structure. In this regard, the current department needs to be upgraded to a level of bureau which would be under the direct supervision of the regional government itself. The new bureau that may be established, the Bureau of Population Affairs would be instrumental in integrating all other population-related activities carried out by different stakeholders. This will ultimately play a pivotal role in the achievement of the common goal.

♣ The existing monitoring and evaluation systems (if any) aimed at assessing the on-going population –related activities need to be activated and strengthened. Particularly, whether the 1993 Population Policy of the country (which does not have any action plan) is properly and effectively implemented needs evaluation. Its strengths and weaknesses from initiation to date should be assessed. This may lead to improving the current Population Policy by taking account of the evaluation results and the emerging attitudes of the people towards the prevailing

rapid population growth. That is, amendments need to be made on the existing population policy by taking account of the available evidence. It is to be noted that the 1993 National Population Policy aimed at "closing the gap between high population growth and low economic productivity through planned reduction of population growth and increasing economic returns."

♣ Discussion about family planning made between the couples was found an important instrument in using contraceptives. In this regard, the health service extension workers assigned in each *kebele* by the Ministry of Health should encourage couples to discuss freely about the advantages of a small family and allow them to decide themselves in using family planning methods. In the mean time, making radios at a low cost to the rural people, besides initiating discussion to take place among family members, will be instrumental in passing information useful to the day today activities of the population. As observed in the present study, quite a great many radios were not functional due to some maintenance problems. This requires the need to establish a mechanism that may help farmers to tackle the maintenance problems within their vicinities. In this regard, training of selected farmers how to maintain non-functional radios could be one option.

♣ One of the barriers for using family planning methods is the fear of twin births after discontinuing hormonal contraceptives (pills and injectables). This requires further exploration by the Ministry of Health and other NGOs working in the field of family planning and the necessary actions need to be taken accordingly and promptly.

♣ Schools (particularly at the primary level) should be taken as one area of disseminating information about disease prevention, family planning and other components of reproductive health, etc. It is therefore timely to establish a system that allows (obliges) health workers to give health education to primary school students at least once in a week.

♣ The practice of wife beating was condemned by many of the participants of this study (women, men and religious leaders). However, there were some women who approved this practice when a woman does wrong. The perceived wrong deeds mentioned by them were: arguing with the husband, burning the food, neglecting the children, refusing to have sex with the husband, etc. The regional government has developed a system (establishment of community police in the rural areas) partly to prevent such harmful traditional practices. Although this is a good move towards improving the problem, the fundamental and long lasting solution that would liberate women not only from the practice of wife beating but also from many other obstacles would be female education. Education will lead females to actively participate in the labour force thereby ending their economic dependence on males. In the mean time, mechanisms that would allow rural women and other social groups to facilitate their reading capabilities and update themselves to the ever changing environment need to be in place. This may include the opening of mini-libraries in each rural *kebele*. The health service extension workers assigned in each *kebele* could help a lot in this regard. In doing so, apart from improving (exercising) women's empowerment, harmful health practices including female circumcision which is currently prevalent in South Gondar, will gradually disappear.

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