ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

1. E
2. 9
3. S
4. F

600

WOMEN'S EDUCATION AND MARITAL FERTILITY IN URBAN ETHIOPIA

ALmaz Hagos

June 1997

Broad age groups 15-24
25-34
35+

just one more table.

The AAUW6

WOMEN'S EDUCATION AND MARITAL FERTILITY IN URBAN ETHIOPIA

By

Almaz Hagos

A thesis submitted in partial fulfillment for the degree of Master of science in Demography in the Addis Ababa University

June 1997

Addis Ababa

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

Women's Education and Marital Fertility in Urban Ethiopia

BY

Almaz Hagos

Demographic Training and Research center Institute of Development Research

Approved by Examining Board

Chairman, Department Graduate Committee	Signature
Advisor	Signature
External Examiner	Signature
Internal Examiner	Signature

TABLE OF CONTENTS

List Of Tables

List of figures

Abstract

Using data from the 1990 NFFS, this study attempts to show the direction and degrre of association between education and life-time fertility. It also attempts to determine the threshold level of education at which marked fertility decline can occur.

A total of 1268 currently married women of reproductive ages from urban areas are included in the study. Data quality was first assessed and then various analysis techniques were used to show the association between education and life-time fertility and to establish the threshold level of education.

The findings show that education negatively affects lifge-time fertility through its effect on other variables. As the level of education increased, number of children ever born declined. The findings also show that age at first marriage, husband-wife communication, current use of contraceptives negatively affect the number of children ever born. On the other hand, infant/child death, duration of breast feeding and desired family size affect the number of children ever born positively.

The threshold level of education where a modest (10 %) change in fertiliy occured was at educational level 1-4 and a substantial (20 %) decline in fertility reduction occured at 5-8 level of education.

The study concludes by summarizing the research findings and sugests the need for intensifing the effort to educate women.

INTRODUCTION

1.1 Background of the Study

The world population has been increasing at an unprecedented rate since the 1950's. Most of this increase is observed in the developing countries. According to the united nations (1991) report, in 1950-55 it was estimated that out of the total average annual increment of 47 million to the world population, 77 per cent was contributed by the less developed countries and only 23 per cent by the developed nations. In 1985-1990, the share of the developing nations had increased to 93 per cent out of the 88 million average annual increment to the world population and it is expected that the share of these developing nations will reach 97 % by 2020-2025, leaving only 3 percent to the developed nations (UN, 1991).

High and rising fertility and moderately declining mortality are responsible for the accelerated growth of the population size in the developing countries. Findings from the world fertility survey of 29 developing countries showed fertility levels to be highest in Africa especially in Sub-Saharan Africa, where the average number of children ever born to a woman was 6.7 compared to 4.8 and 4.6 in Asia and Latin America respectively (Faruque and Gulhati, 1983). Fertility in this region is, therefore, the most important and critical component of high population growth.

Ethiopia is one of the Sub-Saharan Africa countries whose population is growing at a fast rate. The total population which was estimated at 11.8 million in 1900 increased to 23.6

million in 1960 and reached 42.6 million in 1984(CSA, 1991). The growth rate of the population of Ethiopia was estimated to be about 3.2 % in 1995 (Abdulahi, et al, 1994). The country is the third most populous country in Africa with an estimated population of about 60 million in 1997 (Abdulahi and Strong, 1997).

Similar to other developing countries, the most important demographic factors responsible for this dramatic growth of the population in Ethiopia are the continuing high birth rate and slowly declining mortality rate. Available data indicate that fertility has been increasing from 5.8 children per woman in 1970 to 7.7 children in 1990 (CSA, OPHCC, 1993, Assefa and Allen, 1997). Hence the present demographic trends indicate that Ethiopia assuming other things equal, will have to bear the burden of unprecedented rapid population growth unmatched with its skilled human resource and socio-economic development in the years ahead. This high population growth may slow down growth of per capita income and fixed capital formation through its depressing impact on rates of savings and investment of the country (Assefa, 1994; Hirut, 1994). So to over come this serious problem, some programs that can reduce the level of fertility must be examined and be applied in practice in the country.

Among the several mechanisms available for reducing the level of fertility, improving the educational attainment of women is highly recommended (Cochrane, 1979; Caldwell, 1980; Koening, 1981;Kasarda et al., 1986; UN, 1987; Jain.K, 1981; Ware, 1981; Alemseged, G, 1989; Yacob, 1991). This is because education is the key to transforming women's attitudes and values from traditional to more modern; and their behavior from constrained to

emancipated. Education increases a woman's knowledge and competence in all sectors of contemporary life, broadens her access to information via the mass media and written materials. Hence education, though not the only prime instrument, it is perhaps the single most important institutional variable to policy manipulation that can help reduce fertility rates in developing countries(Kasarda et al. 1986 Jejeebhoy, 1995) like Ethiopia.

1.2 The problem.

As it is discussed above, Ethiopia is exhibiting high population growth. The prevailing fast population growth may hinder economic development of the country at the macro level and consequently the economic welfare of individuals at the micro level. High population growth poses a serious challenge to the nation, particularly in the provision of health and educational services and employment opportunities. With rapid population growth, extra facilities in schools and hospitals and more roads and housing would be required to cope with the additional population. In such circumstances the country's limited resources would have to be directed towards the provision of such services at the expense of needed domestic savings to finance fixed capital formation and investment which could increase production in the future.

It is also clear that a fast growing population is characterized by a young age structure. In the case of Ethiopia, around 50 per cent of the population is below age 15 (CSA, 1993). These are usually young persons who are not working or are those whose work input is insufficient for their consumption needs. Therefore, the dependency ratio of the country is very high, where one productive person is expected to feed two persons including himself. On the other

hand, high fertility causes high maternal and infant mortality. In Ethiopia out of 100,000 women, 70,000 die each year of which 40000 die during prignancy and at time of delivery. The same to this when fertility is very high interval between births is very short, thus children will not get the necessary care and affection from their mother's, so they become easly exposed to different diseases which leads ti high infant and child mortality.

Thus to reduce the high population growth and get rid off these sever problems, the annual rate of population growth must be moderated by reducing the prevailing high fertility. Increasing the prevalence of contraception and increasing level of female education and literacy particularly among young female are often cited as factors most likely to lead to fertility decline and this study tries to investigate and pinpoint the threshold level of education that initiates a decline in fertility in the country.

1.3 Significance of the Study

In Ethiopia, the direction and degree of association between education and fertility, and the threshold level of education where fertility starts to decline is not well studied and known. On the other hand to have a clear knowledge on the threshold levels of education where the proximate and dependent variables show modest or substantial decline on fertility helps to design and develop appropriate educational strategies. In the study a 10% change (modest) in the proximate and dependent variables due to difference in education is taken as a threshold level of education. Jejeebhoy (1995) took a 10% difference as modest and 20% difference as

substantial changes of the intermediate and dependent variables between educated and uneducated women.

Thus, the proposed study has a paramount importance to the government for development planning because it attempts to fill the gap in our knowledge on the relationship between women's education and fertility and also by providing the threshold level of education in order to allocate resources properly for fertility decline in the future.

1.4 Literature Review

1.4.1 Women's Education and Marital Fertility

At the macro level, education has been used as an indicator of socio-economic development in structural explanations of the demographic transition and at the micro level, educated women are usually portrayed as forerunners of the transition, i.e. pioneers of fertility change. By educating women it is then possible to reduce population pressure because education is linked with later marriage, lower fertility rates, the desire for smaller families and increased practice of contraception. But many developing countries invest less on educating and retaining women in school as a result of which there is a wide gender gap between boys and girls attending school.

In Ethiopia, the situations of gross enrollment and girls enrollment ratio are not very different from the conditions in other developing countries. According to the Ministry of Education's statistical abstract, in the academic year 1993-94, the percentage of girl to boys attending was

50.2, 38.2, 46.4, and 45.2, in the kindergarten, primary (1-6), junior secondary and senior secondary levels respectively (Ministry of Education, 1995). The data indicates that generally enrollment of girls decreases as one ascends the education ladder.

The data from the Ministry of Education for the same year show that the percentages of the school age girls was 10.2, 17.7, 5.0, and 8.6 for the stated grade levels respectively of the total female population but the enrollment ratios for those respective grade levels were only 1.2, 18.0, 12.0, and 6.9 per cent of the school age population. It means from the 10.2 per cent of the total female population who should have been in kindergarten, only 1.2 per cent were enrolled and out of the 8.6 per cent of those of senior secondary school age, only 6.9 per cent were enrolled during the academic year 1993-94 (MOE, 1995).

1.4.2 Women's Education and Marital Fertility

Studies of fertility behavior and change have consistently identified education as an important factor in accounting for fertility differences within population (Cochran, 1979; Jain, 1981; Kasarda et al., 1986; Abdulahi, 1989; Seyoum, 1990; Selvartrun, 1988; Gadala, et al., 1987; UN, 1984; Freedman, et al., 1988; Eshetu, 1994; Jejeebhoy 1995) and its effects may be either unintentional or deliberate. These studies seem to indicate that education may increase or decrease individual fertility. Education enhances fertility by shortening the duration of breast feeding and postpartum abstinence and also by increasing the fecundity of a woman because of better nutrition and health situation. On the other hand it decreases fertility by increasing age at marriage, and also by increasing infant/child survival chances. Therefore the fertility of

an individual and the fertility of a country or region will then be the net effect of these opposing factors. So the form and size of the relationship between education and fertility vary considerably and the relationship will not be as uniform as is generally believed. It can show a negative, positive or no relationship. In their studies, Cochrane (1979) and Jain (1981) have noted that education operating through other variables does not always has linear relation with fertility, it may have inverse, an inverted "U" shaped pattern or reversed number 7 (Oppong C. and Abu k., 1987 Jejeebhoy, 1995).

The effect of women's education on fertility varies among countries at different levels of development. In poor developing countries with relatively low levels of literacy, education may at first raise fertility by improving health and reducing infertility. For example, the United Nations report of 1987, indicates that, in Indonesia and Sri Lanka, there was no negative relation between education and fertility. In Sri Lanka, the fertility of women with no schooling was almost equal to that of women with seven or more years of education. In Indonesia, the fertility of educated women was considerably higher than that of women with no education (UN, 1987).

Similar results were obtained in some of the sub-Saharan African countries. Positive relation between education and fertility was obtained in Benin, Cameroon, Cote Devoir, Kenya and Senegal. In all these countries, the mean number of children ever born was higher for those women with 1-3 years of schooling compared to those with no schooling (UN, 1987:335).

On the other hand, among developing countries with better or higher levels of literacy or educational attainment and in developed nations, education has an inverse relation with fertility. Cochrane (1979) and Ware (1981) have proved that the evidence of an inverse relation between education and fertility to be strongest for countries at the middle level of development.

While most studies in developed nations have shown a linear inverse relationship between education and fertility, some have reported curvilinear ones. It means more education does not necessarily, everywhere and every time mean fewer children. Studies based in England and Wales, the Netherlands, Norway, and West Germany have detected a U shaped pattern, showing a positive relation between education and fertility at the higher levels of education(Freedman et al., 1959; Mason et al., 1971; Wolf, 1980; as cited in Kasarda et al., 1986).

Education may directly change attitudes, values and beliefs towards a small-family norm and towards a style of child bearing that is relatively costly to parents. So education does affect fertility directly. But as is stated above, education largely affects fertility through a wide variety of factors known as the proximate variables.

1.4.3 Education and the Proximate Determinants of Fertility

Proximate determinant of fertility refers to "the biological and behavior factors through which the socio-economic, cultural & environmental variables affect fertility (Bongaarts 1978: 105).

Education sets off changes in these variety of proximate determinants of fertility. Some of them enhance fertility and others depress it and the actual number of children ever born to a woman is the net effect of these opposing forces. The proximate determinant used in the study are age at first marriage, breast feeding, and contraceptive use. But in addition to these variables infant/child death, desired family size, work status of mother and husband-wife communication are also treated. The indirect influence of education on fertility can be summarized as follows:

(i) Education can affect fertility indirectly by raising age at marriage thereby reducing the number of childbearing years of a woman,

(ii) Education may affect the efficiency of fertility control by increasing a woman's knowledge and use of contraception there by lessening the divergence between desired and actual family size,

(iii) Education improves the opportunity of a woman to work outside the home. But working away from home competes with the time spent in bearing and raising children so educated women will be forced to limit their fertility (iv) Education increases aspirations for upward socio-economic mobility, which favors small family size,

(v) Education also enhances husband-wife communication thus creating a condusive environment for fertility reduction and

(vi) Finally it affects fertility by reducing infant/child death. Below we shall see the effect of education on each proximate variable and the combined effect of these on fertility.

1.4.4 Education, Age at First Marriage and Fertility

The age at which women enter marriage and the length of time they remain married directly influences fertility rates because most fertility in the developing world occurs within marital unions. In a population with little contraceptive practice and where fertility occurs within marriage, a decrease in fertility results from a reduction of exposure of women to the risk of pregnancy at young ages. It means that the longer the first birth is postponed, the smaller the completed family size will be, so that delays in initiating child bearing will result in smaller family size.

The timing and nature of marriage are obviously essential factors in the study of the links between educational attainment of women and fertility. The chief significance of marriage, considered as determinant of fertility, is that, it defines at least approximately, periods of exposure to the risk of pregnancy.

Marriage can affect fertility in three different ways. These are:

i) Its universality or the proportion that ultimately marry. This might have a great influence on the high rate of population increase in developing countries because marriage in most of those countries is a universal social institution. In most traditional cultures, it is the state of being married that is most highly valued and indeed is often considered an essential prerequisite for the attainment of full adult status. In his study of the marriage patterns in Malaysia, Johns (1980) found that

two-thirds of the decline in fertility in the country prior to 1970 was the direct results of the declines in the proportion married.

In Ethiopia according to Assefa (1992), among females aged 15-19 about 45% had been married in 1986 and their median age at first marriage was 16 and by age 25 more than 97% were married. Thus early and universal marriage implies a longer duration of exposure to the risk of child-bearing and hence causes high fertility. So declines or changes in the proportion married causes fertility to decline.

ii) The timing among those who marry. Timing of marriage depends on the level of socio-economic and cultural development of the society. In societies where enrollment of females in school is low, marriage which is usually arranged by parents is likely to take place at an early age. In Ethiopia, over 50 per cent of the women marry before they reach age 20 and by age 30, over 95 percent of all women were married (Assefa, 1992). From this we understand that the duration of time from first marriage to the last reproductive age, age 49, is very long favoring high fertility.

iii) The amount of potential reproductive period spent after marriage disruption and before remarriage. The effect of this factor as determinant of fertility levels and of educational differentials in fertility in almost all developing countries is not significant. Because women of developing countries, spent almost all of their time in union. This may be due to their economic dependency on their partner's

income and cultural values in the society. For example, the study by Bourgeois-Pachat (1965) cited in Ware (1981) shows that, European women spend some 60 per cent of their reproductive lives in formal marriages, while women in Tropical Africa spend fully 85 per cent of the time in marriage.

When we see the relationship between education and age at first marriage, the educated usually marry at later age because they postpone their marriage till they complete their education and find their desired partner, which in turn shortens the time of risk of pregnancy in their life time and reduces fertility.

1.4.5 Breast Feeding

The link between breast feeding and the delay of the return of ovulation and menstruation is important for reducing fertility. In countries where breast-feeding is universal but where there is little use of modern contraception, breast-feeding has a great role in protecting pregnancy (McCann. M.F. et al., 1981). The effect of breast-feeding on fertility operates primarily by delaying the resumption of ovulation after birth. This is because a woman becomes temporarily infecund immediately after birth since the normal cycle of ovulation and menustration is normally absent and this temporary infecundity of a woman is largely a function of duration of barest-feeding (Yeshewamebrat, 1995).

Results of different studies show that, the duration of amenorrhoea following a birth averages only 1.5 to 2 months for women who do not breast feed, but if a woman breast feeds for two

years or more, the average period of amenorrhoea will be from 15 to 24 months (Leridon, 1977; Bongaarts and Potter, 1983 as cited in UN, 1987). In other words, prolonged breast-feeding causes for the long birth interval which brings a substantial effect in fertility reduction.

In most developing countries like Ethiopia, where there is not enough substitution to breast milk and where little or no contraceptive practice prevails, breast feeding may have long duration and prevalence and can have an important effect on fertility reduction.

According to the 1990 NFFS, about 97 % of the ever married women had reported to breast feed their last child. This nearly universal practice of breast feeding extends to well over 18 months in the whole country prolonging birth intervals and hence reducing fertility (Abdulahi, 1988). The contraceptive prevalence rate (CPR) of the whole country was only 4.4 (CSA, 1993). So breast-feeding has a determinant role in fertility reduction in the country. The key determinants of breast feeding according to Abdulahi et al., (1994) are women's education, place of residence, husband's occupation, and the survival status of the child. Thus changes in breast feeding patterns and infant feeding practices associated to educational attainment causes increase to marital fertility by shortening the postpartum amenorrhoea.

According to the study made by Jain in Indonesia, the average duration of breast feeding decreases from about 20 months among women with no education to about 11 months among those with at least 7 years of schooling and the corresponding averages for Colombia were about 12 and 5 months respectively (Jain 1981). Similarly in Haiti the mean duration of breast

feeding among women with no education was 17 months compared to 12.7 months among those with 1 to 3 years of education (Ferry and Smith 1983). So the decrease of the duration of breast-feeding reduces the interval between births, hence increases life-time fertility.

1.4.6 Education, Infant/child death and Fertility

Infant/child death can affect fertility through three principal modes of influence.

i) Involuntary or biological mechanisms (physiological effect) which works through the effect of lactation on postpartum amenorrhea, that is, shortened breast-feeding periods leading to a more rapid return of ovulation following an infant death. Its effect is strong in populations where breast feeding is wide spread and where contraceptive prevalence rate is very low. Declining infant mortality and prolonged breast-feeding following child survival may lengthen birth intervals and in turn depresses overall fertility. Reduction of birth intervals due to shortened breast-feeding caused by infant death induces a fertility increasing effect (Knodel and Van de Walle, 1967 cited in UN, 1987).

ii) Replacement motivation or behavioral effect. It is volitional response of individual families to mortality levels-reaction to an actual child death for replacement. It involves a deliberate decision of couples to makeup for the dead children. Foot note that this may not work in societies where CPR is low

iii) Insurance motivation or Hording effect - it works by forcing parents to give birth to as many children as possible in order to secure the survival of a sufficient number to match or exceed the desired number of children.

Infant/child mortality is then closely related to the length of breast-feeding. When there is high infant and child mortality, the length of breast-feeding will be short and the arrival of the next child will be again in a short time and hence increasing fertility. But female's education decreases infant/child mortality because it increases the possibilities for improved health for parents and children by providing better knowledge and higher income to parents so through that it may decrease fertility.

1.4.7 Education, Desired Family Size and Fertility.

People want children for economic, social and psychological reasons. Parents' preference for children is based on the labor value that they contribute to the family, as old-age support and risk insurance to them, and their rising aspirations. The process of decision making on fertility is volatile and reaches the maximum level of crystallization during the marital stage.

The desire for children ranges between family size which is "up to God" and that to which a number is attached.

Education affects the demand for children by altering preferences and by changing the perceived costs, benefits and ability to afford the necessary expenses of children. Parents' educational level may affect fertility in many ways. In approving this idea, Anker and Knowls (1982) argue that, education may increase parents' relative preference for consumption items not related to children and reduces preference for more traditional life styles which include large family size. In addition, education may increase an individual's willingness to accept new

procedures that reduce fertility more effectively-thereby reducing the number of unwanted births. Finally education increases women's income-earning potential and thereby increases the opportunity cost of their withdrawing from the labor force in order to care for children and hence reduces the desire of having large family size.

1.4.8 Education, Work status of Mother and Fertility.

The more years of formal education women have, the more likely they are to be in the modern sector of the working force. Educated mothers who participate in the modern labor force and who work away from home, staying there for a longer period face greater incompatibility between women's role as mother and worker. Role incompatibility exists when bearing and rearing children conflict with woman's career or other non familial roles.

According to Kasarda et al., (1986) role incompatibility can arise from normative- that is when society disapproves of non familial roles of mothers, or from time incongruities- which arises when time spent in child care and employment conflict or a combination of the two.

The traditional expectation of a woman's major roles in life are those of wife, mother, and homemakers. Although the negative attitude towards mothers' being in the labor force is changing, many mothers still hold keen perceptions of the normative expectations. It is true that, the propensity to work among women depends on their level of education and it is well known that women working outside home cannot easily take care of their children. Since employed women typically carry the double responsibility of working inside and outside the

home, the time demand must be adjusted to work and child care. If the woman cannot restrict the time demand of employment, she is likely to reduce the time demand of being a mother by restricting her family size. Therefore, working women usually desire small families. But in most developing countries including Ethiopia since there is extended family and easily available mother substitutes, role incompatibility of mother's work may not have a significant effect on limiting family size. There will not be such a conflict of time incongruities that is conflict between time spent in child care and work outside home.

1.4.9 Education, Knowledge and use of Modern contraceptive and Fertility

Education stimulates greater fertility control by increasing knowledge of methods of control and rising the motivation for control. Education has positive effects on attitudes toward contraception, knowledge of contraception, and communication between husband and wife and through these and other variables on contraceptive usage. Educated women are more likely to be contraceptive users than those with no education because of their access to information on family planning through mass media and written materials (Berent, 1982; Dandekar, 1965; Freedman et al., 1959; Husain, 1970; Lightbourne and Singh, 1982; Miro and Rath, 1965; Sather, and Chidambaram, 1984; Sen and Sen, 1967; Yaukey, 1961; as cited in Kasarda et al., 1986). This is because education removes barriers created by myths and misinformation and facilitates the acceptance of contraception. In approving this idea, Newland stated:

Indent from both sides.

"Literacy facilitates the distribution of birth control information - not only information about obtaining services, but also the more basic understanding of how and why different methods work, and of the advantages and disadvantages of different methods. Information is a great antidote to the fear and misapprehension that surround this sensitive subject"(Newland, 1977:10 as cited in Kasarda et al,. 1986)

1.4.10 Education, Husband- wife communication and Fertility

Education is expected to increase discussion between husband and wife, which is necessary for making decision on their family size. Evidences from different studies confirm that communication between husband and wife increases contraceptive use and reduces fertility (Mitchell, 1972; Michel, 1969; Hill and others, 1959; Ramakumar and Gopal, 1972; Simmons and Calagoviski, 1973 as cited in Cochrane, 1979) .

1.5 Objectives of the Study

1.5.1 General Objective

The main objective of the study is to investigate the impact of Women's educational attainment on their marital fertility directly and through the main demographic, cultural and socio-economic variables that play a role in determining fertility levels.

1.5.2 Specific Objectives

a) To asses fertility differences by classifying the population into meaningful categories by educational attainment and investigate the type and degree of association between education and fertility.

b) to determine the threshold level of education whereby a modest or substantial change in the Life-Time fertility is attained.

c) On the basis of the findings, to suggest policy guidelines for regulating fertility behavior through increasing women's educational attainment.

1.6 Hypotheses

Based on the above objectives, effort will be made to test the following hypotheses:

1. The direct or net effect of educational attainment on fertility will be negative i.e. the higher the level of education, the lower is the level of fertility.
2. The greater the time spent in education, the higher the age at first marriage will be. This relationship shortens the reproductive time span which in turn reduces the ultimate family size. Therefore the indirect or compound effect of education through age at first marriage will be negative.
3. Maternal education increases infant/child survival probabilities. And when parents are convinced of the survival of their existing children, they do not need to have more. So they try to limit their family size. Thus, the indirect effect of education on fertility through infant/child death will be negative.

4. Education reduces duration of breast-feeding, thus by shortening the interval between births it leads to increased fertility.

5. Education increases the opportunity of women to work outside home and this creates conflicting goals between child rearing and working outside home. Thus, it is hypothesized that women's participation in the paid labor force outside from home creates conflict of time incongruities between child care and employment and thus leads to lower fertility.

6. Education increases the chance for husband-wife communication, use of modern fertility regulation and decision on their family size. Thus it is hypothesized that number of children ever born will be negatively affected by these variables ~~will be negative.~~

CHAPTER II

METHODS AND MATERIALS

2.1 Source of Data.

The study is based on data from the 1990 National Family and Fertility Survey (NFFS) conducted by the Population Analysis and Studies Center of the Central Statistics Authority (CSA).

A multi-stage stratified sampling design was used to select the target fixed sample size of 14,680 women of reproductive age by dividing the country into eight domains- two urban and six rural. In the urban domains, Addis Ababa -the capital city was taken as one domain and other urban centers as the second domain.

Of the total 14,680 women expected to be sampled, 4,300 were from urban and 10,380 from rural areas. However, the survey actually managed to interview only 8757 women of child bearing age (15-49) with 5913 women from rural and 2844 from urban domains. This was because of the exclusion of most parts of the north eastern and northern high lands(Northern and southern Wello, Northern and Southern Gonder and Tigray) due to security problems at the time of survey.

The number of women included in this study is 1268 currently married women of reproductive age. This is because the eligibility criteria for this study was living in urban areas, being evently married, and being fecund. These criteria of selection were taken because:

1 Fertility pattern is most conveniently studied for currently married women;

2. Any study of fertility differentials caused by social factors must be confined to fecund women; and

3. Differentials between educated and non educated women are likely to be particularly evident in urban areas of the country because of the heterogeneity in their level of education.

The background or explanatory variable is women's education while the life-time fertility measured by number of children ever born (CEB) to currently married women, is the dependent variable. Age at first marriage, infant/child death, breast-feeding, work status of mother, husband-wife communication, and knowledge and use of family planning are the intermediate variables.

However, the reported number of children ever born may suffer from problems of under reporting or over reporting due to omission of live births or inclusion of stillbirths which are serious problems in developing countries where recall lapse is high and vital registration system is incomplete or does not exist. So the following section trys to examine the quality of the data used in the study.

2.2 Data quality

The validity of fertility analysis is determined to a large extent by the accuracy of age and date reporting for both women and their children. Therefore, before looking at patterns of fertility change in Urban Ethiopia, it is important to examine the quality of the age and date information collected in the 1990 NFFS.

The most serious error that affects the quality of data on children ever born is omission of live births, particularly those children living elsewhere and those who have died. The proportion of women omitting live births increases with age of mother. Another error in the reported children arises from the inclusion of still births or late foetal deaths among live born children(UN 1983). Therefore, these probable errors should be borne in mind while interpreting the reported fertility data. The section that follows examines the quality of the data on age and children ever born.

2.2.1 Age Data

Errors in age data could arise either due to failure to record age (coverage error); or due to misreporting of ages (referred to as content error). The study has tried to detect the prevalence of content errors in the age data by using the two main approaches-the Graphic method and the analytical method (Myer's Blended Index of Age Preference) in evaluating age-data quality. Figure 2.1 on the next page shows the percent distribution of the currently married women by age and it shows that there is age heaping on digits 0, 5 and 8 in that order.

Fig. 2.2 Percentage Distribution of Currently Married Women by Single Year of Age, Urban Ethiopia, 1990

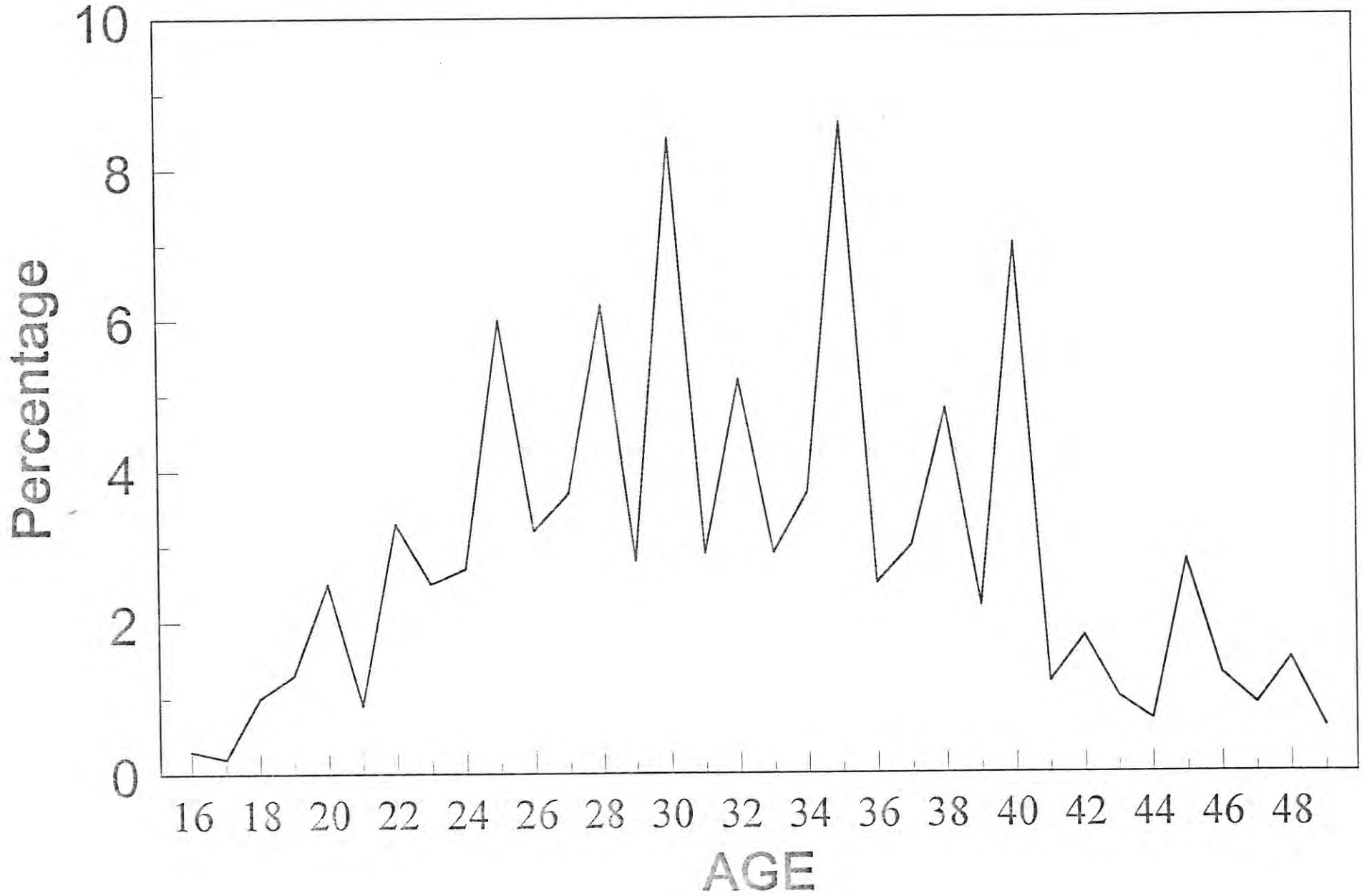


Table 2.1 Myer's Blended Index of Terminal Digit preference

Terminal Digit	Deviation from 10 percent
0	9.7
1	-4.4
2	1.4
3	-2.9
4	-2.2
5	9.3
6	-2.8
7	-2.2
8	3.4
9	-9.2
Summary Index	47.5 /2 = 23.8

The summary Index of digit preference for all digits for women currently married and living with a man in urban Ethiopia was 23.8 and as can be seen from the table, the highly preferred digits were 0, 5 and 8 in that order while the highly avoided digits were 9, 1, and 3 respectively. The assumption underlying this procedure is that, if there are no misreporting of ages, the blended sum of each terminal digits should approximately be equal to 10 percent of the total. A positive deviation from this shows a preference while a negative deviation shows avoidance (Shryock and Siegle, 1976).

The summary Index for the 1990 National Family and Fertility Survey for ever married women in Urban Ethiopia was 21.5 and the summary index for the currently married urban women was 23.8.

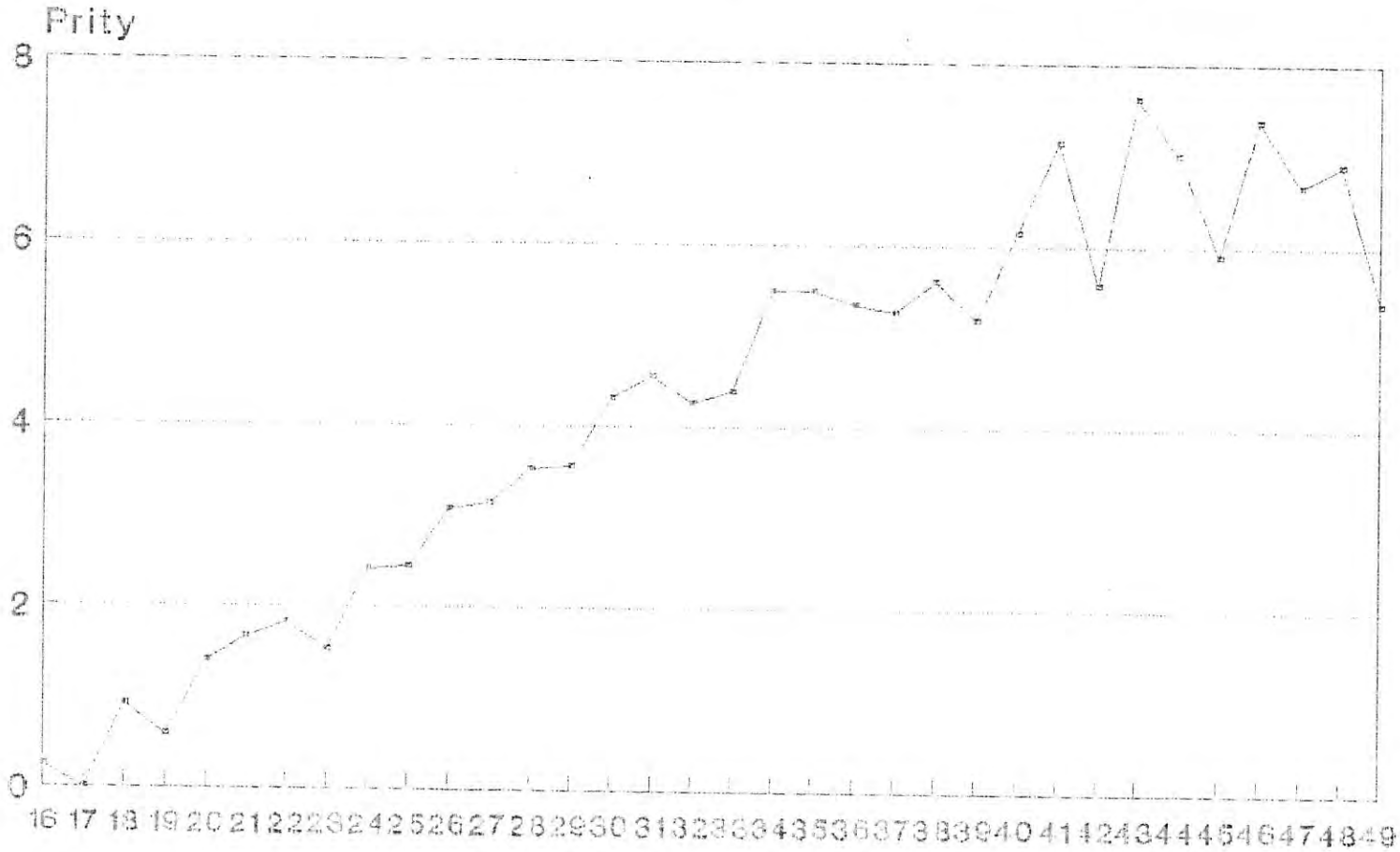
To sum up, there is some evidence of age heaping in the 1990 National Family and Fertility Survey. However as the analysis is done using grouped data, the effect of heaping is expected to be minimal.

2.2.2 Data on Children Ever Born (CEB).

The number of children ever born refers to the number of live births during a woman's ~~in her~~ life time up to the survey date irrespective of their survival status. However estimates of fertility can be distorted due to effects of reported age errors. Children who where born to women of a certain age group may be reported in another age group. Also as was discussed earlier, reported fertility-data can be distorted by partial omission of children borne to older women or inclusion of adopted children or still birth. Anticipating the existence of such errors in the reported fertility data, births are examined by calculating mean parity for the five year age group and also using a graphic presentation of reported number of children ever born by single year of age.

Theoretically, under normal conditions, total number of children ever born to a woman, being a function of her age, is expected to increase with age of mother. Figure 2.3 shows the

Figure 2.3 Reported parity of currently married women by single year age.



relationship between number of children ever born and age of women and it indicates that the total number of children ever born increases with the increase of age of mother.

Table 2.2 Number of Children Ever born, Average Parity and Number of currently married Women in Conventional Five Year Age Groups Urban Ethiopia, 1990.

Age Group	No. of Respondents	CEB	Average Parity
15-19	37	23	0.62
20-24	152	273	1.8
25-29	278	863	3.1
30-34	293	1325	4.5
35-39	263	1437	5.4
40-44	149	952	6.3
45-49	91	584	6.4
Total	1268	5457	4.3

The average number of children ever born per currently married women classified by five year age group is given in Table 2.2. The Mean life time fertility of the target population was found to be 4.3 and the average parity increases with age of mother as was expected. As the figures indicate an increasing trend with age, it may be stated that the data on CEB are well reported.

But at the last age group, eventhough it shows an increase of 0.1 child, it is not as it should be. This could be due to omission of births by the older women or that the fertility of these women was low.

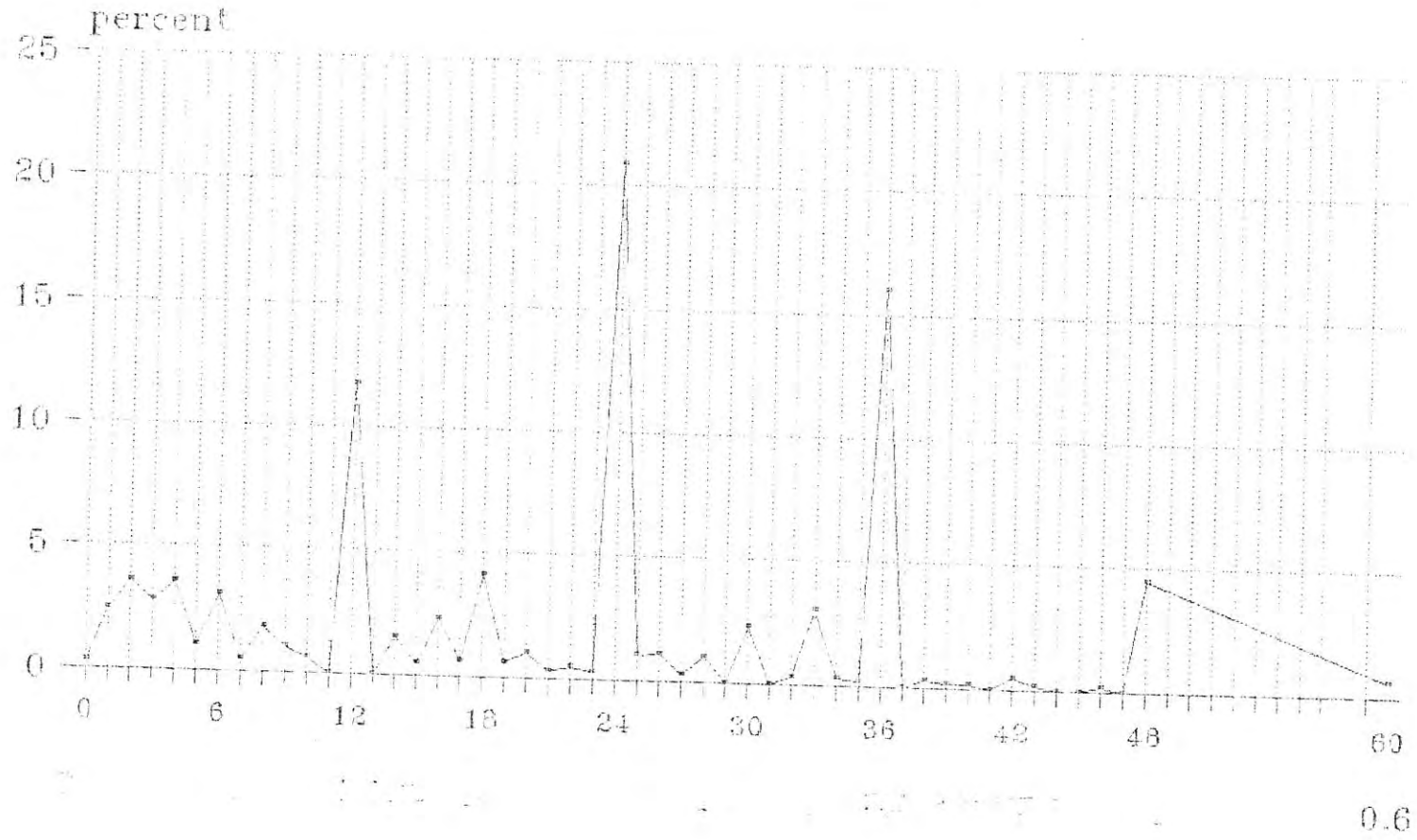
2.2.3 Data on Breast-feeding

In the survey, the women were asked to recall for how long they had breast-fed their last child. The percentage distribution of duration of breast-feeding by single month is presented in figure 2.4. According to the data, there is heaping on duration of breast-feeding on multiples of six. About 8.1 percent of the women reported 6 months duration of breast-feeding while 1.0 percent and 0.5 percent reported duration of 5 and 7 months respectively. Similarly about 20.7% of the women reported 24 months of duration, while only 0.3 percent and 1.0 percent reported durations of 23 and 25 months respectively.

To examine whether there is heaping in duration of breast-feeding, it is advisable to calculate the index of heaping. According to Ferry (1981), index of heaping can be calculated by summing the percentages corresponding to these preferred values[1]. The index for the data is found to be 65.3% showing that about 65% of the women reported durations in these preferred digits. Although there is heaping on the retrospective data of duration of breast-feeding, it is not that much bad and to remove these irregularities, duration of breast feeding is grouped into categories.

[1]The index provides a good summary measure of the quality of the reported data on duration of breas feeding of the last child with any deviation from 50% considered as digit preference (Ferry, 1981)

Fig2.1 Distribution of Duration of breastfeeding



2.3 Scope and Limitation Of The Study

This study is constrained by certain data limitations, which necessitate special attention. The National Family and Fertility Survey data were not collected for the purpose of this study, some variables that may have greater effect on marital fertility were not treated. For example there was limitation on economic variables and on value and cost of children that were significant for the purpose of the present analysis.

Also dates and numbers concerning some demographic variables such as desired family size and breast-feeding do not appear to be very reliable because there were many unknown cases or missing values.

Another limitation of the data was that, it was impossible to use all the intermediate variables in the path model since some were dichotomous variables. This is because in estimating the effect of education on these variables and find the beta coefficients or path coefficients, the dependent variables should be continous. However, the problem was solved by using path model for the continuous variables and multiple repression for the dummy variables.

2.4 Method of Analysis

The methods of analysis employed in this study varies from simple tabular representation or descriptive analysis to a more refined one.

The descriptive method uses percentages, means, standard deviations and coefficients of variations. This approach is employed in the investigation of bi-variant relationships between dependent and independent variables.

To examine the effect of the variables on average number of children ever born, Path analysis, Logistic regression and ordinary least square techniques are used.

Path analysis is used in the multi-variate analysis because the causal ordering hypothesized in the framework suggests the appropriateness of path model as a good analytical tool for testing the model. Path analysis is a statistical technique that presents a method of measuring the direct influence along each separate path in such a system and thus of finding the degree to which variation of a given effect is determined by each particular cause. It is a standardized multiple regression analysis (using a standardized form of dependent and predictor variable, with mean zero and unit variance) in which a chain of relationships among the variables, arranged in an orderly manner, is examined through a series of regression equations. Mathematically it can be expressed as:

$$Y_k = P_{k1}X_1 + P_{k2}X_2 \ldots\ldots + P_{k.K}\text{-}X_{k-1} + e_k$$

Where P_{ks} are the path coefficients and the X_s are the measured variables which have direct effect on Y_k and e_k is the disturbance term. It should be noted that the structural equations are linear in the P_{ks} that they do not have a constant term. This is because our variables are standardized, giving them a mean of zero and a standard deviation of one. In other words for convenience a_i has been omitted by assuming that all x_i are measured in terms of deviation about their respective means.

Path analysis is chosen because:

(i) it provides automatically estimates of the precision of the coefficients and a framework in which hypothesis concerning the coefficients may be tested,

(ii) it shows that the total effect of one variable on another is the sum of its direct and indirect effects.

In addition, path analysis enables us to decompose the correlation between any two variables as the sum (total) of simple and compound paths with some of these compound paths being substantively meaningful indirect effects and others perhaps not. Some compound paths may not be indirect effects when they violet the causal ordering among the variables. All indirect effects are compound paths, but not all compound paths are substantively interpretable indirect effects.

Any correlation between two variables can be decomposed into sum of simple and compound paths, and that a compound path is equal to the product of the simple paths comprising it (Asher, 1990). In applying this, three assumptions must be fulfilled.

1. No path may pass through the same variable more than ones,
2. No path may go backward on (against the direction of) an arrow after the path has gone forward on different arrow,
3. No path may pass through a double headed curved arrow (representing un analyzed correlation between exogenous variables) more than once in any single path.

Path analysis is chosen because:

(i) it provides automatically estimates of the precision of the coefficients and a framework in which hypothesis concerning the coefficients may be tested,

(ii) it shows that the total effect of one variable on another is the sum of its direct and indirect effects.

In addition, path analysis enables us to decompose the correlation between any two variables as the sum (total) of simple and compound paths with some of these compound paths being substantively meaningful indirect effects and others perhaps not. Some compound paths may not be indirect effects when they violet the causal ordering among the variables. All indirect effects are compound paths, but not all compound paths are substantively interpretable indirect effects.

Any correlation between two variables can be decomposed into sum of simple and compound paths, and that a compound path is equal to the product of the simple paths comprising it (Asher, 1990). In applying this, three assumptions must be fulfilled.

1. No path may pass through the same variable more than ones,
2. No path may go backward on (against the direction of) an arrow after the path has gone forward on different arrow,
3. No path may pass through a double headed curved arrow (representing un analyzed correlation between exogenous variables) more than once in any single path.

In addition to path analysis, logistic regression is used for the dichotomous dependent variables where beta coefficient can not be obtained with the help of OLS. In logistic regression we directly estimate the probability of an event occurring. Mathematically the logistic regression model for a single independent variable is expressed as $P(x) = 1/1+e^{-(B0+B1X1)}$.

The log odds $\ln\left[\frac{P_i}{1-P_i}\right] = e^{B_0 + B_1X_1 + B_2X_2 + \cdots + B_nX_{1C}}$.

Finally Multiple Regression analysis was employed to estimate the relationship between the continuous dependent variable (CEB) and the continuous or discrete (education, work, knowledge, communication and current use of family planning) independent variables. The technique can mathematically be expressed as:

$Y = a_i + b_1X_1 + b_2X_2 + b_3X_3 + B_4X_4 + e$

where Y = CEB, a and b are constants, Xs = independent variables and e is the error or residual term.

2.5 Frame Work of the Study

As is stated above even though education may affect fertility directly, its primary effect comes through its influence on other variables bearing directly on reproductive behavior. It can be said that most influences of education on fertility is caused by the proximate determinants indirectly. The proximate variables considered in this study are:-

a) Age at first marriage

b) Duration of breast-feeding

c) Infant/child death

d) Knowledge and use of contraception.

In addition to these proximate variables the following socio-economic variables were included:

e) Family size Preference

f) Work Status of Mother

g) Husband-wife Communication are also to be treated.

The conceptual framework presented in figure 2.3 is used to investigate the effect of education on marital fertility directly or indirectly through the demographic and socio-economic factors.

The framework shows the different channels through which education affects fertility. As is shown in the framework, fertility is a function of the stated demographic and socio-economic variables and education. Education affects fertility directly by shaping the psychic orientations favoring smaller family size and through three sets of intervening path ways (Cochrane, 1979 and Kasarda et al., 1986; Jejeebhoy, 1995) which are classified as:

a) Biological supply of children which refers to the number of surviving children a couple can have under natural fertility conditions, that is, if couples make no attempt to limit fertility. Supply of children is influenced by education because education is associated with the delay of marriage or entry into unions; shorter duration of breast-feeding that consequently affects the duration of post partum amenorrhoea.

Education may reduce the supply of births, mainly through the postponement of marriage or formation of union, thereby shortening the period of reproductive life. On the other hand, education by shortening the periods of breast-feeding and abstinence increases the risk of conception.

b) Demand for children by parents is affected by cost and benefit of children, family size preference, and incompatibility of mother's work. Education affects a number of motives underlying a couple's preference for number and composition-notably the economic and non-economic returns parents obtain from children as well as the costs associated with child rearing. The economic independence facilitated by education, can reduce women's reliance on children for their support in the form of child labor, as well as for their assistance in emergencies and during the parents old age.

c) Regulations of fertility which operates through developing attitudes towards birth control, improved knowledge of birth control, and better husband-wife communication.

The effect of education on each of these variables and their combined effect on fertility have been discussed in the section reviewing the literature.

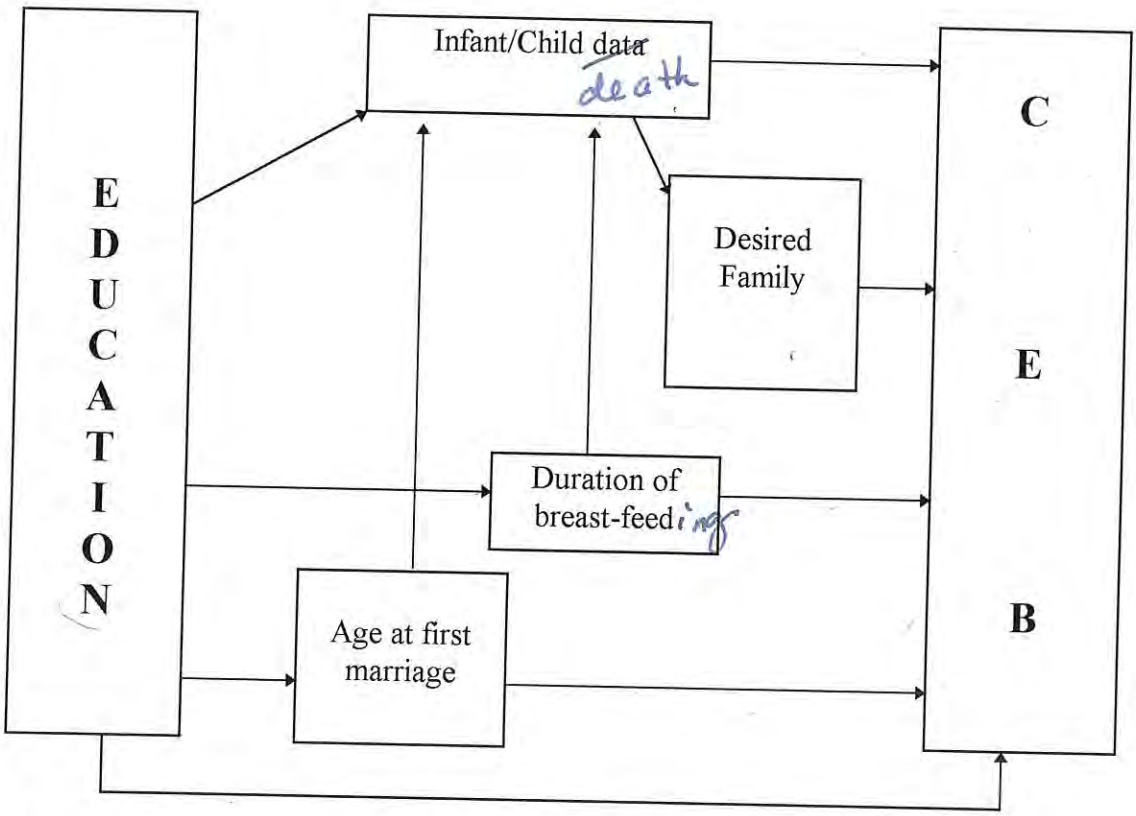


Fig 2.3 **A Schematic Model of The Effect of Education on Marital Fertility through some selected intervening variables, Urban Ethiopia, 1990.**

Specification of a path model calls for a good deal of understanding of the substantive field of investigation and a conceptual model underlying the nature of the interrelationship among variables. In this study a recursive path system is used. It means that there are no feed back loops in the system whereby X_i can influence itself. This is simply for the sake of simplicity and clarity of the study.

CHAPTER III

DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS OF THE STUDY POPULATION

As already mentioned, the population to be investigated in the study consists of 1268 currently married urban women in their child-bearing age(15-49). Table 3.1 shows the numerical and percentage distribution of the study population by age group.

Table 3.1: Numerical and percentage distribution of currently married women by conventional age group, Urban Ethiopia, 1990.

Age group	Number	Percent
15-19	37	2.9
20-24	152	12.0
25-29	278	21.9
30-34	293	23.1
35-39	268	21.1
40-44	149	11.8
45-49	91	7.2
Total	1268	100

As it is presented in Table 3.1, the highest percentage (23.1%) of the study population is in the age group 30-34 while the least percentage that is, 2.9 percent is found in the early reproductive age(15-19). The mean age of the total population is 32.2 years.

3.1 Educational Characteristics of the Study Population

The study addressing the relationship between education and fertility, measures education by the number of years spent in school (or grade completed). Education is categorized based on the new educational policy into five categories namely:- no schooling, Grades 1-4, 5-8, 9-10, and 11 and above. The no schooling category includes those who have never attended school, literacy program and non formal education. These are lumped together because those who have reported to have non formal education were very few (only 7 women) to treat them separately.

From the total study population, only 55.2 percent were literate while the rest 44.8 percent had no schooling (see Table 3.2).

Table 3.2 : Percentage Distribution of Currently Married Women by Educational Level, Urban Ethiopia, 1990.

Highest Grade completed	Cases	Percent
1. No schooling	568	44.8
2. Grade 1-4	274	21.6
3. 5-8	220	17.4
4. 9-10	50	3.9
5. 11+	156	12.3
Total	1268	100

It can be observed from Table 3.2, that except at higher educational level, mother's educational attainment is declining. with increasing level of education

From the literate ones the highest proportion is in grades 1-4 followed by grade 5-8 (21.6 and 17.4 percents respectively). Generally the majority of those who are educated are in the elementary level.

3.2 Demographic Characteristics of The Study Population

The percentage distribution of age at first marriage of currently married women in the reproductive age groups 15-49 years by educational level are presented in Table 3.3. In this study, age at first marriage is classified into three groups: < 15 years 15-19 and 20+ years. From those who have responded in one way or the other to the question of age at first marriage (1202 women), 40.4 percent (485 women) married before age 15, 46.5 percent between 15-19 , 13.1% at the age of 20 or more (see Table 3.3). Again from those who married before age 15, 52.4 percent or 254 women were from the no schooling educational category while 22.7 percent (110 women), 17.7 percent (86 respondents), 2.4 percent (or 12 women) and 4.7 percent (23 women) had 1-4, 5-8, 9-10 and 11+ level of education respectively. As can be seen from Table 3.3. early marriage (below age 15) seems to be the character of the uneducated women.

About 70 per cent of the total marriage was arranged by parents/relatives, only 23.2 percent by respondents themselves and the rest, 6.5 percent by others (Table 3.3).

Table 3.3 Percentage Distribution of Respondents by Selected Demographic Characteristics and Educational Level, Urban Ethiopia, 1990.

	Educational Level						
	No schooling	Grade 1-4	Grade 5-8	Grade 9-10	Grade 11+	Total	N
Age at First Marriage							
Below 15 years	48.2 (254)	42.2 (110)	40.4 (86)	25 (12)	15 (23)	40.4 485)	
15-19 years	44.6 (235)	49.4 (129)	46.5 (99)	54.2 (26)	45.8 (70)	46.5 (559)	
20 years and above	7.2 (38)	8.4 (22)	13.1 (28)	20.8 (10)	39.2 (60)	13.1 (158)	
Missing						5.2 (66)	
Marri. arranged by:-							
Parents/relatives	52.7	24.4	14.8	2.7	5.4	70.2	888
Respondents	23.1	14.3	25.5	6.1	31.0	23.2	294
Parents/resp.	31.8	13.6	16.7	12.1	25.8	5.2	66
Others	64.7	23.5	11.8	-	-	1.3	17
Infant/Child Death							
No Death	53.7	70.4	75.9	90.0	86.5	66.6	845
1-2 I/C deaths	59.6	19.8	13.4	1.4	5.8	28.3	359
3-4 I/C deaths	70.2	21.1	8.8	-	-	4.5	57
5 & above	90.0	10.0	-	-	-	0.8	10
Breast-feeding							
Not BRFD	42.9	12.5	23.0	-	21.4	4.8	56
Still BRFD	48.9	23.1	15.8	4.4	7.8	35.5	411
Less than 13 months	20.9	17.4	23.0	7.0	31.7	18.1	230
13-24 months	46.8	20.4	19.4	3.9	9.5	17.4	201
25-60 months	59.7	27.4	9.7	1.1	2.2	16.1	186
Until Dead	68.9	14.9	10.8	1.4	4.1	6.4	74

From Table 3.3, we can see that number of infant/child death experience by individual mothers decreases with increase in education. From the total study population 66.6 percent had no

infant/child death experience while 33.4 percent had experienced infant/child death at least once. Among women with no schooling, more than 46.0% had at least one infant/child death experience. A quarter of those who had no schooling had experienced one infant/child death while only 12.2 percent of those who had completed grade 11 or above had one death experience. The data from the table indicates infant/child death experience is higher among the non educated compared to the educated women.

Table 3.3 again shows that from the total study population 91.3 or 1158 women responded to the questions 'Have you ever breast-feed your last child' and 'For how long do you breast-feed.' From those who responded, only very few, 4.8% were not breast-feeding and the rest 95.2 percent although for different duration of time, were breast-feeding. This corresponds with the result of the 1990 National Family and Fertility Survey which was 97 percent of ever married women for the whole country. The percentage still breast-feeding is higher among those with no schooling than among women with some formal education. It appears that duration of breast-feeding decrease with increasing education. For instance 59.7% of women in the no education category breastfeed between 25-60 months while among those with higher levels of education it was only 2.2 percent.

3.3 Socio-Economic Characteristics of the Study Population

For the purpose of this study, desired family size with the numerical response is classified in to small (0-2), medium (3-4) and large (5+) children. The same table shows the distribution of the numerical and non numerical response of desired family size by educational level of

women. From the study population only 719 women responded numerically to the question. From these again only 5.7 percent desired 0-2 children, 32.3 percent desired 3-4 children and 18.8 percent wanted large family size that is 5 children or more and 43.3 percent did not give numeric response (they said up to "GOD"). Out of the currently married women in the no schooling educational category, only 2.5 percent desired 0-2 children, 20.1% 3-4 children,, 18.7% desired large family size and 58.8 percent did not respond numerically. On the other hand, from the highly educated women 14.1% desired 0-2 children, 56.4% desired 3-4, 17.3% desired 5 and above children and only 12.2 percent did not give numerical response. From those who desired small family size (72 respondents), 19.4% or 14 respondents where from those who have no schooling while the largest proportion, 30.6 percent or 22 respondents were from the higher educational level, that is, grade 11 or above. This proves the hypothesis that desired family size decreases as women's educational attainment increases. Again from those who responded to the question by saying up to God (549 respondents), 60.8 percent were from the no schooling category while from the educational category of 9-10 grades it was only 0.73 percent. Also from those who gave numerical answers, respondents from the higher educational category constitute the highest proportion that is, as the level of education increases women tend to limit their family size and respond their desire numerically.

Education increases intimacy between spouses, and increased loyalty to the conjugal unit rather than to the larger extended-kin network, and a correspondingly greater child

orientation. Increased intimacy with husbands may allow educated women to engage in freer discussion of contraception and family size preference.

As can be observed from Table 3.4, only 27.1% or 343 women discussed with their partners about their family size and the rest did not. From those who discussed with their husbands, the higher percentage was in the higher educational category. In other words, percentage of women who discuss with their husbands increases with the increase in their educational attainment. About 54 percent of those who did not discuss with their husbands were from the no schooling category and only about six percent of those who did not discuss were from the higher educational category.

As is indicated in Table 3.4, only 485 women or 38.2 percent of the study population gave response to the question "are you currently using family planing" and from those, 286 (59 percent) were currently using family planning while the rest 199 women or 41 percent were not current users. The percent of current use of contraceptive in urban Ethiopia among currently married women during the survey was 22.6 percent.

Table 3.4: Percentage Distribution of Respondents by Selected Socio-economic Characteristics and Educational Level, Urban Ethiopia, 1990.

	Educational Level						
	No schooling	Grade 1-4	Grade 5-8	Grade 9-10	Grade 11+	Total	N
Desired Family Size							
0-2 Children	2.5	6.9	6.4	6.0	14.4	5.7	72
3-4 Children	20.1	31.4	41.4	60.0	56.4	32.3	409
5+ Children	18.7	15.7	22.3	26.0	17.3	18.8	238
Up to God	58.8	46.0	30.0	8.0	12.2	43.3	549
Husband-Wife Commu.							
Yes	19.8	18.1	22.2	10.2	29.7	27.1	343
No	53.8	23.1	15.6	1.7	5.8	72.9	909
No Stated						1.3	16
Knowledge of Moder FP							
Yes	20.8	21.8	24.1	8.0	25.3	39.4	499
No	61.3	21.5	13.0	1.3	3.9	60.6	769
Current Use of Contr.							
Yes	18.5	24.5	23.1	5.9	30.0	59.0	286
No	26.6	26.1	17.6	9.6	20.1	41.0	199
Not Stated						61.75	783
Work Status of Mother							
Working	40.0	33.9	42.3	32.0	65.4	41.9	531
Not working	60.0	66.1	57.7	68.0	34.6	58.1	737

The relationship between women's education and the practice of contraception is direct, that is, percentage of users increases with the increase in educational attainment. This is because educated women face fewer obstacles relating to the practice of contraception than uneducated women.

From the same table, 41.9 percent (531 women) were working and the rest 58.1 percent (737 women) were not working. It is expected that the percentage of working women should increase with the increase of educational attainment because education is the most important variable for employment in the paid labor force. But in the case of this study, the percentage of working women in the no schooling, 40.0 percent, is higher than the percentage of working women in the educational categories of 1-4, and 9-10. The reason may be due to smaller number of cases in these educational categories.

CHAPTER IV

MATERNAL EDUCATION AS DETERMINANT OF FERTILITY DIFFERENTIALS: BI-VARIATE ANALYSIS

This chapter examines differentials in fertility among currently married women by their socio-economic and demographic variables. Mean number of children ever born to currently married women is used as the fertility measure. As is discussed in the previous chapter, education affects fertility directly and to a large extent indirectly through three sets of intervening path ways namely:-

- the biological supply of children, referring to number of births that parents can have under natural fertility dealing with age at marriage, duration of breast feeding, lower infant/child death;
- the demand factors which refer to the number of children a couple wants and that deals with family size preference, and incompatibility of mother's work;
- and finally the regulation of fertility which operates through developing attitudes to wards birth control and better partner's discussion.

In the study, the relationship between each direct (intervening) variable and the dependent variable and also between the indirect variables and the dependent variable were treated separately (Bi-variate Analysis). To test whether the variation in the dependent variable due to

the background or intermediate independent variables was statistically significant, a One Way Anova was employed.

4.1 Direct Effect of Education on Life-Time Fertility

Ethiopia being a developing country has a high illiteracy ratio especially among women(the illiteracy ratio among the currently married urban women during the survey date was 44.8 per cent).

The average number of children ever-born per currently married women classified by conventional age group is presented in Table 4.1. The effect of education on Life-Time Fertility as can be seen from Table 4.1 is as expected, that is, Life-Time fertility decreases with the increase in educational level of mothers showing a difference of 2.5 children per woman between the highly educated and those with no schooling. The mean parity of those with no schooling is 5.2 and decreases to 4.2, 3.5, 2.9, and 2.7 for grades 1-4, 5-8, 9-10, and 11+ respectively. The mean parity or Life-Time fertility for the entire population is 4.3 children per woman (Table 4.1).

The threshold level of education where a 10 per cent or more difference in average parity is seen is at the educational level 1-4. It indicates a decrease of parity by 19.2 percent to mothers in grades 1-4 compared to those with no schooling. The women in the higher educational category, grade 11+, have 48.1 percent less CEB than the women in the no schooling educational category.

So to achieve a substantial change in the average parity of women or decrease in fertility of about 20%, for women in urban Ethiopia, 1-4 years of female education is required.

Table 4.1 Number of Cases and Average parity by Educational Level of currently married Women, Urban Ethiopia, 1990.

Highest Grade completed	cases	Life-Time Fertility	Percent Diff. in fertility b/n educated and uneduc.[2]
No schooling	568	5.2	
Grade 1-4	274	4.2	-19.2
5-8	220	3.5	-32.7
9-10	50	2.9	-44.2
11+	156	2.7	-48.1
Total	1268	4.3	

F pro. = 0.000 F ratio = 38.8

4.2 *Education, Age at Marriage and Life-Time Fertility*

Marriage or union is important in fertility analysis because it defines at least approximately, periods of exposure to sexual activity and child bearing. For the purpose of this study, age at first marriage was classified into three categories - those who married before age 15, between 15-19, and those who married at age 20 or older and to see the threshold level of education on age at marriage, the mean age at marriage of respondents in different educational category was calculated.

[2]Percentage Calculated by subtracting fertility of the uneducated from the educated one's and dividing it by the value of the uneducated.

Table 4.2: Average Parity by Age at First Marriage and Education and Mean age at First Marriage of current Married women, Urban Ethiopia 1990.

Highest Grade Complete	Age at first marriage			Total cases	Mean age at marriage	% Diff. in age at marriage b/n educated and uneducated
	< 15	15-19	20+			
No schooling	5.2 (254)	5.5 (235)	4.7 (38)	5.3 (527)	14.7	
Grade 1-4	4.4 (110)	4.4 (129)	3.3 (22)	4.3 (261)	15.0 1	1.42
5-8	3.9 (86)	3.6 (99)	2.2 (28)	3.5 (213)	15.7	6.08
9-10	4.3 (12)	2.7 (26)	1.9 (10)	2.9 (48)	16.6	12.16
11+	3.8 (23)	3.1 (70)	1.9 (60)	2.7 (153)	18.9	27.03
Total	4.6 (485)	4.8 (559)	2.8 (158)	1202	15.56	

P value = 0.000 F ratio = 33.7
Note: Figures in brackets indicate number of cases.

As Table 4.2 indicates, the life-time fertility of those who were married before age 15 which is 4.6 is higher than the life-time fertility of those who married at age 20 and above (2.8) with a difference of 1.8 child per woman on average.

The overall effect of education on marital age is documented to be positive (Jejeebhoy, 1995) but this relationship may not be necessarily linear or steep. For instance the average age at first marriage for the women who completed grade 8 in the study is not that much higher than the age at first marriage of those who have not attended any school, it is only 6.1%. It suggests that to bring a substantial change in fertility by increasing age at first marriage in Ethiopia women should complete senior education. From the highly educated women, around 85

percent (130 out of the 153 cases) were married at the age of 15 and older while those in the no schooling and grade 1-4 category, only 51.8 percent and 13.0 percent respectively were married after the age of 15. The reason for this positive relationship of education to marital age is due to greater say of educated women in marriage decisions, including whom and when to marry; the greater control over resources derived by educated women as a result of premarital employment; and in many settings the lessened marriageability of educated women at an early age.

4.3 Women's Education, Infant/Child Death and Fertility.

Better educated women have lower infant and child mortality experience than the uneducated due to the following reasons:

- educated women shift from fatalistic acceptance of sickness to a more active implementation of good health practices;
- educated women increase capability for dealing with the outside world, including the world of health-services providers; and
- educated women show shift of power structure of the family to wards them as a major health-decision makers.

Based on these assumptions, there is a general consensus that infant/child death is positively related with Life-Time fertility. It means as infant/child death increases, fertility also increases because parents need to have as many births as they can for replacement and security purpose.

Table 4.3: Average Parity by Educational Level of Currently Married Women and Different Infant/Child Death Experiences, Urban Ethiopia, 1990.

Highest Grade Comp.	Average parity by number of Infant/Child Death Experience									
	0	1	2	3	4	5	6	7	Mean I/CD[1] death	Diff in I/CD b/n edu. & uned
No schooling	4.0 (304)	5.6 (140)	7.1 (72)	8.1 (30)	9.7 (6)	10.0 (7)	11.0 (1)	14. (1)	.7950	
Grade 1-4	3.4 (193)	5.9 (51)	6.2 (19)	6.5 (6)	8.3 (3)	8.0 (1)	- -	- -	.4548	-42.9
Grade 5-8	3.0 (166)	4.6 (41)	- -	7.7 (3)	6.5 (2)	- -	- -	- -	.3211	-59.6
Grade 9-10	2.8 (45)	3.8 (5)	7.0 (6)	- -	- -	- -	- -	- -	.1050	.86.8
Grade 11+	2.5 (135)	3.8 (19)	5.0 (2)	- -	- -	- -	- -	- -	.1474	.81.5
Total	3.4 (843)	5.4 (256)	6.8 (99)	7.8 (39)	8.7 (11)	9.8 (8)	11 (1)	14.5 (1)	.5310	

ue = .000 F ratio = 15.887 [1]I/CD = Infant/Child Death
Note: Figures in brackets indicate number of cases.

As was expected, the Life-Time fertility for those who have no infant/child death experience was low (3.4 children per woman) where as the parity of those who have one infant/child death experience was (5.4 children per woman) higher by 2 children per woman. It means for a one child loss, they give birth for two more children for replacement.

As can be seen from Table 4.3 the average parity of women with one infant/child death is 5.4 increasing to 6.8, 7.9, 8.8, 9.8 11.0 and 14.5 for women with infant/child death experience of two, three, four ,five, sex, and seven respectively. Thus Life-Time fertility increases with the increase of infant/child death experience.

4.4 *Education, Duration of Breast feeding and Fertility.*

Education erodes the traditional practice of breast-feeding resulting in an increase in fertility. In many literatures (Jejeebhoy, 1995:78) it is observed that there is inverse relationship between education and duration of breast-feeding. Educated women breast-feed for shorter duration. The reason to this may be the increased awareness among educated women of alternatives to prolonged breast-feeding, greater decision-making power among educated women concerning such personal aspects of their lives, and the increased husband-wife intimacy.

From the data in Table(4.4), duration of breast feeding decreases with the increase of education. Others have also found similar result(Abdulahi, 1989; Eshetu, 1994; Yeshewamebrat, 1995). In her study of breast feeding Determinants and Birth interval Effects in Addis Ababa a case of Zone One, Yeshewamebrat (1995) found that women with at least seven years of schooling breast feed for about 5 months shorter than those with primary and 6 months shorter than those who are illiterate. In this study women with at least five years of schooling breast-fed for about 10 months shorter than those with no education and 8 months shorter than those in grade 1-4. The highly educated women breast-fed on average 16 months shorter than those in the no schooling educational category and 14 months shorter than those who are in grade 1-4 (Table 4.4).

The range of duration of breast-feeding in months between educated and uneducated in the age groups 15-24, 25-34 and 35-49 are 15, 15 and 17 months respectively.

Table 4.4a Mean Duration of Breast-Feeding by Education and Age Group of Currently Married Women, Urban Ethiopia, 1990.

Education	AGE GROUP				
	15-24	25-24	35-49	Total	Relative Diff. in duration of Breastfeeding b/n educated & neducated(%)
No schooling	24	25	27	26	
Grade 1-4	25	25	23	24	-7.7
Grade 5-8	18	16	17	16	-38.5
Grade9-10	18	13	5	13	-50.0
Grade 11+	9	10	10	10	-61.5
Total	17.9 (189)	18.5 (571)	23.3 (508)	100.0 (1268)	

Note: Figures in brackets indicate number of cases.

As is shown in Table 4.4, the average duration of breast-feeding increases with age, that is, the higher the age of mother the higher is the duration of breast-feeding. This may be because women in the younger age groups are more educated than those in the higher age groups. But when we leave age and see the duration of breast feeding by education, we see educated women breastfed for 16 months shorter (26-10=16) compared to the uneducated.

The threshold level of education where the modest or 10 percent change in duration of breast-feeding is achieved is in the 3rd educational category, grade 5-8. It means women completing grade four, develop a substantial change in breast-feeding compared to their counter parts who have no formal schooling. When they reach grade 11 and above they breast-feed 61.5 percent less than those with no education. Several studies have shown that after delivery of a child the fertility of a breast-feeding woman is substantially lower than the fertility of non breast-feeding woman(Kasarda et al., 1986; Jain, 1981 and Jejeebhoy, 1995). This apparent contraceptive effect of breast-feeding is attributable to the suppression of ovulation and of menstruation that is associated with lactation. Lactation provides a degree of contraceptive protection through the post partum anovulation and amenorrhoea caused by elevated prolactin levels which inhabit the release of ovarian hormones. However its contraceptive protection diminishes with time, and it appears to be heavily dependent upon the frequency and intensity of suckling.

Table 4.4a Mean Duration of Breast-Feeding by Education and Age Group of Currently Married Women, Urban Ethiopia, 1990.

Education	AGE GROUP				
	15-24	25-34	35-49	Total	Relative Diff. in duration of Breastfeeding b/n educated & uneducated(%)
No schooling	24	25	27	26	
Grade 1-4	25	25	23	24	-7.7
Grade 5-8	18	16	17	16	-38.5
Grade9-10	18	13	5	13	-50.0
Grade 11+	9	10	10	10	-61.5
Total	17.9 (189)	18.5 (571)	23.3 (508)	100.0 (1268)	

Note: Figures in brackets indicate number of cases.

As is shown in Table 4.4, the average duration of breast-feeding increases with age ,that is, the higher the age of mother the higher is the duration of breast-feeding. This may be because women in the younger age groups are more educated than those in the higher age groups. But when we leave age and see the duration of breast feeding by education, we see educated women breastfed for 16 months shorter (26-10=16) compared to the uneducated.

The threshold level of education where the modest or 10 percent change in duration of breast-feeding is achieved is in the 3r^{d} educational category, grade 5-8. It means women completing grade four, develop a substantial change in breast-feeding compared to their counter parts who have no formal schooling. When they reach grade 11 and above they breast-feed 61.5 percent less than those with no education.

Several studies have shown that after delivery of a child the fertility of a breast-feeding woman is substantially lower than the fertility of non breast-feeding woman(Kasarda et al., 1986; Jain, 1981 and Jejeebhoy, 1995). This apparent contraceptive effect of breast-feeding is attributable to the suppression of ovulation and of menstruation that is associated with lactation. Lactation provides a degree of contraceptive protection through the post partum anovulation and amenorrhoea caused by elevated prolactin levels which inhabit the release of ovarian hormones. However its contraceptive protection diminishes with time, and it appears to be heavily dependent upon the frequency and intensity of suckling.

Table 4.4b Average Parity by Educational Level and Duration of Breast feeding of Currently married Women, Urban Ethiopia, 1990.

Highest grade	Duration of Breast feeding					
	< 7 months	7 - 12 months	13 - 24 months	25 - 60 months	Total	% Diff in parity by brfd b/n edu. & unedu.
No schooling	4.7	5.6	5.1	5.4	5.2	
Grade 1-4	4.9	5.8	5.1	3.9	4.8	-7.7
5-8	4.0	4.0	3.7	3.8	3.9	-25
9-10	3.1	3.1	3.1	1.0	3.0	-42.3
11+	2.7	3.4	2.9	3.0	2.9	-44.2
Total	3.6	4.8	4.6	4.7	4.4	

F pro = .010 F Ratio = 4.666

In the analysis of average parity by duration of breast-feeding, the category still breast feeding was excluded because of its open ended character. The average parity of the study population decreases both by duration of breast-feeding and educational level attained. The life-Time fertility of those who breast feed for 7-12 months is 4.8 children per woman and decreases to 4.6 and 4.7 children per woman for those who breast feed for 13-24 and 25-60 months respectively. But the average parity for the women who breast feed for less than 7 months is

low , 3.6 children per woman. The probable explanation for the low average parity of the women breast feeding for shorter duration could be that those women who breast feed for less than 7 months have substituted it by contraceptive use. This could be because as can be seen from table 3.4, 40.3 per cent of those women who breast-feed for shorter time were from the higher educational category who have the knowledge and access of contraception. Again the average parity of the women in the educational category, of 'no schooling' except in the duration of less than 7 months, decreases with the increase in the duration of breast feeding(see Table 4.5).

4.5 Education, Family Size Preference and Fertility.

Mean family size usually decreases steadily with increasing levels of respondent's education (Jejeebhoy, 1995). This may be because educated women are more likely to be economically and socially self reliant than uneducated women. They are also less likely to be dependant on children for support in old age and secure their position in the society and finally, the costs- both economic and time- associated with child-rearing are expected to be higher among better educated than among uneducated or less educated women.

As Table 4.5 show, the average desired family size for the entire population is 4.9 children per woman which is higher by 0.6 child per woman from the actual family size of the study population. The evidence links higher educational level with desire for less children i.e., women with no schooling desire on average 5.4 children, those with grades 1-4 4.6 those with 5-8, 9-10 and 11 and above are 4.7, 4.9 and 4.3 children per woman respectively.

Table 4.5 Average Parity by Educational Level of Currently Married Women and Desired Family Size, Urban Ethiopia, 1990.

Highest Grade Completed	Desired family size				% Diff. in DFS[2] b/n educated and uneduc.
	Total	0-2	3-4	5+	
No schooling	5.4	4.4	4.7	5.0	
Grade 1-4	4.6	3.8	3.8	4.7	-14.8
5-8	4.7	2.7	3.2	4.2	-13.0
9-10	4.9	1.7	2.6	3.5	-9.3
11+	4.3	2.1	2.4	3.7	-20.4
Total	4.9	3.1	3.6	4.6	

P value = .000 P Ratio = 15.286 [2] DFS = Desired Family Size

The threshold level of education which creates a 10% difference in the desire of family size in the study population is in grades 1-4 with 14.8% less desire compared to uneducated in family size preference. The women who have completed grade 11 and above, desire 20.4 percent less children than the women with no schooling.

4.6 Education, Husband-Wife Communication and Fertility

Education enhances Spousal communication and closer conjugal relations between them(Jejeebhoy, 1995) so educated women are more likely to discuss with their husbands on various family concerns, such as contraception, number of children they should have in their life time, etc. According to Kritz and Gurak as cited in Jejeebhoy (1995), education turns out to be one of the strongest predictors of Spousal communication in each state and is generally more power full than their economic status or marital age.

Table 4.6 Average Parity by Educational Level of Currently Married Women and Husband-Wife Communication.

Highest Grade completed	Discuss with Husband	Not Discuss with Husband	% Diff. in parity by partner's comm. b/n educated and uneducated.
No schooling	5.6	5.0	
Grade 1-4	4.5	5.2	-19.6
5-8	3.5	3.5	-37.5
9-10	2.9	2.7	-48.2
11+	2.5	3.0	-55.4
Total	3.8	4.5	

P value = 0.0000 F Ratio = 18.2151

The average Life-Time fertility of the women who discuss with their husbands is 3.8 children per woman (see Table 4.5) which is less than the average parity of women that do not discuss with their husbands (4.5) by 0.7 child for each woman. The difference in average parity due to the difference in educational attainment among those who have discussed with their husbands themselves is also very high with more than three (5.6 - 2.5= 3.1) children per woman. This difference is the result of the close intimacy between spouses developed by education which can lead to a greater concern for women's health & well being and for the health implication of frequent child bearing.

4.7 *Education, Knowledge Of Modern Family Planning and Life-Time Fertility*

The higher knowledge and change in attitude gained by education increases and widens the knowledge of modern family planning. In Table 4.7 it is indicated that out of the total study population only 39.4 percent (499 women) have knowledge on family planning methods. The rest 60.6 percent of the women had never heard about family planning method. The life-Time fertility of those who have no knowledge of never heard of Family planning, 4.5, children is higher than the life-Time fertility of those who have heard of modern family planning (4.0 children) by about half a child (see Table 4.7). This proves the hypothesis that, women who have knowledge of family planning have a probability of contracepting and regulating their fertility.

Table 4.7 Average Parity by Educational Level of Currently Married Women and Knowledge of Modern Family Planning, Urban Ethiopia, 1990.

Highest Grade completed	Knowledge of Family planing				% diffe. in parity by knowledge of family planning b/n educat. and uneducated
	Yes		No		
	CEB	Count	CEB	Count	
No schooling	5.2	104	5.2	464	
Grade 1-4	4.8	109	3.8	165	-7.7
5-8	3.9	120	3.0	100	-25.0
9-10	2.7	40	3.6	10	-48.1
11+	2.8	126	2.2	30.	-46.2
Total	4.0	449 (39.4)	4.5	769 (60.6%	

P value = 0.0000 P Ratio = 9.0563

The threshold level of education where by a modest or 10% fertility decline, due to knowledge in family planning, is attained is in the higher elementary (5-8 grade) levels with 25 % less parity than the uneducated.

4.8 Education, Current Use of Contraceptive and Life-Time Fertility

Educated women have greater decision making authority, and thus they are in a better position than the less educated women to make reproductive and contraceptive decisions. Educated women develop close relationship with their partners' which may allow them to overcome shyness in making contraceptive decisions and above all their wider knowledge of methods enables them to make more informed decisions with fewer chances of subsequent discontinuation or failure of contraception.

Table 4.8 Average Parity by Educational Level of Currently Married Women and Current Use of Contraceptive, Urban Ethiopia, 1990.

Highest Grade completed	Current Users		Not current users		% diffe. in parity by current use of family planning b/n educa. and unedu.
	CEB	Count	CEB	Count	
No schooling	5.6	60	6.1	46	
Grade 1-4	4.7	79	4.7	43	-14.0
5-8	3.9	67	4.6	34	-31.6
9-10	2.6	19	3.7	17	-52.6
11+	2.7	82	3.5	38	-52.8
Total	4.0	307	4.8	178	

P value = 0.0052 P Ratio = 7.8731

As can be seen from Table 4.8, the difference in Life-Time fertility of the eligible women who are currently using any one of the contraceptive methods compared with those who were not currently using any method was 0.8 child per woman. For the eligible women in the educational category of no schooling, grades 1-4, 5-8, 9-10, and 11+ the difference of the average number of children born between current users and non users was 0.5, 0.0, 0.7, 1.1, and 0.8 child per woman respectively.

The threshold level of education where by a 10 % change in CEB due to current use of contraceptive is attained in grades 1-4 with 14.0 % less parity compared to the uneducated women.

4.9 *Education, work status and Life-Time Fertility*

One of the dominant factors in women's control over the number of children they want to have is their participation in the modern sector of labor force or the participation in the extra-domestic economic production. Educated women who have greater control over resources (wages) may have less reliance on children for material support rather increase their motive and ability to purchase health and contraceptive services. Supporting to the above argument, the Life-Time fertility of the currently married and working women is lower (3.8 children per woman) than the Life-Time fertility of the not working women (4.7 children per woman) by almost a child on average. As can be seen from Table 4.9, the parity of both working (except in Grade 9-10) and not working is declining inversely with education, but in most of the educational categories the average parity of the not working seems higher than that of working women.

Table 4.9 Average Parity by Educational Level of Currently Married Women and Work status, Urban Ethiopia, 1990.

Highest Grade completed	Working		Not working		% diffe. in parity by work status b/n educa.& uneducated
	CEB	count	CEB	count	
No schooling	4.8	216	5.5	352	
					-20.8
Grade 1-4	3.8	89	4.5	185	
					-39.6
5-8	2.9	93	4.0	127	
					-37.5
9-10	3.0	16	2.8	34	
					-43.8
11+	2.7	102	2.7	54	
Total	3.8	516	4.8	752	

P value = 0.0000 P Ratio =27.4873

Education affects the demand for children, and notably it reduces the extent to which women rely on children for economic and social support, both in the childhood and especially in the old age. At normal conditions, educated women are more likely to be employed in remunerative activities, and these activities are less likely to be compatible with child-rearing. Thus mothers' employment out side home which creates incompatibility between work and child care, decreases fertility.

The threshold level of education where a substantial (a 20 percent) fertility decline due to mother's work status, is achieved is lower primary (1-4). The mean number of children born to women working in the modern sector was 21 % lower compared to that of the non-working.

CHAPTER V

RELATIONSHIP BETWEEN EDUCATION AND MARITAL FERTILITY

In the previous chapters, examination of the variation the number of children ever born due to some background and intermediate variables by taking each variable with children ever born and controlling for the educational attainment was examined. In this section, general discussion of the relationship between Life-Time Fertility and education directly and indirectly through demographic and socio-economic variables will be dealt. In other words our main purpose in this sub-section is to assess the influence of these variables on children ever born.

The analytical techniques employed in this study are path analysis, and multiple regression. Path analysis is used with the continuous dependent variables because the standardized beta coefficients which are the path coefficients can only be estimated using ordinary least square with continuous dependent variables. So the path model in the study works only with age at first marriage, number of infant/child death duration of Breastfeeding and desired family size.

To estimate the probability of an event occurring when the dependent variable is dichotomous, i.e. when the value of the variable is either 0 or 1, logistic regression is employed. Therefore, to estimate the relationship between education and the dependent variables work status of mother, knowledge of family planning, husband-wife communication, and current use of family planning, logistic regression is used.

As is stated in the methodology part, to estimate the relationship between the categorical and dichotomous independent variables and CEB multiple regression analysis is used.

Path Analysis Technique

Path analysis is used to quantify the relative direct and indirect effects of continuous variables on Life-Time Fertility. Path analysis also allows us to explore the mechanism through which the demographic and socio-economic variables contribute to the number of children ever born. While using path analysis technique, it will be necessary to construct an arrow diagram or causal model of reliable and valid indicators of the key concepts that reflect causal processes since it often facilitate the clearer statement of hypotheses.

5.1 Causal Modeling

Three basic conditions are necessary to establish causal priority among variables, and none is sufficient by itself.

i) Covariation between the variables- the joint variation or association between a pair of variables i.e., systematic changes or differences in one variable must accompany systematic changes or differences in the other.

ii) Time order- the necessary condition that changes in a purported independent variable must proceed in time the change in the dependent measure, when a causal relationship between the two is assumed. This can be done by applying knowledge about the time ordering of the variables.

iii) Nonspuriousness- Covariation between two variables that is causal and not due to the effects of a third variable. In other words the pattern of association between variables Y and X must not arise from other, common causal factor. In applying a causal model for path analysis all our knowledge of social theory, past research and logical deducation must be used. It is then helpful in developing causal interpretations to have a reasonably clear idea of the different levels of explanation so that the processes which carry the causation from one level to the next, finally determining the level of fertility can be understood clearly. Table 5.1 presents the definitions of the independent and dependent variables used in the present path analysis, along with a brief description of their measurement.

Figure 5.1 shows the hypothesized relationships between the independent and dependent variables, however, all the variables are not used in the path analysis due to their nature.

From the hypothesized relationship diagram, education of mother, age at first marriage, infant/child death, Breastfeeding and desired family size are the only variables dealt in the path analysis (see Figure 5.2). Education is assumed to affect age at first marriage positively and infant/child death, breast-feeding and desired family size negatively. Age at first marriage which comes next to education in its causal ordering is assumed to affect infant/child death, desired family size, and finally children ever born negatively. The same to this infant/child death is assumed to affect desired family size and children ever born positively and duration of breast-feeding affects infant/child death negatively.

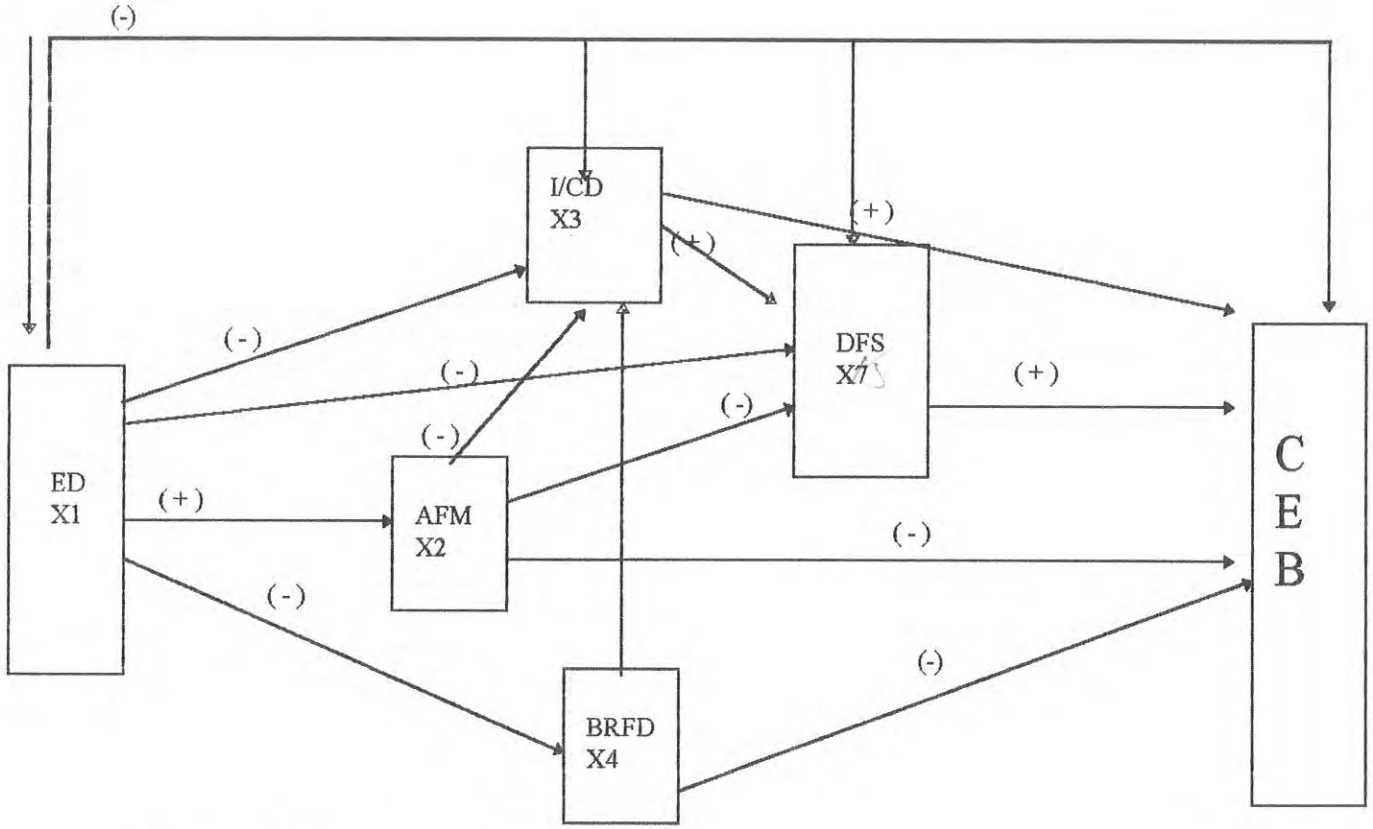


Figure 5.1 Hypothesied relationship

Equation

(1) How did you calculate the P_{ij}s.

- First correlation (Partial) r_{ij} using least square technique and by substitution of the variable.

$$P_{21} = \frac{r -}{1 - r_{12}^2}$$

Table 5.1 Names, Abbreviations, Causal(Algebric) Order and Measurements of the Variables Used in the Path Analysis, Urban Ethiopia, 1990.

Variable Name	Abbrev iation	causal order/Algebraic symbol	Measurement
Education of mother	ED	X1	No. of years of schoo.
Age at first marriage	AFM	X2	Age at first marriage in years
Infant/child death	ICD	X3	No. of deaths
Breast-feeding	BRFD	X4	Duration of BRFD in months
Desired family size	DFS	X5	Total children desired
Children Ever Born	CEB	Y	Number of CEB

The causal ordering implied in this case is that education is causally prior to all the other variables in the study, and X_2 to X_5 are causally prior to number of children ever born. Three kinds of variables can be identified in the diagram. The first variable, education of mother is considered to be exogenous variable i.e., it is not affected by but affects some other variables in the model. Variables X_2 ,X_3, X_4, X_5 and Y are endogenous that are affected by other variables in the model and the R_is are residuals or disturbance terms that represent those factors not actually measured that but make an impact upon the endogenous variables.

The system of structural equations for the constituency influence model of figure 5.1 is:

$X_2 = P_{21}x_1 + e_2$

$X_3 = P_{31}x_1 + P_{32}X_2 + e_3$

$X_4 = P_{41}x_1 + P_{43}X_3 + P_{45}X_5 + e_4$

$X_7 = P_{51}X1 + P_{52}X_2 + P_{53}X_3 + e_5$

$Y = P_{01}x_1 + P_{02}x_2 + P_{03}x_3 + P_{04}x_4 + P_{05}X_5 + e_o$

$e_i = \sqrt{1-R^2}$

P_{ij} (example P_{21}) is the path coefficient, where $_i$ identifies the dependent variable and $_j$ represents the variable whose direct effect on the dependent variable is measured by the path coefficient and the "0" in the path coefficient represents the variable y. In other words P_{ij} is nothing but the regression coefficient of X_i on X_j, using a linear regression of all X_i's supposed to be influencing X_j and when all variables are used in standard forms. The e_is represent contributions of the omitted variables.

As is said above, one of the main advantages of path analysis is that it enables one to measure the direct and indirect effects that one variable has on another. Table 5.2 shows the direct and indirect effects of independent variables on the dependent variables.

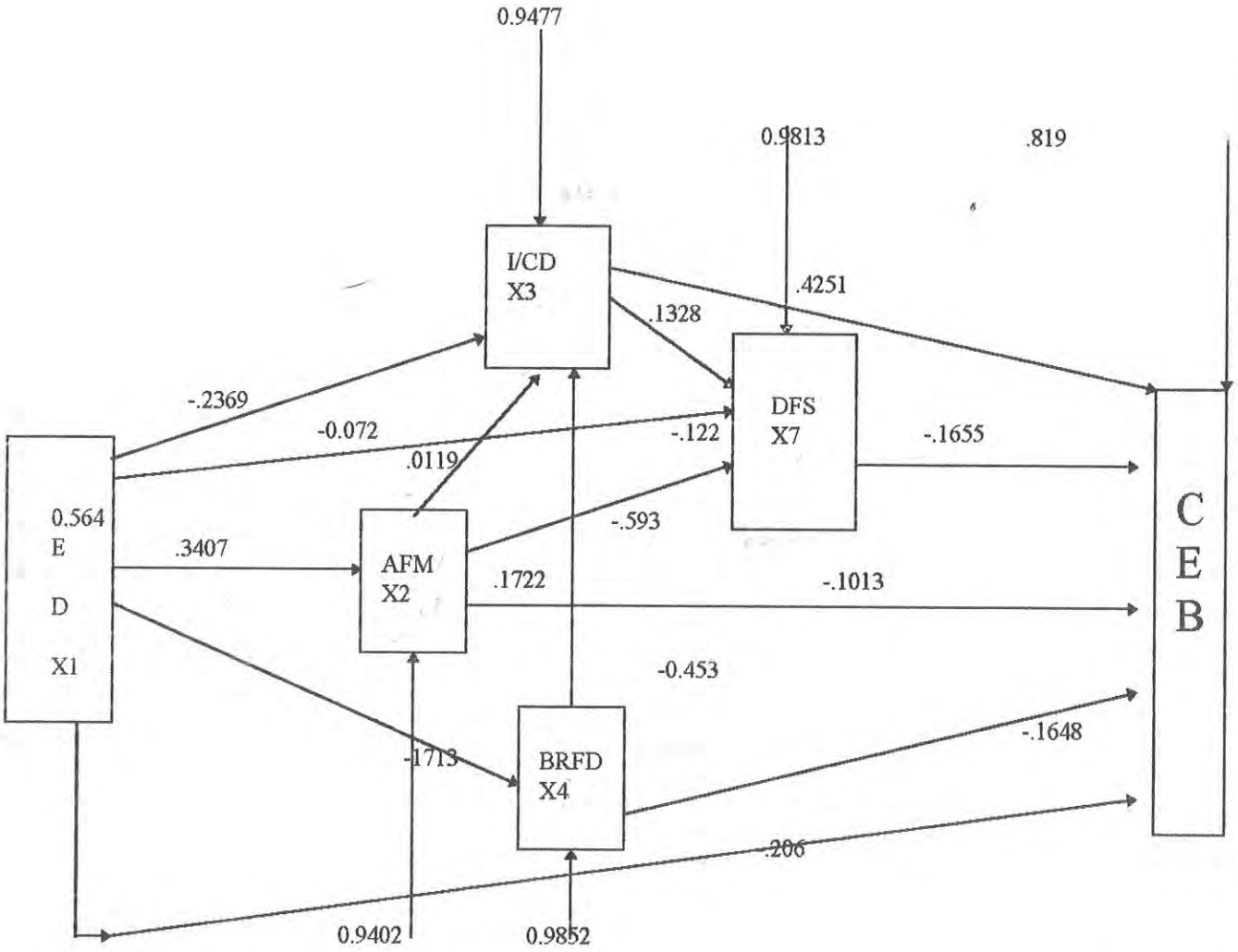


Figure 5.2: Path Diagram of the Fertility determinants of the Currently Married Urban Women, 1990

Table 5.2 Decomposition of Effects in Path model of Maternal Fertility In Urban Ethiopia, 1990

Depene Variable	Predetermined ariable	Direct effect	Indirect Effect Via X2 X3 X4 X5	Total Effect
AFM X2	women's edu X1	0.3407	-	.3407
I/CD X3	Women's ed X1	-.2369	-.0041 - -.0295	-.2704
	AFM X2	-.0119		-.0119
BRFD X4	Breastfeeding Women' edu	.1722		-1722
DFS X5	X1			-.1713
	Women's edu. X1	-.1713	.0120	-.11
	AFM X2	-.1220	- -.0016	.0577 .1328
	I/CD X3	.0593		
CEB Y	Women's ed. X1	.1328		
	AFM X2	-.2062		
	Breast feeding	-.1013	-.033 -.1176 .0151 -.01758	-.2911
	X3	0.4251	- -.0098 .0098	-.1013
	desir family	-.1648	- - - 0.022 -	.4471
	SIZE	.1655	- .077	.2425

Note: ** Path coefficient is significant at 0.001.
* " " " " " 0.05.

5.2 Direct Effects

As shown in Table 5.2, and figure 5.2, all the five variables included in the model, have significant direct effects on children ever born. As expected, the three variables, education of mother, age at first marriage, and duration of breastfeeding (with beta coefficient of-.2602,-.1031 and -.1648 respectively) have direct negative effects on CEB, while desired family size and infant/child death (with beta coefficient of .1655 and .4251 respectively) have direct positive effect on CEB.

The direct path with the largest path coefficient is from infant/child death (beta=0.4251) which is significant at 0.001 level showing that the lower survival probability of children leading to high fertility. The direct effect of education on CEB, (beta=-0.2062) is negative as expected and the variable with least coefficient is age at first marriage (only beta= -.1013).

It means a change in education by one grade has an effect of changing the average parity by 0.2062 child per woman inversely. In other wards a better educated woman has on average (.21) fewer children for each year of education she has received.

5.3 Indirect Effects

The path from education to CEB represents a summation of the whole set of complex causal chains passing through any number of intermidiate variables. The indirect effects of the significant variables mentioned above consist of several different paths which affect children ever born in the same direction. The total effects of these variables on CEB are the summation of both the direct and indirect effects.

Based on the results of the analysis, education affects CEB indirectly via age at first marriage with a compound effect of -0.033, via infant/child death = -0.1176, via breastfeeding = .0151, and via desired family size with a compound effect of -0.0176. The same to this age at first marriage affects CEB indirectly through infant/child death by compound effect of -0.099 and via desired family by 0.0098. Finally duration of breast- feeding affects number of children ever born through infant/child death with a compound effect of 0.770.

Table 5.3 Correlation Matrix of the variables used in the Path Model

Corre.	Q212	AFM	UF	BRFD	Q712	Q408
Q212	1.0000					
AFM	.2839**	1.0000				
UF	-.2714**	-.1001	1.0000			
BRFD	-.2075**	-.0747	.2123**	1.0000		
Q712	-.1104*	.0347	.1174*	.0636	1.0000	
Q408	-.3344**	-.1844**	.4757**	-.0137	.2242**	1.0000

2-tailed Signif: * - .01 ** - .001

Result of Logistic Regression

To see the relationship between the dichotomous dependent variables and education, logistic regression technique is used. Logistic regression estimates the probability of an event occurring. Based on the findings, the relationship between education and work status of mother is not statistically significant except in the higher educational category. The result indicates that, the probability of being a worker is 3.08 times higher in the 11+ educational category compared to that of no schooling (the reference category).

Taking the no schooling as a reference category again, the odds ratio of husband-wife communication is positively associated with education. From Table 5.4, the odds of discussing with their husbands of the 1-4 educational category women was 2.15 times higher compared to the non educated. The same to this the odds ratio of discussing about family size with their

husbands in grades 5-8, 9-10 and 11+ was 3.9, 17.2 and 13.9 times higher compared to the reference category.

The association between the different levels of education and knowledge in methods of contraceptive is positive and all are statistically significant (at p =0.01). From the analysis it means the odds ratio of knowing a method of family planning of the women in grades 1-4 is 2.95 times while in the grade levels of 11 and above was 18.7 times higher compared to the reference category (women with no education). The probability of using contraceptive of the women in the educational category 1-4 times higher compared to the non educated women. As level of education increases the degree of being current user of contraceptive increases. It was 3.7, 5.2 and 9.4 times higher in the educational level of 5-8, 9-10 and 11+ respectively compared to the reference category (see Table 5.4).

Table 5.4 Results of logistic regression of Education on Selected Socio-Demographic variables, Urban Ethiopia, 1990.

Predictors	Regression coefficient (B)	standard error	wald value	Exp(B)
Work Status				
Grade no Schooling	RC	RC	RC	RC
Grade 1-4	-.2432	.1553	2.4534	.7841
5-8	.1768	.1615	1.1972	1.1933
9-10	-.2652	.3152	.7079	.7670
11+	1.1243	.1892	35.3141	3.0780*
Constant	-.4883	.0864	31.9226	
-2LL	1713.639			
Husband-wife comm.				
Grade no Schooling	RC	RC	RC	RC
Grade 1-4	.7656	.1938	15.6108	2.1504*
5-8	1.3560	.1919	49.9559	3.8807*
9-10	2.8424	.3346	72.1720	17.1568*
11+	2.6311	.2122	153.7394	13.8889*
Constant	-1.9951	.1293	238.2648	
-2LL	1255.181			
Knowledge of FP				
Grade no Schooling	RC	RC	RC	RC
Grade 1-4	1.0808	.1643	43.2584	2.9471*
5-8	1.6777	.1735	93.5058	5.3535*
9-10	2.8817	.3698	60.7171	17.8445*
11+	2.9305	.2303	161.9126	18.7365*
Constant	-1.4954	.1085	189.9992	
-2LL	1415.067			
Current Use of Con				
Grade no Schooling	RC	RC	RC	RC
Grade 1-4	1.2326	.1908	41.7173	3.4301*
5-8	1.3104	.2002	42.8246	3.7076*
9-10	1.6466	.3218	26.1893	5.1892*
11+	2.2388	.2106	113.0298	9.3819*
Constant	-2.1361	.1365	244.8637	
-2LL	1265.022			

RC=reference Category
* Significant at 0.01 level

Multiple Regression Analysis

To estimate the precise quentitative relationship between a continous and/or dichotomous variables (education, work status, knowledge of family planning, husband-wife communication and current use of contraceptive) and the continous dependent variable (life-time fertility), multiple regression technique is employed. Multiple regression analysis shows the precise quantitative relationship and strength of association between the pairs. The multiple regression results of the model are displayed in Table 5.5.

Table 5.5 Results of Multiple Regressio n of Life-time Fertility as a function of some socio-economic variables

Explanatory Variables	Estimated Cofficients	Beta Coefficints	t statistics
Work status	-.4281	-.0879	-2.046*
Knowledge	.4206	.0848	1.878
Current use	-.5122	-.1019	-2.445*
Husband-wife com.	-.0807	-.0166	-.368
Education	-.2130	-.4076	-8.286**
Constant	5.813		
Adjusted R^2	.18403		
F	22.8319		
DF			

** Significant at 0.001 level
* Significant at 0.05 level

The regression coefficients measure the amount of increase or decrease in the dependent variable for a unit change in the independent variable, controlling for the other independent variable(s). As a brief summary of Table 5.5, it can be stated that findings of the multivariate analysis are all except knowledge of family planning negatively associated with the number of children everborn. and are consistent with the results obtained in the bi-variate analysis.

Controlling for other variables in the model, the effect of education on life-time fertility is -0.213 and is statistically significant at 0.001 level. It means that for each additional year of education, the life-time fertility of the currently married women is expected to drop by 0.213, on average. Similarly, the beta coefficient or the net effect of education on CEB is -0.408 which is the domnant beta coefficient in the model.

The estimated coefficient of work status of mother confirmed that working mothers had less average parity by 0.43 (significant at 5 percent level) compared to those not working. It means being a worker in the paid labor force, life-time fertility of the currently married had decreased by 0.43 children. Similarly, current use of contraceptive and husband-wife communication had an estiamted coefficients of -0.5122 and -0.0807 respectively showing that as current use of contraceptive and communcation between husband and wife increases life-time fertility decreases. Current use of contraceptive was significant at 5 % level while husband-wife communication was not statistically significant. Knowledge on family planning methods had insignificant relationship with number of children everborn. The possible explanation to this could be that knowing the different methods by itself does not affect CEB unless it is not followed by use of contraceptive. So current use of contraceptive affects knowledge of family planning methods.

Comparison of the estimated coefficients of these variables show that current use of contraceptive (with an estimated coefficient of -0.5122) is the most important explanatory variable followed by work status of mother (with an estimated coefficient of -0.4281).

Finally the adjusted R^2, 0.184, in the model indicates that 18.4 % of the variation in the life-time fertility of the study population is due to the independent variables (education, work status, knowledge, current use and husband-wife communication) included in the model. This value of adjusted R^2 would have increased if all the continous variables used in the path model were icnluded in the regression model.

CHAPTER VI

SUMMARY AND CONCLUSION

The study attempted to assess the nature of relationship between education and life-time fertility through some selected intermediate Variables. Before detailed data analysis, the quality of data was evaluated. In the study, data on children ever born, age data, and duration of breastfeeding were the main target that data evaluation focused. The average parity or mean number of children ever born by age of women was found to be nearly in line with the theoretical expectation, i.e., it increased with age of mother. But data on the reported age showed heaping on numbers ending in zero, five and eight. To minimize this digit preference, the study population were classified into the conventional five year age groups. Similarly data on duration of breastfeeding revealed heaping on multiples of six but it was not that much bad.

Following data evaluation, methods of data analysis, scope and limitations of the study, and the background characteristics of the study population were also discussed. Based on the objectives of the study the investigation was done in three different steps. First the description of the background and intermediate variables, second the relationship between the independent variables with children ever born and finally the relationship between children ever born and all the demographic and socioeconomic variables used was analyzed. Based on the background variables of the study population about 44.2 % were in age groups 30-39 and the mean age of the total study population was 32.2 years. Similarly about 49 % of the

population did not have formal education while the rest 51 percent were from grades 1 to university.

As it is clear from the objectives of the study, investigating effect of women's education on children ever born and pin pointing the threshold levels of education are the main interest. From the review of literature we have seen that, education can either enhance or decrease fertility. It enhances fertility if the effects of shorter duration of breastfeeding and the less in fecundity outweigh the effects of delayed marriage, small family size desire, and increased contraception. Education decreases fertility if the reverse happens. Education, the background variable of the study is classified into five categories and differentials in fertility among currently married women by their background variables controlling it was investigated. The overall mean number of children ever born of the study population was 4.4 children per woman. From the bi-variate analysis, the mean number of children ever born was positively and significantly associated with infant/child death while it was significantly and negatively associated with education, age at first marriage, husband-wife communication, knowledge of family planning. And finally a significant but inconsistent relationship was observed between children ever born and duration of breastfeeding and children ever born and desired family size.

Concerning the investigation of the threshold level of education- at which marked negative differentials in the different intermediate variables is achieved, percentage difference between the educated and uneducated women was calculated. Table 6.1 shows the summary of the threshold level of education in the intervening variables used that affect fertility.

Table 6.1 presents the years of education completed required to generate a 10 percent or greater change in each intervening variable. From the table, completing grades 1-4 is the threshold level of education for infant/child death, husband-wife communication work status of mothers, desired family size and current use of contraceptive. It means women who completed grade 4, achieve a difference or change of 10 percent or more in the intermediate variables compared to the uneducated women.

Similarly the threshold level of education to age at first marriage is grades 9-10, while that of duration of breastfeeding and knowledge of family planning is after completing grade 8.

Table 6.1 Summary of thresholds by which a 10 percent or greater change takes place in the intervening variables.

Variables	Educational Category				
	no schooling	Grades 1- 4	Grades 5 - 8	Grades 9 - 10	Grades 11+
AFM	-	0.69	2.1	22.8	27.6
I/CD	-	-42.9	-59.6	-86.8	-81.5
Duration		-42.9	-38.5	-50.0	-61.5
BRF		-7.7	-13.0	-9.3	-20.4
DFS		-14.8	-37.5	-48.2	-55.4
Comm		-19.6	-25.0	-48.1	-46.2
Knowledge		-7.7	-39.6	-37.5	-43.8
Work		-208	-31.6	-52.6	-52.8
Use		-14.0			

The results of the final analysis on fertility behavior of the currently married urban women indicate that most of the variables (education, age at first marriage, infant/child death, breastfeeding, work status and communication) appear to significantly and directly affect the reproductive behavior of the women. Number of children ever born is positively affected by infant/child death, the strongest predector with beta of 0.425 and desired family size (beta = .1655). Thus the higher infant/child death exprience by mothers,the higher their lif-time fertility to be and the same to this the higher desire of family size will be. Conversely, children everborn is negatively affected by age at first marriage (beta = -.1013) and duration of breastfeeding (beta=-.1648).

The results of the analysis revealed that, controlling for the other variables:

i. The direct or net effect of educational attainment on life-time fertility was negative and statistically significant at a= 0.01. In other words the direction of association between education and number of children ever born was found to be inverse.

ii. The higher age at first marriage attained by increased education has an inverse relation with CEB. Thus the indirect effect of education on children ever born via age at first marriage was negative.

iii. The confidence of educated parents in the high survival probability of their existing children leads them to limit their number of children and this decreases their ultimate family size. Thus the indirect effect of education through infant/child death and desired family size was negative.

iv. Results of the multiple regression show that, work status of mother, discussion between partners about their family size, (though not significant) and use of contraceptive were significantly and negatively associated with children ever born.

v. The threshold level of education where by a modest variation in each intervening variable that affect fertility was observed after completing grade four for most of the variables. But it takes more years of schooling for duration of breastfeeding and knowledge of family planning (after grade 8) and age at marriage (after grade 10) to generate changes of 10 percent.

RECOMENDATIONS

In general the study suggests that women's education directly or indirectly (except through duration of breastfeeding) tends to decrease marital fertility of the currently married urban women and this outweighs its enhancing effects . The results then argue strongly for sustained investment in women's education specifically for insuring universal primary school enrolment, more important attendance- a minimum of four years for girls.

To reach at this goal the following points are recommended.

i. The government and other responsible bodies should had in hand give intensive education to parents, elders, religious leaders, and the society in general to create awareness on the advantages of girls education for development in general and to reduce fertility in particular.

ii. Provide education, specially of lower grades, free from school fees and building schools nearby residential villages in order to decrease school-home distance with that the risk of abdiction of girls which can increase girls enrolment.

iii. Give scholarships and awards for girls can also increase girls enrolment and attendance in schools, with that, their age at first marriage will increase, they will develop small family size norm, thus their ultimate family size will decrease.

iv. Encourage NGO,s that focus on facilitating & improving girls education in the country. The implication of these and other factors can offset the unintentional fertility enhancing effects in the country.

v. The indirect effect of education on life-time fertility via infant/child death was strong & inverse, thus it is recommended to improve the survaival probability of infants/children by improving the prenatal & post natal care services in the country.

vii The compung effect of education through durationof breast-feeding was found to be positive. To reduce the existing high fertility in the country, relevant policies and intensive educaiton on the importance of breast milk should be directed towards promoting breast feeding practice and to extend its duration.

REFERENCES

Abdulahi Hansen. 1988. *Fertility Levels and Differentials in Urban Ethiopia with reference to Metu*, Alemaya and Addis Ababa, Ph.D. Thesis University of Dress Salaam.

Abdulahi, H., Assefa, H., and Yacob Zewoldi 1994. *Proximate Determinants of Fertility in Ethiopia: An Application of the Bongaarts' Model*. Demographic Training and Research center Institute of Development Research, Addis Ababa University, Addis Ababa.

Alemseged, Gebreamlak. 1989. *Fertility Differentials in Addis Ababa case study of one kebele*. M.Sc. Thesis, Addis Ababa University, Addis Ababa.

Anker, R. and James c. Knowles, 1982. *Fertility Determinants in Developing countries:* A case of Kenya, Belgium.

Asher, H.B. 1990. *Causal Modeling, Second edition, Series:* Quantitative Applications in the Social Science, Sage Publications The international Professional publishers Newbury Park London New Delhi.

Assefa, Hailemariam. 1992 "an overview of the determinants of high fertility in Ethiopia" *Ethiopian Journal of Development Research*. Vol.14 No. 2 Addis Ababa.

____. 1994.Population and Development in Ethiopia: Paper presented at a workshop on "integrating population and Development Planning" MOPED, Ethiopia, Addis Ababa.

Bongaart. J. 1978. "A framework for analyzing the proximate determinants of fertility. *Population and Development Review* Vol. 4 No. 1.

Caldwell J. C. 1980. Mass education as determinant of the timing of fertility decline. *Population and Development Review* vol.6(2) 225 -255

Central Statistical Authority (CSA), 1991. *The 1984 Population and Housing Census Analytical report,* Ethiopia, Addis Ababa

Central Statistics Authority (CSA), 1993. *The 1990 National Family and Fertility Survey Report*, Population Analysis and studies center Ethiopia, Addis Ababa.

Cochrane, Susan H. 1979. *Fertility and Education: What do we really know?* World Bank occasional papers, No. 26 Washington D.C.

Eshetu Gurmu. 1994. *Female labor Force Status and Fertility in Akaki; a sub-urban Industrial Town in Ethiopia.* Unpublished M.Sc. Thesis, Addis Ababa University, Addis Ababa.

Faruque, R. and Gulhati, R. 1983. *Rapid population growth in Sub-Saharan Africa*: Issues and policies. World Bank Staff working papers no.559. Washington D.C., USA.

Ferry, B. 1981. Breastfeeding: WFS Comparative Studies No. 13.

Ferry,B. and Smith. 1983. Breast feeding Differencials WFS comparartive Studies No 23.

Freedman, R. et al., 1988. "Education and Fertility in two Chinese provinces 1967-1970 to 1979-1982". *Asia Pacific Journal,* Vol. 3 No. 1.

Gadalla. S., et al., 1987 "The proximate determinants of Fertility in Rural Egypt: A study of Menoufia and Beni-suef Governors, *Journal of Bio-social science* Vol. 19 No. 2.

Hirut Terefe.1994. "population and Development in Ethiopia" in Institute of Curriculum Development research, *Source Book on Population and Family Life Education for Ethiopia.* Addis Ababa.

Jain, Andruh K. 1981. "The effects of female education on fertility: a simple explanation", *Demography* Vol. 18 No. 4.

Jejeebhoy,S.J., 1995.Women's Education, Autonomy, and Reproductive Behavior:- Experience from Developing Countries. Clarendon Press-Oxford New York.

Kasarda, Billy J. and West K. 1986: *Status, Enhancement and Fertility: Reproductive Responses to social Mobility and Educational opportunity,* Studies in population, Academic press, New York.

Koenig, D. 1981 "Education and Fertility Among Cameroon Working Women" in Ware, H (ed.) *Women, Education and Modernization of the Family in West Africa:* Changing African f ily Project series Monograph No. 7.

McCann, M.F. et al., 1981 Breast feeding, fertility and family planning. *Population Reports, Series Journal* No. 24, Population Information Program, John Hokins University, Baltimore.

Ministry of Education, 1995. *Annul statistics of education.* Ethiopia, Addis Ababa.

Office of population and Housing Commission, 1987. *Population and housing census of Ethiopia*, 1984: Analytical Report on results for Addis Ababa, Addis Ababa.

Oppong,C. and Abu, K. 1987. *Seven Roles of Women:* Impact of Education, Migration and Employment on Ghanian Mothers. International labor office Geneva. Women-work and Development 13.

Selvartnam. S. 1988. "population and status of women", *Asia Pacific journal* Vol. 3 No. 2.

Shyrock,H.S and Siegle, 1976. Methods and Materials of Demography, New York, Accademic press.

Seyoum, G. 1990. "Social Structure and fertility in Addis Ababa" *Population and Development Bulletin,* Ethiopia.

United Nations, 1984. *Relationships between Fertility and Education:* a comparative study of WFS data for twenty two developing countries, New York.

United Nations, 1987. *Fertility Behavior in the context of Development:* Evidence from World Fertility survey.

United Nations, 1991. World population Monitoring, *Population Studies* No 126, New York, 1992.

Ware, H. 1981 *women Demography, and Development:* Development studies Center Demography Teaching Notes 3. The Australian National University.

Wang. S. et al., 1987 "proximate determinants of fertility and policy implication in Bejing". *Studies in Family Planning* Vol. 18, No. 14

Yacob Zeweldi, 1991. *Fertility Behavior of Elites and their perception of the population problem in Ethiopia.* Unpublished Masters Thesis Addis Ababa University, Addis Ababa.

Yeshewamebrat Ejigsemahu. 1995. *Breastfeeding :Determinants and Birth Interval Effects in Addis Ababa- A case of Zon one.* Unpublished M.Sc. Thesis, Addis Ababa University, Addis Ababa.

DECLARATION

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

Name: Almaz Hagos

Signature _____

Place and Date of Submission: A.A.U

June, 1997