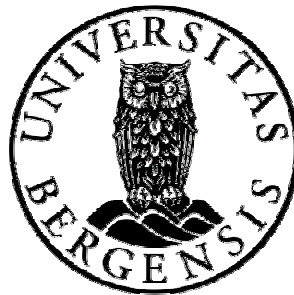


# Preventing HIV among Young People

A community based study from Butajira on traditional norms, sexual health and HIV associated deaths

Mitike Molla



Thesis for the degree Philosophiae Doctor (PhD)

at the University of Bergen

2009

---

I dedicate this work to my beloved brother Teferi Molla

---

# Acknowledgements

I am very grateful to the youth and the health professionals who participated in the study.

My sincere thanks go to the Norwegian State Educational Fund and the Centre for International Health, University of Bergen for funding this study. I would also like to extend my gratitude both to the School of Public Health, Addis Ababa University and the Department of Epidemiology and Public Health, Umeå University, Sweden for the technical and material support they provided during this study. My special thanks go to those who have established and supported the Butajira Rural Health Programme.

In the prolonged engagement in this study, a number of people were involved to bring it to this shape and I owe them all heartfelt gratitude.

My main supervisor, Professor Bernt Lindtjørn deserves very special thanks for his excellent supervision, unreserved support, swift communication and patience. I have no words to express my gratitude.

My supervisor from the home institute, Professor Yemane Berhane also deserves thanks for his concern, mentorship, encouragement, and above all intellectual decision making that gave me all the strength during this work.

My co-supervisor from CIH, Professor Nordrehaug Åstrøm is to be thanked for her unreserved guidance, excellent analytical skills and insight that helped me in the course of the research.

My co- supervisor for the qualitative part, Dr. Maria Emmelin needs to be thanked for her expertise, mentorship skill, friendliness, and compassion that contributed a lot to the completion of this work.

To my co-supervisor, Professor Peter Byass, I am grateful for his support and guidance during this work.

---

I am also grateful for the support and encouragement of my colleagues' friends and administrative staff from the School of Public Health, Addis Ababa University.

I would like to express my gratitude to the staff at the Centre for International Health, University of Bergen: Solfrid Hornell, Borgny Lavik, Helge Opedal, Unni Kvernhusvik and Nils Gunnar Songstad. My appreciation also goes to my friends in Bergen for their love and encouragement.

I am deeply indebted to my mother Mamite Teshome and my late Father Molla Sisay for, sending me to school and helping with raising my children while I was engaged in my higher education. I would also like to thank my sisters (Alemtsehay and Meseret) and brothers (Worku, Abebe, Mussie, and Sisay) for their unreserved support. All my friends who in one way or another supported me also deserve acknowledgement.

The love, endurance and support of my husband Seyoum Alemu and my children Hannamariam and Michael were the source of my success. I love you and am proud of you!

Above all, I praise the Almighty God, for the strength and endurance He gave me all these years. Glory be to him!!!

---

## Summary

Although young adults make up a large proportion of the population in developing countries, their health needs are often neglected. Sexual and reproductive health problems challenge this population in the second decade of life. HIV is one of the major health problems among young people in least developing countries, where the transmission of the disease often starts to pick up at the age of 15-24 years, more profoundly among females.

Applying both qualitative and quantitative research methods, we did this study to assess risky sexual behaviours, reported sexually transmitted infections (STIs) and HIV related mortality among the rural Ethiopian youth. For the behavioural studies, we used cross-sectional design. We used a theoretical model, the theory of planned behaviour (TPB), in a three month follow-up period to see the predictive ability of the model in relation to intended and actual condom use. Data were collected using face-to-face interviews at a household level. We used data from the Butajira Rural Health Programme (BRHP) Demographic Surveillance Site (DSS), 18-years of open cohort, to assess mortality trends among young adults aged 10-24 years.

We found that the traditional norm of keeping virginity until marriage is still observed among the youth in rural South Central Ethiopia. Only 3% of the never-married youth had premarital sex, while almost all married youth started their union as celibates. Young adults who used alcohol, chewed khat, and did not believe in the traditional norm were more likely to have premarital sex. However, we also found that married women are vulnerable to HIV and other sexually transmitted infections (STIs) because of risky sexual behaviours among their husbands.

Among the sexually active youth, 4% had at least one symptom of STIs during the year preceding the study. Most of these were married women. Half of those who had STI symptoms did not seek help, mainly because of shame of having the infection in marriage and taboos related to premarital sex. Also, lack of readiness of the health services for youth sexual and reproductive health (SRH) services,

---

unfavourable attitude of health professionals, women's subordinate position in the society, and lack of knowledge about STIs among youth were possible reasons of the low health seeking behaviour among young people.

Six out seven of the sexually active young adults never used condoms. Using the theory of planned behaviour (TPB), we found that the intention to use condoms was strongly influenced by attitude; however, in the 3-month follow up period, previous condom experience was found to be the strongest determinant of condom use in our theoretical model.

The overall mortality declined during the period 1987-2004. Although declining, malaria still represents the leading reported cause of death. There were few HIV related deaths among the youth. However, low condom use, risky sexual behaviour among young married men and lack of health seeking behaviour for STIs suggest that the youth in Butajira are vulnerable to HIV and other STIs. Alcohol use and khat consumption represent risk factors for HIV related behaviour among the never-married youth, particularly in towns.

Upholding the traditional norm of virginity, which helps in delaying sexual debut, prevention programmes should encourage HIV counselling and testing (HCT) before marriage, and faithfulness in marriage. Condom use among non-users should be encouraged and strengthened among ever-users to bring about consistent use in all non-mutual monogamous relations. The health services should be reoriented towards young adults' sexual and reproductive health (SRH) to improve use.

---

## Original Papers

This thesis is based on the following papers, which will be referred to in the text by their roman numerals.

- PAPER I Molla M, Berhane Y, Lindtjørn B. Traditional values of virginity and sexual behaviour in a rural Ethiopian youth: results from a cross sectional study. *BMC Public Health*. 2008, Jan. 9; 8(1):9
- PAPER II M. Molla A. Nordrehaug Åstrøm , Y. Berhane Y: Applicability of the theory of planned behavior to intended and self reported condom use in a rural Ethiopian population. *AIDS Care*, 2007, 19 (3):425-431.
- PAPER III Molla M, Emmelin M, Berhane Y, Lindtjørn B. Readiness of youth in rural Ethiopia to seek health services for sexually transmitted infections *AJAR* 2009; 8(2):00-000. In press
- PAPER IV Molla M, Byass P, Berhane Y, Lindtjørn B. Mortality decreases among young adults in south-central Ethiopia. *Ethiop.J.Health Dev.* 2008; 22(3):218-225

---

## Acronyms

|        |  |
|--------|--|
| AIDS   | Acquired Immunodeficiency Syndrome                               |
| ANC    | Antenatal Clinics  |
| BRHP   | Butajira Rural Health Program                                    |
| DSS    | Demographic Surveillance Site                                    |
| EDHS   | Ethiopian Demographic and Health Survey                          |
| HCT    | HIV Counselling and Testing                                      |
| HIV    | Human Immunodeficiency Virus                                     |
| ICPD   | International Conference on Population and Development           |
| Km     | Kilometre  |
| M      | Metre  |
| NGO    | Non Governmental Organizations                                   |
| NNE    | North North East   |
| PA     | Peasant Association  |
| PHCU   | Primary Health Care Units  |
| SNNPRG | Southern Nations, Nationalities and People's Regional Government |
| SRH    | Sexual and Reproductive Health                                   |
| SSW    | South South West   |
| STI    | Sexually Transmitted Infection                                   |
| TPB    | Theory of Planned Behaviour                                      |
| UN     | United Nations   |
| VCT    | Voluntary HIV Counselling and Testing                            |
| WHO    | World Health Organization  |



| <b>Contents.....</b>  | <b>Page</b> |
|---|-------------|
| <b>ACKNOWLEDGEMENTS.....</b>  | <b>I</b>    |
| <b>SUMMARY.....</b>   | <b>III</b>  |
| <b>ORIGINAL PAPERS .....</b>  | <b>V</b>    |
| <b>ACRONYMS .....</b>   | <b>VI</b>   |
| <b>CONTENTS.....</b>  | <b>VII</b>  |
| <b>1. INTRODUCTION .....</b>  | <b>1</b>    |
| 1.1 SEXUAL AND REPRODUCTIVE HEALTH OF YOUNG PEOPLE.....   | 1           |
| 1.2 HISTORICAL BACKGROUND OF SEXUAL AND REPRODUCTIVE HEALTH.....  | 4           |
| 1.3 SEXUAL BEHAVIOUR AND OCCURRENCE OF HIV AND OTHER SEXUALLY TRANSMITTED<br>INFECTIONS AMONG ETHIOPIAN YOUNG ADULTS..... | 6           |
| <b>2. RATIONALE OF THE STUDY .....</b>  | <b>10</b>   |
| <b>3. STUDY AIMS .....</b>  | <b>12</b>   |
| 3.1 GENERAL AIM.....  | 12          |
| 3.2 SPECIFIC AIMS .....   | 12          |
| <b>4. PARTICIPANTS AND METHODS.....</b>   | <b>13</b>   |
| 4.1 COUNTRY PROFILE .....   | 13          |
| 4.1.1 <i>Population</i> .....   | 13          |
| 4.1.2 <i>Economy</i> .....  | 14          |
| 4.1.3 <i>Health service structure and coverage</i> .....  | 14          |
| 4.2 STUDY AREA.....   | 14          |
| 4.2.1 <i>Health services</i> .....  | 15          |
| 4.2.2 <i>Education</i> .....  | 15          |
| 4.2.3 <i>Economy</i> .....  | 15          |
| 4.2.4 <i>The study setting: Butajira Rural Health Programme (BRHP)</i> .....  | 16          |
| 4.3 STUDY POPULATION .....  | 17          |
| 4.4 STUDY DESIGN .....  | 18          |
| 4.4.1 <i>Cross-sectional studies: Papers I and III</i> .....  | 18          |
| 4.4.2 <i>Cohort studies: Papers II and IV</i> .....   | 18          |
| 4.4.4 <i>Qualitative studies</i> .....  | 20          |
| 4.5 SAMPLE SIZE AND SAMPLING METHODS.....   | 21          |
| 4.6 DATA COLLECTION.....  | 23          |
| 4.7 DATA MANAGEMENT AND STATISTICAL ANALYSIS .....  | 24          |
| 4.8 ETHICAL ISSUES .....  | 27          |

|           |   |            |
|-----------|---|------------|
| <b>5.</b> | <b>MAIN FINDINGS OF THE PAPERS .....</b>  | <b>28</b>  |
| 5.1       | PAPER I: TRADITIONAL VALUES OF VIRGINITY AND SEXUAL BEHAVIOUR IN RURAL ETHIOPIAN YOUTH: RESULTS FROM A CROSS SECTIONAL STUDY .....                                  | 28         |
| 5.2       | PAPER II: APPLICABILITY OF THE THEORY OF PLANNED BEHAVIOUR TO INTENDED AND SELF REPORTED CONDOM USE IN RURAL ETHIOPIAN YOUTH.....                                   | 29         |
| 5.3       | PAPER III- YOUTH IN RURAL ETHIOPIA HEISTATE TO SEEK HEALTH SERVICES FOR SEXUALLY TRANSMITTED INFECTIONS: A CROSS-SECTIONAL STUDY IN BUTAJIRA(CENTRAL ETHIOPIA)..... | 29         |
| 5.4       | PAPER IV- MORTALITY DECREASES AMONG YOUNG ADULTS IN SOUTH.....  | 30         |
| <b>6.</b> | <b>DISCUSSION.....</b>  | <b>32</b>  |
| 6.1       | METHODOLOGICAL CONSIDERATIONS .....   | 32         |
|           | 6.1.1.1 <i>Study design and method of analysis</i> .....  | 32         |
|           | 6.1.1.2 <i>Precision</i> .....  | 33         |
|           | 6.1.1.3 <i>Validity</i> .....   | 34         |
| 6.2       | DISCUSSION OF MAIN FINDINGS .....   | 38         |
| 6.3       | IMPLICATIONS OF THE STUDY .....   | 43         |
| <b>7.</b> | <b>CONCLUSION AND RECOMMENDATIONS.....</b>  | <b>45</b>  |
| 7.1       | CONCLUSION .....  | 45         |
| 7.2       | RECOMMENDATIONS.....  | 47         |
|           | 7.2.1 <i>For practical measures</i> .....   | 47         |
|           | 7.2.2 <i>For research considerations</i> .....  | 47         |
|           | 7.2.3 <i>For policy measures</i> .....  | 48         |
|           | <b>SOURCE OF DATA .....</b>   | <b>50</b>  |
| <b>8.</b> | <b>PAPERS I-IV .....</b>  | <b>63</b>  |
| <b>9.</b> | <b>APPENDICES.....</b>  | <b>139</b> |
| 9.1       | SURVEY QUESTIONNAIRE.....   | 141        |
| 9.2       | IN-DEPTH INTERVIEW GUIDE.....   | 152        |
| 9.3       | CONCENT FORM.....   | 157        |
| 9.4       | LETTERS OF ETHICAL APPROVAL.....  | 158        |

---

# 1. Introduction

## 1.1 Sexual and reproductive health of young people

About 1.3 billion young people live in the developing world (1). The age classification of young people varies, but the UN refers to those aged 10-19 as adolescents and those aged 15-24 as youth. People aged 10-24 years are often called young people or young adults (2, 3).

Adolescence is the transition from childhood to adulthood. It is a period when important physical, psychological and behavioural changes take place. It is a development from the onset of puberty to full sexual and reproductive maturity, the beginning of independent life, a time of exploration, and expanding horizons. This period harbours vulnerability and risk, but it also carries great opportunity for sustained health and well-being through education and preventive efforts (3, 4).

Though the same physical development and changes occur universally at adolescence, the nature and experience of adolescents vary by gender, marital status, class, region and cultural context (2). Adolescents in different settings face different challenges, different needs and expectations, different behaviours based on different norms and cultures attached to this specific age group (5). For example, in some cultures a girl younger than 15 years is expected to involve in marriage, while this is not acceptable in other cultures (6, 7). Gender and age also contribute to differences in opportunities and threats in life. Young women are more vulnerable to much of the reproductive health problems and their consequences than young men. In the same manner, young people aged 10-14 years have different needs than those aged 15-19 or 20-24 years (2).

Adolescent reproductive health is one of the key issues addressed in the 1994 International Conference on Population and Development (ICPD) programme of

---

action as sexuality and reproductive health of this age group is one of the challenges the world is facing today (5, 8). However, young people have not been considered a health priority everywhere probably due to the lower morbidity and mortality in this age bracket than in the older and younger age groups (9). The consequences of early pregnancy and sexually transmitted infections including HIV and AIDS, however, threaten the health of young people in their reproductive debut more than that of any other age group (10).

Globalization is changing traditional ways of life, often resulting in urbanization, migratory working habits, and changing opportunities for education and employment. In addition, the influence of media and peers shapes the behaviour of young people, which often leads to sexual freedom (9). Pre-marital sexual activity among young people increased in every country as the age of marriage is increasing because of urbanization and education (2, 11).

Many young people are engaged in sexual activity before they turn 15 (2, 12). However, this activity might not be planned, and many young people do not use condoms for protection from STIs and HIV(2). Young people lack information on sexual health, skills to negotiate sexual relations, and access to reproductive health services. Although the majority have heard about HIV and AIDS, many do not know how HIV is spread, and therefore do not believe they are at risk (12). Culture plays a significant role in discussing issues about sexuality among young adults. Some cultures disapprove of having sexual intercourse before marriage. The taboo nature of sexual activity before marriage forbids young people from seeking information and services on sexuality (5). Gender inequalities in most developing countries might worsen this situation as young women's ability to seek reproductive health services is limited (3).

Sexually transmitted diseases due to unsafe sex are among the leading causes of disease burden worldwide (13) . The World Health Organization (WHO) has shown that the burden of STIs has more than doubled between 1995 and 2000 (from 2.3% to 6.3 %) (13). An estimated 340 million new cases of sexually

---

transmitted infections occur every year. A third of these occurs among young adults (14).

In sub-Saharan Africa, young people are hardest hit by the HIV pandemic. About 11.8 million young adults are living with HIV (12). About half of all new adult infections that count to about 6000 daily is acquired at young age (12). In spite of grave infections such as HIV, the youth often practice risky sexual behaviour. A review of case studies by the WHO in developing countries revealed that multiple partners, irregular use of condoms and other contraceptives, unwanted pregnancies, frequent occurrences of unsafe abortions, forced sex, and gender inequalities favouring male to have premarital sex were common among the youth (15).

However, provision of information and services for young people is still controversial because of fear of disapproval by parents (5, 6). In many settings where premarital sex is a taboo, addressing specific sex-related topics like HIV, STIs, and condoms is believed to encourage premarital sex (5, 16).

Countries that have successfully decreased the HIV prevalence have achieved the gains mostly by encouraging safer sexual behaviour in adolescents (10, 17).

Adolescent health services should be seen as an opportunity of promoting healthy lifestyle and treating emerging problems which will create a healthier generation (4).

Behaviours learned in adolescence, and the health consequences of sexual health problems have lasting effect at individual and public health level (4, 9).

Adolescent sexual and reproductive health should not be viewed as a responsibility of one sector nor should it be designed in a universal package. It is a cross-cutting issue of several sectors, a problem of not only individuals but of couples, families and the society at large. Therefore, SRH programmes should be designed according to particular situations and needs (5).

---

## 1.2 Historical background of sexual and reproductive health

The 1948 Universal Declaration on Human Rights affirms the fundamental right of everyone to health, where sexual and reproductive rights are integral part (18). The right of women, children and choice in reproduction was recognised and included in the 1968 World Conference on Human Rights (19).

Previously, reproductive health was regarded as family planning plus basic maternity care and treatment of sexually transmitted infections (STIs). However, sexual and reproductive health surpasses these vertical programmes. It also includes human rights and ethical issues that promote the autonomy and dignity of men and women on sexual relations (20).

Reproductive health has been widely accepted since the 1994 International Conference on Population and Development (ICPD) held in Cairo (6). The ICPD emphasizes that reproductive health is not merely the absence of disease or infirmity of the reproductive health system, but also includes a spectrum of conditions, processes and events in the lifetime of men and women ranging from healthy sexual development to abuse disease and death (6).

Sexual health has been linked to and incorporated into the definition of reproductive health since the ICPD in 1994. Recently, this concept was challenged, and sexual health is considered as a necessary underlying condition for reproductive health. Sexual health is important throughout the life span of an individual, and not only during the reproductive years (21). WHO defines sexual health as *“a state of physical, emotional, mental and social well being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual*

---

*relationships, as well as the possibility of having pleasurable and safe sexual experiences free from coercion, discrimination and violence (21).”*

The definition further explains that *“Sexuality is a central aspect of being human throughout life and encompasses sex, gender identities and roles, sexual orientation, eroticism, pleasure, intimacy and reproduction. Sexuality is experienced and expressed in thoughts, fantasies, desires, beliefs, attitudes and behaviours, practices, roles and relationships. While sexuality can include all of these dimensions, not all of them are always experienced or expressed. Sexuality is influenced by interaction of biological, psychological, social, economic, political, cultural, ethical, historical, religious and spiritual factors (21).”*

In every society, sexuality and sexual behaviour have marked consequences at individual, family and societal level. Sexual and reproductive health of many people around the world is still not well addressed. Some governments have coercive sexual and reproductive programmes, and ignored reproductive rights of women (22, 23). Women in developing countries and adolescents all over the world are still disempowered. Sexual and reproductive health services are non-existent, poorly organized or underutilized because of the discomfort associated with discussing sexual intercourse and sexuality. The pressure exerted by certain conservative religious, cultural and political groups negatively affects the progress made in SRH (23, 24). In addition, behavioural factors, quality and availability of reproductive health information, power relation between men and women, and discriminatory social practices are some of the factors that contribute to poor SRH in developing countries (8).

---

## 1.3 Sexual behaviour and occurrence of HIV and other sexually transmitted infections among Ethiopian young adults

HIV has been a threat to Ethiopia since the mid 1980s (25). The first evidence of HIV was identified from stored sera in 1984 (26). The mode of transmission of HIV in Ethiopia is mainly through unsafe heterosexual sex. Multiple sexual partnership and STIs are the most important contributing factors to the transmission of HIV in the country (27). The 2005 EDHS report showed that 9% of men and 3% of women aged 15-49 years had sex with someone other than their spouse or cohabitating partner a year before the survey. Urban residents of both sexes were engaged in risky sex more than were their rural counterparts(28).

At the beginning of the epidemic, female commercial sex workers and lorry drivers were the most affected by HIV (29, 30) . Currently, there is a generalized epidemic in the country (a consistent prevalence of above 1% in pregnant women) (31, 32) where population movements is mainly responsible for the transmission of the disease. Farmers travelling between home and urban market areas, demobilized soldiers and truck drivers are incriminated for the transmission of the disease to the rural parts of the country (33).

The HIV prevalence in Ethiopia has been estimated from antenatal sentinel surveillance sites since the early 1990s (34). However, the surveillance system was not free from problems of estimation (34, 35). The main problem with the system was under-representation of the rural population which is more than 85% of the population. Limited access to health services because of long distance between residential area and health services, low level of education, poverty and young age are the factors contributing to the low health service utilization among rural pregnant women (35-37). The 2005 EDHS indicated a huge gap between urban and rural service use, where 69% of the urban pregnant women and only 24% of the rural pregnant women had used antenatal service (37). As health



---

service utilization is limited due to the above problems, only those who had health problems visited the health centres which is a possible source of bias in estimation (38). In addition to low health service utilization by the rural pregnant women, the location of sites was also biased towards high prevalence areas because of the first serological surveys that followed the main trade routes (39). The first AIDS report of the MoH documented the national prevalence estimate based on six rural and four urban antenatal clinic (ANC) sentinel surveillance sites. The 1996 AIDS report of Ethiopia indicated that the prevalence of HIV almost doubled between 1993 and 1996 (27). A high national prevalence of HIV has continued to be reported since then, with the highest reported prevalence from 15 surveillance sites being 7.3% in 2000 (40). However, with the increase in the surveillance sites from 10 in 1992/1993 to 82 in 2005, and the use of more advanced projection methods, the estimates had greatly improved (27, 40-42). Based on the new estimates, the prevalence for 2005 was 3.5% (10.5% for urban and 1.9% for rural), which is much lower than the earlier estimates (40, 41, 43). The 2005 EDHS report, which was a better representative of the population, further indicated a lower national prevalence of 1.4 (5.5% for urban and 0.7% for rural areas) (28). The report further showed a lower HIV prevalence (0.7%) among young people 15-24 years, with a rural prevalence of 0.4% and urban prevalence of 2.1% (44). However, the decline in the prevalence should be interpreted cautiously as the changes in the estimation method and the addition of sites make comparison between the previous and the current estimates difficult (39).

A trend analysis performed using ANC data from 1989-2003 indicated the heterogeneity of the epidemic in the country with the highest site prevalence being 48 times higher than that of the lowest. As most rural surveillance sites were newly included, assessing trends was difficult for these areas. For sites where serial data were available, more sites indicated a declining trend in the prevalence where this trend was more pronounced among young antenatal clinic attendants (45).

---

However, the actual number of deaths that the disease caused among young people is huge due to the rapid increase in population which grows at an annual rate of 2.6% (45). In 2005, a third of all deaths among young people aged 15-49 was attributed to AIDS (43). Most deaths in Ethiopia occur at home; therefore, estimation of AIDS related mortality is difficult. Nevertheless, some population based studies suggest that the impact is not negligible. A verbal autopsy done in Butajira in 2000 showed that AIDS related mortality among adults aged 15-64 was 4.8% in the rural areas and 11% in the urban settings (46). A cemetery based study conducted in Addis Ababa indicated an increase on mortality rate of young women aged 20-24 years from 2.1/1000 in 1984 to 3.3/1000 in 2001(47).

Many community and school based studies in Ethiopia suggested that young people are at risk of STIs, including HIV. A study from Addis Ababa conducted on the youth of 15-24 years of age indicated a prevalence rate of 3% of HIV. This study further documented that young people were engaged in premarital sex because of peer pressure, exposure to unlicensed erotic video films, and economic reasons (48). A recent study among high school students in Northwest Ethiopia, Gondar, showed 1.1% HIV prevalence and 10% STI prevalence. The study further indicated that 17% of the students had sex with non-regular partners and commercial sex workers (49).

The Ethiopian Behavioural Surveillance Survey (BSS) reported a 5% reported prevalence of STIs among out-of-school youth (50). Other studies indicated a reported prevalence of 2-3% of STIs among the youth 15-24 years in different parts of the country (51, 52).

Different behavioural studies conducted among urban youth indicated that about 33-49 % of male and 6-10 % of female adolescents were sexually active with mean age at sexual debut of 11-17 years for both sexes (49, 53-59). Multiple sexual partnership was reported as a common practice in most studies in the country (32, 48, 57). About two out of every three sexually active out-of-school youth had sex with more than one partner (41)

---

On the other hand, many studies, including the BSS 2002 of Ethiopia, showed a high knowledge about HIV and AIDS among young people of 15-24 years of age (49, 59-61). Among the 2000 BSS participants, most youth in Somali, Afar and Gambella Regional States perceived themselves to be at lower risk of HIV (50). On the other hand several studies documented that most of the sexually active youth had been engaged in unprotected sex (45, 48, 54, 55, 57, 60). Although young adults in Ethiopia are at risk of STIs including HIV, programmes that cater for the reproductive health needs of young people were either poorly focused or totally unavailable. The existing reproductive health programmes were not either gender or age disaggregated and do not give attention to married adolescents. The situation is much worse in rural areas where more than 80% of the population lives (62). Recently, the Ministry of Health issued its first Reproductive Health Strategy, followed by Adolescents Health Strategy, which is believed to guide health programme managers at all levels (62, 63).

---

## 2. Rationale of the study

The HIV pandemic is a threat to the young generation especially in the sub-Saharan Africa. Without effective interventions, many more people in the developing world would be infected by 2010 (64). Prevention methods based on behavioural modifications are important to halt heterosexual transmission of HIV when there is no vaccine. There are evidences from the industrialized countries indicating that HIV and AIDS epidemic can be controlled by implementing carefully selected prevention strategies (65).

Ethiopia is one of the countries affected by this pandemic. The prevalence of HIV among young people aged 15-24 years is still high in this country suggesting continuous occurrence of new infections (43). Therefore, the National AIDS Strategic Framework of Ethiopia recommends behavioural change as the main method of controlling HIV transmission (66). Though the problem is widely recognized, specific information on sexual behaviours and outcomes, such as STIs and AIDS related mortality among young adults in rural communities is limited.

We conducted studies among young adults in rural Ethiopia to gain a better understanding at the time of behaviour formation and modelling (67). Adolescents that do not have good information about sexuality tend to test their sexual capability without protection, and try high-risk behaviours like drug and alcohol abuse (67, 68). Studies from other African countries also show that deaths from AIDS are the result of HIV infection acquired at the late teen ages assuming an average sero-conversion period of 10 years (69, 70). Therefore, interventions introduced among young adults would benefit the generation to come (71).

Behavioural studies help to assess the behavioural pattern of the target population by explaining who do what and why in specific contexts (72). Understanding people's behaviour helps targeting interventions appropriately. Paper I of this thesis identifies risky sexual behaviour and predictors of such behaviour among

---

young people. The sexual behaviour of male and female, married and never married in both rural and urban communities was explained. Theory based studies could help to target behaviour and predict appropriate interventions. In paper II, we used the theory of planned behaviour to predict condom use in a rural population (73).

The role of STIs in fuelling the HIV epidemic is well documented (74). Some studies suggest that controlling STIs might reduce the spread of HIV (74). We, therefore, studied the knowledge, reported prevalence and health service use of the youth for STIs (Paper III). Further, the attitude and perception of youth towards SRH health services and the attitude, perception and practice of health professionals in relation to youth SRH programmes in the area were determined. Such knowledge might be important to improve the sexual and reproductive health of young people in Ethiopia.

Policy makers will have a trade-off between alternative interventions if they are aware of the impact of the HIV epidemic (75). However, causes of death in general and AIDS related deaths in particular are limited and hard to get in Ethiopia because of the absence of vital registration system. Population based information is most reliable to estimate mortality without civil registration if collected prospectively and continuously (76). We used the Butajira DSS to measure the risk of death among the youth and adolescent population. These assumptions were the basis for formulating the objectives of this thesis.

---

## 3. Study Aims

### 3.1 General aim

The general objective of this thesis is to assess the sexual behaviour of young adults and its consequences such as STIs, health seeking behaviour and mortality on the group in predominantly rural Butajira and come up with recommendations to improve their sexual health.

### 3.2 Specific aims

- i. To assess sexual behaviour of the youth in relation to traditional norms of virginity (Paper I).
- ii. To determine the predictors of condom use, applying the theory of planned behaviour (Paper II).
- iii. To describe the youth's health seeking behaviour, access, use and perception of health services for STIs (Paper III).
- iv. To assess, in the era of HIV and AIDS, mortality trends among young adults aged 10-24 years (Paper IV).

---

## 4. Participants and Methods

### 4.1 Country profile

Ethiopia is an ancient independent country with rich culture and unique alphabet that dates back 3000 years. It is situated in the north-east African region usually known as the Horn of Africa (77). The tropical location of the country endowed it with variations in altitude which resulted in great diversity of terrain, climate, soil, and ecology. The western highlands get summer rainfall; the lowlands and eastern highlands are hot and dry. Most people live in the western highlands and the capital, Addis Ababa, which is the highest capital city in Africa at 2,400 metres above the sea level and found at the heart of the country (78, 79). The country is divided into nine Regional States locally known as *kilils* namely: Tigray, Afar, Amhara, Oromia, Somali, Benishangul-Gumuz, Southern Nations, Nationalities and People's Region (SNNPR), Gambella, Harari and two city administrations: Addis Ababa, and Dire Dawa (80).

#### 4.1.1 Population

In 2007, about 77 million people lived in Ethiopia. The population age structure is typical of a developing country. Forty seven per cent of the population is younger than 15 years of age, 50 per cent is between the ages of 15 to 64 years, and only 3 per cent is older than 65 years of age (80). About 33% of the Ethiopian population is in the age group of 10-24 years (81). Only 16 percent of the population lives in urban areas (82).

---

## 4.1.2 Economy

The country has an agrarian economy where agriculture accounts for 47.7% of its gross domestic product (GDP). About 80% of the population is deriving its livelihood from agriculture. Ethiopia is one of the poorest countries in Africa with an average per capita gross national product (GNP) of 110 USD in 2004 (80, 83, 84).

## 4.1.3 Health service structure and coverage

The government of Ethiopia developed a Health Sector Development Programme (HSDP) which enables it to increase access and quality of care for its population (85). The health service structure is a four-tiered system. It includes primary health care units (PHCU) comprising a health centre and five satellite health posts designed to serve 25,000 people; a district hospital that provides comprehensive care and training for a catchment population of 250,000 people, and zonal hospitals providing services in the four basic specialities (internal medicine, surgery, gynaecology and paediatrics), to 1, 000,000 people, and clinical training for nurses. Central referral hospitals are the highest level that provide sub-specialist care and clinical training for doctors and other higher medical professionals (85). As of mid 2007, there were 143 hospitals, 690 health centres and 9,914 health posts. Services delivered by private and non-governmental facilities make up one-third of all service deliveries. Currently the primary health care service coverage is 87 %. and the per capita health expenditure at the end of 2006/2007 was 13.4 Eth Birr (USD 1.50) (86).

## 4.2 Study Area

We carried out the study in south-central Ethiopia in Meskan and Mareko *Woreda* (district) in the Guraghe Zone of the Southern Nations, Nationalities and People's



---

Region (SNNPR) (see Figure 1). The district is located 130 km south of Addis Ababa. The altitude of the district varies from 1750 to 3740 metres above the sea level. Its topography varies from warm and dry lowlands to mountainous and cooler highlands. The population density is high with 392 persons per square km. About 340,000 people live in the area (82). The district has currently been reorganized as Meskan *Woreda* which has 41 *kebeles*<sup>1</sup> (communes) and Mareko *Woreda*. The administrative town is Butajira (87).

### **4.2.1 Health services**

The population gets health services from public, private and NGO health institutions and programmes. At the end of 2006, a district hospital, four health centres, ten health posts and two pharmacies served the population. In addition, one hospital and one clinic were run by NGOs. There were twelve private clinics, two pharmacies, two rural drug sellers and two rural drug stores. At the end of 2006, the district hospital and the health centres were staffed by a gynaecologist, a surgeon, a public health officer, four general practitioners, 33 nurses, five pharmacy and four laboratory professionals and 16 primary health workers.

### **4.2.2 Education**

There are one technical, three secondary and 40 primary schools, and five kindergartens in the district. In 2006/2007 academic year, 25,546 boys and 26,753 girls were enrolled in schools. Of these, 10,998 girls and 7,616 boys were from the Butajira town. The male to female enrolment ratio was 1:1.05(87).

### **4.2.3 Economy**

Farming is the main mode of subsistence for the rural population. Red pepper, khat and coffee are the main cash crops. The staple food in the area is 'Enset'

---

<sup>1</sup> The smallest administrative unit in Ethiopia

---

(*ensete ventricosum*) and maize (88). The area, especially the lowlands, often experience food scarcity due to droughts. In the administrative town Butajira, the economy is based on commercial activities, and public and private services. At the end of 2006, there were 817 government employees in the district (87).

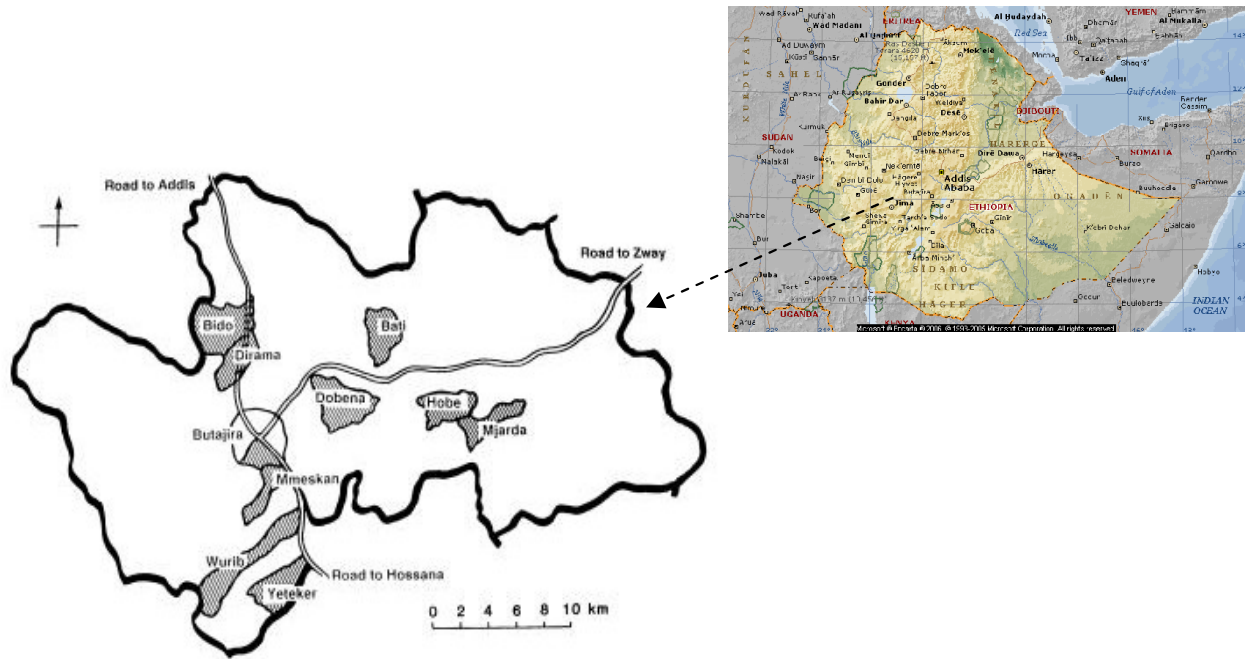
#### 4.2.4 The study setting: Butajira Rural Health Programme (BRHP)

We did this study as part of the Butajira Rural Health Programme (BRHP), which since 1987 runs a demographic surveillance in the area (89). At the start of the BRHP, out of the 82 *kebeles* in the former Meskan and Mareko district, nine rural and one urban *kebeles* were randomly selected. The aim was to set up an epidemiological field laboratory. The *kebeles* included in the BRHP are listed in Table 1. The BRHP represents a collaboration between the then Department of Community Health at Addis Ababa University and the Department of Public Health and Clinical Medicine at Umeå University in Sweden (89, 90). Many Masters and PhD students have used the BRHP data for their research (88-92).

At the beginning of the project, a baseline census was conducted to establish a demographic surveillance system followed by monthly registration of vital and migratory events. These events include births, deaths, marital status, registration of new households, in and out-migration, and internal move within the study area. Each event was recorded separately using a structured instrument at a household level. The DSS operates as an open dynamic cohort. The individual person-times contributed are aggregated to serve as denominators for calculation of health and demographic indices. So far, three complete censuses (in 1986, 1995 and 1999) were done. Currently, events are registered quarterly, and updated continuously (89, 90).

Based on the first 10-year surveillance, a recent study has shown the robustness of the BRHP database (93). The study further emphasised that random errors and missing data in key parameters in large dataset had little noticeable change on

population and mortality profiles. Based on the BRHP database, the study concluded that stakeholders in DSS studies including regional, national and global policy makers can use DSS data with confidence (93).



**Figure 1 The study site Butajira indicating the 10 Kebeles/ villages included in the BRHP**

### 4.3 Study population

In this thesis, the study population includes all young adults aged 10-24 years residing in the BRHP study site. This age group comprises 34 % of the population. At the time of the studies (Paper I-III in 2004), there were about 16,700 young adults, 49 % male and 51% female. Among these, 36% were in the 10-14 year age group while the rest were in the age group of 15-24 years. 87% lived in the rural villages.

---

## 4.4 Study design

### 4.4.1 Cross-sectional studies: Papers I and III

We used a cross-sectional study design to assess risky sexual behaviour in relation to traditional values of virginity, health service utilization and perception about health services in the study area. In these studies, we interviewed 3743 young people using a structured questionnaire.

### 4.4.2 Cohort studies: Papers II and IV

In Paper II, the applicability of the theory of planned behaviour (TPB) to intended and self reported condom use was assessed prospectively. We used the same population as in Papers I and III. The theoretical model shown in Figure 2 was adapted from the TPB and used as a framework for the study (94). We employed a two stage measurement: at stage I, we measured intention to condom use among 802 (21%) of the 3743 youth who gave personal information about their sexual activity. At stage II, i.e. after three months, we assessed the behaviour (condom use) of 743 youth whose intention to use condoms was measured at stage I. The response rate at stage II was 93%.

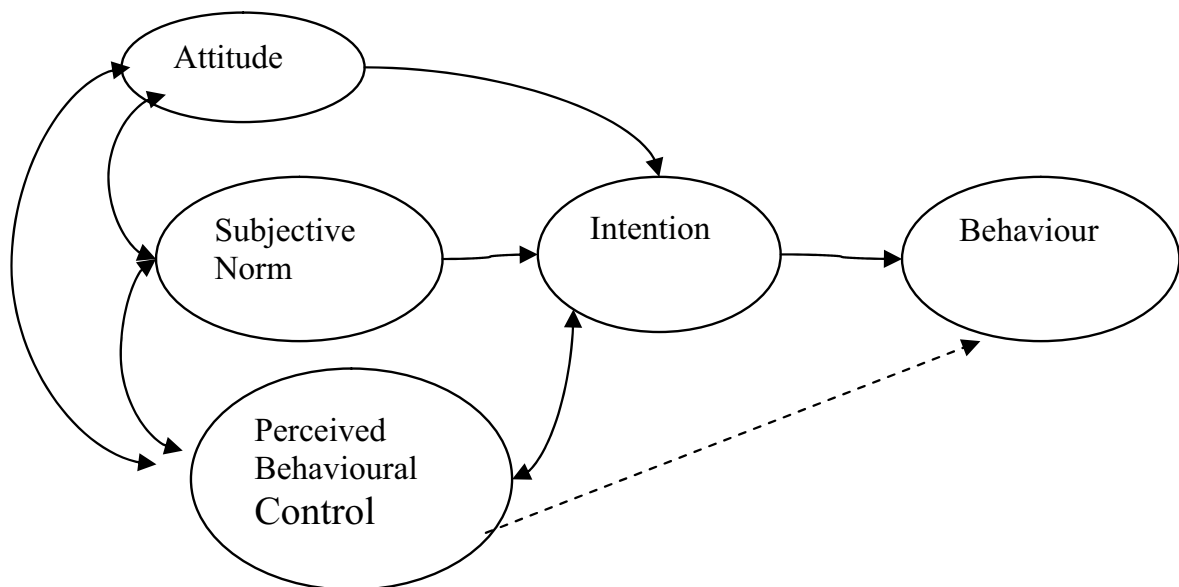
### 4.4.3 Description of Theory of Planned Behaviour (TPB)

The theory of planned behaviour, which is an extension of the theory of reasoned action, was developed to deal with behaviours for which people have incomplete decisional control (73, 94). Intention to perform certain behaviour is the central point in the theory of planned behaviour as in the theory of reasoned action. Intention is an indication of how much people are willing to try hard and how much effort they are putting to perform a certain behaviour (94). Performing these behaviours may demand resources, skill and cooperation of others, in other words, the person's control over these factors. Therefore, the theory of planned behaviour

---

asserts that a person's achievement of a certain behaviour depends on the joint function of intention and ability or behavioural control (94).

Perceived behavioural control is comparable to perceived self-efficacy of Bandura: "*people's judgments of their capabilities to organize and execute a course of action to attain designated types of performances*". It is concerned not with the skills one has, but with judgments of what one can do with whatever skills one possesses (95).



**Figure 2 The theory of planned behaviour**

The figure shows the relation among the different constructs. Two important features of the theory of planned behaviour are underlined here. The direct arrow that connects perceived behavioural control to intention shows that perceived behavioural control has motivational implications for intentions. That is individuals who have neither resources nor opportunities and for whom important others approve the performance of their behaviour are less likely to perform behaviour even if they have favourable attitudes and strong intentions towards the behaviour.

---

At this point we expect a direct association between intention and perceived behavioural control without mediating attitudes and subjective norm (96).

The arrow drawn directly from perceived behavioural control to the outcome (behaviour) shows the ability of perceived behavioural control to influence behaviour without the motivational factor. The broken arrow shows the relation between behaviour and perceived behavioural control to occur only when there is some agreement between perception of control and the person's actual control on behaviour (96).

In Paper IV we use the BRHP cohort which was followed from January 01, 1987-December 31, 2004 to assess the trends of mortality among young adults aged 10-24. A total of 236,549 observations relating to 97,457 individuals covering 715,743 person-years of observation were recorded in the 18 years period. For the purpose of our study 96,811 observations relating to 34,150 individuals aged 10-24, and 248,153 person years were analysed.

#### 4.4.4 Qualitative studies

Mixed method research, that is combining qualitative and quantitative methods within the same research project might be a rewarding exercise in health research (97, 98). Three purposes are included in a mixed method research. Firstly, complementarity aims to achieve elaboration, enhancement, illustration and clarification of the results of one method when combined with the results from the other method. By complementing quantitative methods with qualitative methods, we make the strength of one method improve the performance of the other (98-100). Secondly, by triangulation we aim to ensure convergence and corroboration of data and results from different methods to increase the validity and credibility of the study (98-101). Thirdly, by development we can guide the use of additional sampling, data collection and analysis techniques (99). Unfortunately, lack of direction on standardized methods of combining qualitative and quantitative methods limits using mixed method research (99). However, mixing methods helps

---

researchers to think creatively, broaden their outlook, enhance and extend the logic of qualitative explanation and integration of different forms of data (99, 102).

For paper III, we used in-depth interviews with health professionals in order to explore their attitudes and perceptions about their role in addressing the sexual and reproductive health of adolescents and young adults. In addition, we wanted to increase our understanding of the survey results by discussing their views on the prevalence of STIs among the youth, possible barriers to health service use, and preference of health institutions. In so doing, we used the method as a complementary and a validation tool.

All health units in Butajira were approached. We did ten in-depth interviews, four with health professionals from public health units and six with those from private health units. Moreover, two health professionals from the hospital and two nurses from the health centre (a lower level public health facility) took part in the study. A total of three health professionals, one from each of the private clinics that had been operating for more than a year, have also been included. Further, we interviewed three pharmacy professionals representing the three pharmacies in Butajira.

## 4.5 Sample size and sampling methods

To get a representative sample of sexually active individuals for the follow-up study (Paper II), we used the following assumptions  $\alpha = 5\%$ , 80% power and ability to measure a 15% difference of intention to use condom among married and intention of condom use among unmarried youth. Using the Epi-table calculator for two proportions, we obtained a sample size of 366. Multiplying it by 10, which is the expected prevalence of sexual activity among the unmarried in the area (56), and adding 20% contingency for possible database errors, we calculated a sample size of 4399 persons. We selected the participants

---

proportionally to the size of the villages' population using the Butajira database frame (Table 1).



**Table 1- Sampling and selection of study participants in the ten villages, June 2004, Butajira, Ethiopia**

| <i>Kebeles/</i> villages | Youth population in the villages N=(10475) | Proportion | Sampled N=4399 |
|--------------------------|--|------------|----------------|
| K04 (Butajira town)      | 2806                                       | 26.78      | 1178           |
| 005 (Misrak-Meskan)      | 602  | 5.71       | 252            |
| 04B (Dirama)             | 894  | 8.53       | 376            |
| 007 (Dobena)             | 885  | 8.50       | 374            |
| 008 (Bati)               | 1099                                       | 10.49      | 462            |
| 06A (Yeteker)            | 1086                                       | 10.36      | 456            |
| 06B (Wurib)              | 1116                                       | 10.68      | 470            |
| 09A (Mjarda)             | 602  | 5.74       | 253            |
| 09B (Hope)               | 857  | 8.18       | 356            |
| 011 (Bido)               | 528  | 5.03       | 222            |
| Total                    | 10,475                                     | 100        | 4399           |

## 4.6 Data collection

Data for Papers I, II and III were collected using pre-tested questionnaires (Appendix 1). The questionnaire consisted of items from standard questionnaires (TPB), adopted from other studies (103) and questions originally prepared by the investigators. The instrument was prepared in English and then translated into Amharic (the Ethiopian National Language) which was back translated into English by a language expert to ensure consistency of meanings. The interviews were conducted in Amharic by five women and four men recruited for the purpose. They have all completed high school. Prior to the holding the interviews, they were given

---

a five-day training. Data were then collected through face-to-face interviews at household level. The filled-in questionnaires were checked by supervisors every day, and incomplete or inconsistent ones were sent back to the field for correction. The qualitative information was collected by the primary investigator at the health facilities using a semi-structured topic guide (Appendix 2). Interviews were tape recorded, transcribed and translated into English.

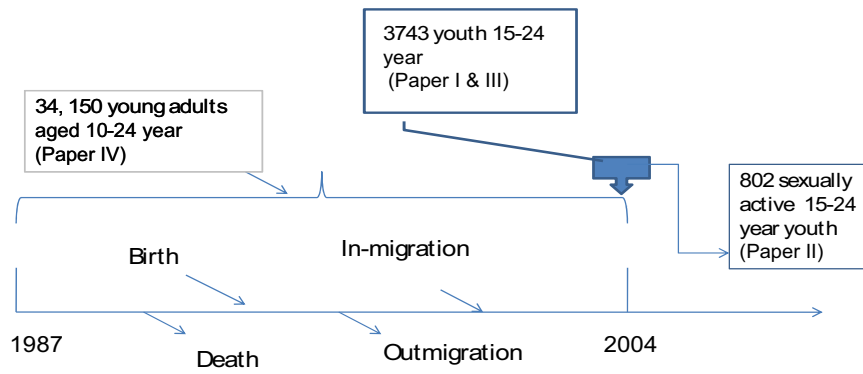
## 4.7 Data management and statistical analysis

For Papers I, II and III, data were entered and cleaned using Epi- Info version 6. The qualitative data were entered using Open Code program (104). Analysis was done using SPSS version 14. In Paper I, we used descriptive statistics, Kaplan-Meier (KM) and Cox's proportional hazard method. In Paper II we applied descriptive statistics, correlation, linear regression, and MANOVA. In Paper III we used descriptive statistics from the survey complemented by results from qualitative data. The qualitative interviews were analysed using content analysis (105). We started the analysis by importing the transcribed text into the Open Code program to facilitate the coding process (104). Relevant meaning units were examined line by line and coded by the first author. The coding results were discussed among members of the research team and discrepancies in the interpretations were negotiated.

In paper IV we used the Beta Cohort statistical program developed by Umeå University, Sweden (106), for calculating incidence and rates, and the Poisson regression methods. Table 2 indicates the use of the software and the type of analysis in each of the papers.

**Table 2 Summary of papers with objectives, type of study design and method of analysis**

| <b>Paper</b> | <b>Objective</b>   | <b>Design</b>  | <b>Method of analysis</b>  |
|--------------|--|--|--|
| I            | To assess sexual behaviour of the youth in relation to traditional norms of virginity                    | Cross-sectional  | Descriptive statistics, univariate comparison for sexual behaviour, KM to estimate age at sexual initiation and Cox's regression to measure contributing factor for premarital sex |
| II           | To determine the predictors of condom use, applying the theory of planned behaviour                      | Cohort   | Descriptive statistics, correlation, linear regression and MANOVA  |
| III          | To describe the youth's health seeking behaviour, access, use and perception of health services for STIs | Cross-sectional design among youth and qualitative studies | Descriptive statistics and content analysis of qualitative data  |
| IV           | To assess, in the era of HIV and AIDS, mortality trends among young adults aged 10-24                    | Cohort   | Beta cohort for calculating incidence and Poisson regression for assessing predictors of mortality   |



**Figure 3 The use of the Butajira open cohort for the four papers in the thesis**

---

## 4.8 Ethical issues

We obtained ethical approval from the Regional Committee for Medical Research Ethics in Norway and the Ethiopian National Ethical Review Committee (Appendix 3). Each participant volunteered to take part in the study and their parents also agreed that we interview people younger than 18 years of age (Appendix 4). To maintain confidentiality, we did not record the names of the respondents on the questionnaire. We did the interviews in an area with maximum privacy for the study participants.

---

## 5. Main findings of the papers

### 5.1 Paper I: Traditional values of virginity and sexual behaviour in rural Ethiopian youth: results from a cross sectional study

Delaying sexual initiation has been promoted as one of the methods of decreasing risks of HIV among young people. In traditional countries, such as Ethiopia, retaining virginity until marriage is the norm. However, no one has examined the impact of this traditional norm on sexual behaviour and risk of HIV in marriage. This study examined the effect of virginity norm on having sex before marriage and sexual behaviour after marriage among rural Ethiopian youth.

We did a cross-sectional survey in 9 rural and 1 urban area using a probabilistic sample of 3,743 youth, 15-24 years of age. Univariate analysis was used to assess associations between virginity norm and gender stratified by area, and between sexual behaviour and marital status. We applied Kaplan-Meier and Cox regression analysis to estimate age at sexual debut and assessed the predictors of premarital sex among the never-married using SPSS.

We found that maintaining virginity is still a way of securing marriage for girls, especially in rural areas; the odds of belief and intention to marry a virgin among boys was 3-4 times higher among rural young males. As age increased, the likelihood of remaining a virgin decreased. There was no significant difference between married and unmarried young people in terms of number of partners and visiting commercial sex workers. Married men were twice more likely to have multiple sexual partners than their female counterparts. A Cox regression showed that those who did not believe in traditional values of preserving virginity (adjusted hazard ratio [AHR] =2.91 [1.92-4.40]), alcohol drinkers (AHR = 2.91 [1.97-4.29]), Khat chewers (AHR = 2.36 [1.45-3.85]), literates (AHR= 18.01

---

[4.34-74.42]), and the older age group (AHR=1.85 [1.19-2.91]) were more likely to have premarital sex than their counterparts

## 5.2 .Paper II: Applicability of the Theory of Planned Behaviour to intended and self reported condom use in rural Ethiopian youth

We involved a cohort of 802 sexually active youth to assess the predicting ability of the TPB at two stages. At phase I, we measured intention to use condom. At phase II, after three months, we measured condom use among 743 youth who initially gave information about their condom use status and intention to use condom.

We found that TPB and previous condom experience, (PCE) explained 36% and 17% of the variance in intended condom use. Subjective norms discriminated strongly between subjects with and without PCE. The TPB and PCE accounted for 5.3% and 8.5% of the variance in reported condom use respectively. This study concludes that the TPB provided fairly accurate description of the process underlying intention but was less sufficient to account for self reported condom use.

## 5.3 Paper III- Readiness of youth in rural Ethiopia to seek health services for sexually transmitted infections

Studies' pertaining to sexually transmitted infections (STIs) among rural young adults in Ethiopia is limited. This study provides the knowledge about common STIs, perceptions, preferences, and use of health services for STI symptoms from the perspective of both youth and health care providers. We performed a mixed

---

method research using a cross-sectional survey among 3743 randomly selected youth aged 15-24 years and in-depth interviews with 10 health care providers in predominately rural Ethiopia, Butajira, in 2004.

Less than 38% of the youth in this study knew the common STIs. Among the sexually active (n=802), 3.9% reported at least one symptom of STI in the past 12 months. One-half of those who had STI symptoms did not seek care from any source. The stigma associated with premarital sex, the shamefulness of having STIs, lack of confidentiality and lack of readiness on the part of the public health services were reported by health professionals as impediments in seeking treatment among youth in the study area. Youth in this study prefer young and friendly providers of same gender with a reputation of being empathetic to consult for STIs. Embarrassment of having STIs and fear of being seen by a familiar individual were perceived barriers for health care seeking among the youth. The results of this study suggest that young people in this study are vulnerable to HIV due to lack of knowledge about STIs and untreated STIs. Uncoordinated health services to handle youth sexual and reproductive health problems, judgemental health professionals and sexual taboo are impediments in seeking health care. Reorientation of the public health services and providers could improve health care seeking for STIs. Health education programmes should address STIs among young adults and the community at large.

## 5.4 Paper IV- Mortality Decreases among Young Adults in Southern Central Ethiopia

Despite the anticipated high impact of HIV and AIDS among young people, AIDS related mortality is not well documented because of the lack of death registration systems in Ethiopia. The objective of this analysis was to investigate the trends in mortality among young adults (aged 10-24 years) in the era of the AIDS epidemic.



---

We analyzed data for young adults aged between 10-24 years using the Butajira Rural Health Programme (BRHP) open cohort database. The study covers 1 urban and 9 rural communities, which were initially randomly selected from the Butajira district. The BHRP database covers the period 1987-2004, recording vital events and migration at the household level after an initial baseline census in 1987, using village-based data collectors. The data included 34,150 young people who contributed a total of 248,154 person years.

In the 18-year follow-up period, 1,030 young adults died, giving an age-specific crude mortality rate of 4.2 per 1,000 person-years. The trends of mortality in this population declined from 6 per 1,000 person-years in 1987-1989 to less than 2 per 1,000 person-years in 2002-2004. Deaths due to HIV were recorded at a rate of only 0.02 per 1,000 person-years, according to causes of death reported by family care givers. A multivariate regression model showed that young adults from the rural highlands and lowlands had a higher risk of death (adjusted rate ratios 1.99 [1.40-2.83] and 2.58 [1.82-3.66] respectively) than young urban adults, even after adjusting for water source, literacy and housing type. The earlier cohorts (1987-1989 and 1990-1994) had higher risks of mortality than the latest cohort (1999-2004) - (adjusted rate ratios 1.91 [1.59-2.29] and 2.03 [1.75-2.35] respectively).

A remarkable decline in mortality was observed in this population with little sign of excessive HIV/AIDS-related mortality appearing during this 18-year period. However, the occurrence of AIDS-related deaths in the latter part of the study period suggests appropriate interventions to counter the developing HIV epidemic are justified.

---

## 6. Discussion

### 6.1 Methodological considerations

#### *6.1.1 Quantitative studies*

##### *6.1.1.1 Study design and method of analysis*

In this study we used both cross-sectional and longitudinal study designs depending on the research question. In Paper I (Traditional values of virginity and sexual behaviour in a rural Ethiopian youth), and Paper III (Youth in rural Ethiopia hesitate to seek health services for STIs), we used descriptive and cross-sectional survey. Cross-sectional surveys enable us to find out the absence or presence of diseases and exposure in an individual at the same point in time, so temporal relation is the problem with these studies. On the other hand, these studies are cheaper and easy to apply, and also estimate magnitude of a study of interest by person, time, and place (107, 108).

In Paper I, alcohol and khat use were predictors of premarital sex. It is, however, difficult to ascertain if they start sex before using khat or alcohol. However, from the pharmacological effect of khat (109, 110) and alcohol we know that using these substances might lead to practicing risky sexual behaviour. Length-biased sampling, that is cases with long duration of an event will over-represent and those with short duration will under-represent the effect, is a problem in cross-sectional studies (111). However, this is less likely to affect our study as our study population was young people with short period of sexual experience.

In Paper II and IV we used analytical study design. Analytical studies are labelled as observational and intervention studies. In intervention studies, the investigators assign the exposure and then follow the study subjects for outcomes. In observational studies, the investigators select the study subjects and follow the

---

outcomes of interest to occur. Assigning of the subjects into a treatment or a control group is outside the control of the investigator (107, 108). In our study, we used observational analytical studies (cohort).

In Paper II, using the same population and instrument as in Papers I and III, we selected a cohort of youth who have had sexual experiences. After measuring intention to use condoms at Phase I, the study population was followed for three months. The target behaviour (condom use) was measured at Phase II after 90 days from the first survey. The main problem with cohort studies is loss to follow-up. In this study we lost 7% of the population within three months. The reason for the loss was moving out from the study area, most often for education and work. However, the socio-demographic features of the population at (Phase I) and (Phase II) were similar.

In Paper IV we used the BRHP open cohort. The untimely death of the principal investigator in 1992 delayed the second census until 1995 and thus created a gap in the information of database (88). As a result, there were some missing data in the subsequent censuses. This created a problem in using some background information in the analysis of predictors of mortality. For example, unknown marital status was significantly associated with mortality. Therefore, we excluded this variable from the analysis.

### *6.1.1.2 Precision*

Precision in estimation or measurement in an epidemiological study implies the reduction of random errors. One way of reducing random error is enlarging the sample size (112). In our study we used adequate sample size both for the cross-sectional and for the cohorts. However, in Paper III, outcomes like prevalence of symptoms of reported STIs was low, and comparison between those who had symptoms of STIs and those had not was not plausible. In Paper I, the sample size of the outcome variables in risky sexual behaviour between married and never-

---

married was small. However, the association in these variables was not due to chance as shown by the 95% confidence interval.

### **6.1.1.3 Validity**

Validity of a study is classified into internal validity (validity pertaining to the source population) and external validity or generalizability (validity as they pertain to population outside the study population). Internal validity implies accurate measurement of effects in studies of causation. Biases are the cause of distorting the estimation of epidemiological measurements. Biases can again be classified as selection bias, information bias and confounding. No epidemiological study is free from bias and the type of bias depends on study design (112).

#### **6.1.1.3.1 Selection bias**

Selection bias is a distortion as a result of selection procedures. “*Selection bias can occur whenever the identification of individual subjects for inclusion into the study on the bases of either exposure or disease status depends in some way on the other axis of interest*” (113). The bases for selection bias implies that the exposure and disease status is different for those who participate and for those who are eligible to participate but do not do so because of the selection procedure or refusal. In paper I, II and III, we randomly selected the participants using the BRHP database. Non-response was the envisaged bias in our study. At the inception of the study 20% non-response rate was allotted for sampling. Non-response was higher among male than female. However, the background information such as residential area and marital status were similar. Therefore, the chance of bias due to selection in our study was low.

---

### 6.1.1.3.2 *Information bias (observation bias)*

Information bias is related to errors in obtaining information from study participants. Paper I, II, and III were conducted using a face-to-face interview, and might introduce observation bias. This can be both on the part of the study participants and the interviewers. For example, most of the rural youth are expected to be celibate until marriage. Therefore, the likelihood of social desirability bias is high. This bias could underestimate the prevalence of premarital sex, STIs and condom use. Although self-reporting questionnaires can minimize such biases, it was not possible to do this as 30% of our informants were illiterate. To minimize these biases, maintaining the sex-match, we had to train young data collectors who could probe and get such sensitive information.

The other information bias was the age difference of the study participants in the BRHP sampling frame and in our findings, (see Paper I). One reason for this age discrepancy is the lack of civil registrations in Ethiopia. Often, people report different ages at different times.

The third observational bias was on the part of the interviewers. Interviewers in our study may have asked the questions differently and thereby received different perceptions from the informants. For example, the knowledge about HIV was high, whereas the knowledge about STIs was low (Paper III). This may be because of the differences in their actual knowledge, or because of the biases introduced by the interviewers.

The fourth information bias was the absence of a validated cause of death in the surveillance system (Paper IV). In the study area most deaths occur at home, and obtaining a death certificate validating the cause of death is not usual unless the death is related to legal issues. However the availability of family reported causes

---

of death in the surveillance system could give hint about the cause of death in the area.

### *6.1.1.3.3 Confounding variables*

Confounder is a third or extraneous variable which is associated both with the outcome and the exposure variable and distorts the effect of the exposure. The distortion introduced by a confounder may underestimate, overestimate or even change the direction of the association (111). In Paper I, II and IV we used multivariate analysis to control for confounding variables. In all papers the models were adjusted for socio-demographic variables after looking for interacting terms. For example in Paper I, we included sex, age, school attendance, literacy, beliefs about virginity, alcohol and khat use in a multivariate Cox regression model to see if these variables were independent predictors of premarital sex. The effect of sex and school attendance which were significantly associated with premarital sex at a univariable level was lost while the rest were independent predictors of premarital sex

In Paper IV there were confounded relationships between area of residence and water supply and type of house. However, the multivariate regression model used suggests that there was a persisting effect of rural residence even after adjusting for these confounders.

Effect modification, also known as interaction or heterogeneity between strata, differs from confounding variables (114, 115). “*Effect-measure modification*

---

*refers to variation in magnitude of exposure effect across levels of another variable*". The major difference between effect modifier and confounder is that the latter is a bias which the investigator wants to prevent or eliminate from the effect estimate, while effect-measure modification is the property of the effect under study. Therefore, effect modification is a finding to be reported than a bias to be abolished (114). In paper I, II, and IV of this study, we tested the regression model for interaction and no important interaction was found to be reported.

### **6.1.2 Qualitative methods**

Qualitative research methods are used to describe the context of a phenomena and activities of interest or to discover new concepts as a major research method (101). Qualitative research method can also be used combined with quantitative method to complement or triangulate the findings from a survey (97). In Paper III, we used qualitative method to complement and triangulate our findings from the survey and enrich our interpretation of the findings. Even if there is a risk that the health personnel may narrate what they think is right rather than what they practice, we think that our efforts to probe on their experiences helped to minimise this problem (see Paper III).

### **6.1.3 Generalizability of the study**

At the establishment of the study site as a field laboratory, several factors were taken into consideration to achieve representativeness. These were the topography which combined the highland, lowland, and in-between characteristics, the diversity of disease pattern, and population density. In addition, in the district, which is predominantly rural, the population at large is illiterate. Access to safe drinking water, electric power, health services and telephone communication is low. The study site, Butajira, is thus typical of rural Ethiopia.

---

The study area also has similar cultural norms as rural central and northern Ethiopia. For example, the cultural norms for virginity, and age of marriage are similar to that of the northern Ethiopia where most initiate sex within marriage (7). The demographic features of the Butajira DSS is comparable with those in the findings from the two series of the Ethiopian DHS (116). Furthermore, we used a randomly selected large sample size for the cross-sectional study and an 18-year cohort database for the mortality study. Having the above mentioned features, this study can be generalized to the rest of rural Ethiopia especially to those with similar cultures.

## 6.2 Discussion of main findings

There are enough justifications to undertake a study among young people aged 10-24 years. One of the main reasons is that behaviours and choices made at this age have enduring effects throughout their adult life. Therefore, interventions introduced on this age group would have an effect on generations to come (71).

The behaviour of the youth in this study was influenced by locally accepted norms. Keeping virginity until marriage was the norm in the community and most of the sexually active youth reported to have initiated sex within marriage. Only few of our informants reported to have had sex before marriage indicating that the norm, though not widely, was accepted in traditional Ethiopia. The intentions of both urban and rural never-married boys to marry a virgin also indicate the strong base of virginity norm in the area. Similar to other rural settings in the country (7), marriage especially for girls occurs at young age, where the chances of young girls to have engaged in premarital sex is low.

In urban areas of the study site, both girls and boys attend school in similar proportion (87). At school, socialization with heterogeneous sex and peer influence, augmented by increase in age, make staying virgin until marriage a challenge. In the regression analysis of Paper I, the significant association of



---

premarital sex with older age group, literacy, alcohol drinking, khat chewing, and unbelief in the virginity norm indicates the norm being in transition. Condom was inconsistently or never used among the never-married youth. These factors predisposes the youth to STIs including HIV (117).

Girls who kept their virginity until marriage usually started sex with a sexually experienced husband/partner (7, 37, 118). In this study we found that both married and never-married male practice risky sexual behaviour, and there was no difference between having more than one sexual partner and having sex with commercial sex workers among both groups. Condom use in marriage was also very low, and this has further compounded their vulnerability to HIV.

Married women in this study reported STI symptoms more than did the never-married, which could be due to unprotected sex with unfaithful husbands. The qualitative findings of this thesis also showed husbands with STIs having unsafe sex with their wives without notifying their STI status. Unprotected sex was not unique only to this study; many studies in Ethiopia have shown similar results among the youth. Marriage or long standing union is considered a safe heaven protecting couples from HIV where youth excuse themselves for not using condoms because of trust in their partners (50, 119, 120).

Why do not the youth practice safe sexual behaviours? Theory-based behavioural studies help to broaden our understanding of risky sexual behaviour among young people in various contexts (121). We assessed the predictors of condom use in a 90-day follow up period using the TPB. In this follow up period, we found that only 16% of the youth had used condoms. Young men reported to have used condoms more often than did young girls which is in conformity with previous studies conducted in the country (48). Condom use in this study may have been underestimated due to the taboo nature of premarital sexual engagement. On the other hand, we also found that women were in subordinate position and were ashamed to seek health care for STIs. Such a position might explain their low

---

condom use found in this study. In other sub Saharan African countries people preserve condoms for casual partners. Using condoms in marriage calls the assumption of mutual monogamy into question (122). However, in the area, polygamous marriage is an accepted norm and this is an inclination towards extra-marital affair (88).

In this study, the TPB variables (attitudes, subjective norms, descriptive norms and perceived behavioural control) explained 36% of the variation in intention to use condom. This was in accordance with a recent meta analysis (123, 124). The TPB fairly well predicts the intention in the rural Ethiopian youth. In the three months follow up period, previous condom experience was the strongest predictor of reported condom use predicting 8.5 % of the variation in condom use. Previous studies from Ethiopia have shown that gender power differences were deep-rooted in the country (125). In a male dominated society, perceived capacity for action in females becomes a factor of gender interaction in addition to personal motivation (122). Based on the findings from the TPB, both men and women decide to use condom if they anticipate positive consequences associated with performance and social support, whereas perceived barriers seem to have less impact. Once young people started to use condom they would continue to do so in the future.

Sexually transmitted infections are one of the major problems adolescents face as they start sex without having information about healthy sexual life (126). Sexually transmitted infections increase the risk of acquiring HIV infection (127).

Biological measure of STI prevalence gives an accurate means of measuring prevalence of STIs. However, in developing countries reported symptoms provide proxy indicator of STIs(128). In this study, nearly 4% of sexually active youth reported at least one symptom of sexually transmitted diseases in the year before the study period. The prevalence in our study was higher than that of the national 2005 DHS report of 1.4% (which has also put the magnitude as underestimated) and 2.9% from a study conducted in a nearby town, Zeway (28, 51).

---

Due to the stigma associated with STIs and premarital sex, under-reporting of the symptoms was an expected bias in this study. Other studies additionally indicated that reported symptoms of vaginal discharge or the clinical sign of vaginal or cervical discharge poorly predicted infections (129, 130) .

Health care seeking for STIs in this population was low and only half sought help. Mistrusting health professionals on keeping their status confidential, fear of being seen by familiar individuals or parents, and unfriendliness of health services were among the main barriers mentioned by the health care providers. Other studies from Ethiopia underlined the stigmatizing nature of STIs (16). Studies from developing countries also showed that the signs and symptoms of STIs in some women in poor countries are considered as part of being women (131). Women also do not seek health services unless the illness interferes with their daily activities (132-134).

On the other hand this study has shown hope for future use of government health facilities by youth. The youth in this study had positive perceptions for the health services provided in the district. However, there was a weakness on the part of the health services that they were not at all ready to handle youth sexual and reproductive health problems. An Ethiopian study conducted among school youth in Addis Ababa also showed that the facilities were not ready to handle sexual health of young people (103). The positive perception of the youth may be a general belief that public facilities are all-rounded and their purpose is to serve the public at large, as the name indicates.

The other weakness in the health services was that the knowledge of professionals about adolescent reproductive health and young adults was limited. A multi-country study rated Ethiopia's reproductive health services as low (131). Our qualitative findings also indicated that youth preferred the private pharmacies and informal sectors to minimize cost and long waiting time which increases their chances of being seen by familiar individuals (135). However the quality of care in the informal sectors and private pharmacies was not assured or supervised by

---

local health authorities. In this study we found that pharmacies which are legitimate only for dispensing medicines were observed treating patients, and informal sectors were seen providing health care without legal permit and registration. This was also the case in many countries (135, 136).

With the advent of HIV, unsafe sexual practice could lead to illness and ultimately death. Following a cohort of sexually active youth to assess the prevalence of STIs including HIV and its outcome can provide a true picture of the impact. However, conducting such a study is not feasible in community settings for a number of reasons such as cost and technical problems. Using demographic surveillance data collected prospectively helps to assess risks of demographic events precisely defined for the study population over time (137). In this study, we assessed mortality trends of young people aged 10-24 in an 18 years open cohort.

The mortality trends of young people could suggest the burden of HIV related mortality among young people in the era of HIV. The findings of this study indicated that mortality of young people has markedly declined from the first cohort in 1987 to the last cohort in 2004. Females had the advantage of surviving than males. The urban were more likely to survive than the rural. Excess mortality among the rural youth indicates the health inequality in the area.

As mentioned earlier, in rural settings where most women had their sexual debut in marriage possibly with a sexually experienced person, HIV related mortality is a most likely event. The commonness of polygamous marriage in the study area where older men take young girls as a second or third wife (88) could intensify the problem. We have also underlined that married young men practice unsafe sexual practice. However, the low female death in this study suggests the less likelihood of HIV related death in the area. The general decline in mortality especially in the last cohort (1999-2004) indicated a less likelihood of HIV mortality. The low rural HIV prevalence (0.2%) for the region (SNNPR) also

---

supports our findings (37). The behavioural pattern of delaying sex until marriage by the youth in the study area could contribute to the low prevalence of HIV related mortality in the study population. The excess mortality in the rural area may be associated with recurrent famine (88), poor hygienic conditions and malaria. In the lowlands of Ethiopia, malaria is characterised by erratic epidemics (138). A verbal autopsy study showed that 20% of adult deaths were attributed to Malaria (91). The expansion of health service, especially the effect of a newly launched hospital in 2002, could explain the sharp decline in mortality at the end of the cohort. In most instances, only complicated cases are referred to hospitals as the country has launched a health referral system. Therefore, if for example, the hospital averts one malaria or complicated abortion related death in this age group per week, it means averting 52 deaths per year. However, AIDS-related deaths occurred in the latter part of the study period. Therefore, appropriate interventions should be encouraged to curb the developing HIV epidemic in the years to come.

### 6.3 Implications of the study

Health programme managers and other development agents need to know the stand point of the new generation in order to foresee the future. In this thesis, both positive and negative findings with regard to young people's sexual behaviour and its consequences are mentioned. In the national strategy of HIV prevention of Ethiopia, abstinence or delaying age of sexual debut was one of the three components focused on (66). In line with the national strategy of HIV prevention, staying virgin until marriage is an accepted norm in the community. This norm has a positive impact in the prevention of HIV in rural settings where access to preventive services and information is scarce. The taboo nature of this norm also introduces shame and stigma among the never-married young people and inhibits them from seeking health services and information on sexual and reproductive health problems. Therefore, this valuable traditional norms should be encouraged

---

with caution and condom use should be introduced in the population when staying virgin is not possible.

To bring about condom use behaviours in this population, theory based behavioural interventions are important in addressing the right predictors of the target behaviour. In this study we found attitude as the strongest predictor of intended condom use followed by intention, and previous condom experience to be the predictor of actual condom use. Based on these findings, health education programme leaders can intervene in creating intentions for condom use by acting on attitudes among those who had never used condoms and by encouraging consistent use of condoms among those who had ever used it.

STIs are known to aggravate HIV transmission. In this study, we found a low prevalence of reported symptoms of STIs though it is higher compared to findings of other similar studies in the country (51). Our study indicated that using self-reported method could be used as a proxy indicator of STI prevalence in a resource-poor setting. In addition, the findings regarding positive perception and preference of private health centres over the public and preference of young health providers by the youth give direction for the re-orientation of the health services for the young people. The limited knowledge and attitude of health professionals towards youth sexual and reproductive health and the lack of readiness of health facilities to handle youth SRH problems would be important information for health programmers in the area and in similar settings to re-orient the health services.

The trend of mortality analysis of the 18-year database showed a clear decline of mortality in this age group which could be a sign of epidemiological transition. Here, HIV related mortality in the population is less likely. Therefore, health programmers can intervene at this age to prevent HIV and its consequences at a later age.

---

## 7. Conclusion and recommendations

### 7.1 Conclusion

1. The prevalence of premarital sex is low among youths in the predominately rural Butajira mainly because of the traditional norm in the area of staying virgin until marriage.
2. Although the HIV prevalence is still low in rural communities, young married women are in danger of HIV and other STIs because of their husbands' high-risk sexual behaviour.
3. Mortality of young people has declined in this population. Only few people died of HIV associated diseases. This is in agreement with recent epidemiological studies showing low prevalence of HIV among rural population.
4. Few young people used condoms. Youth with positive attitudes and those who resist negative social pressure intended to use condoms while those who have used condoms previously had continued to use it actually. In other words, attitudes and subjective norms were the predictors of intended condom use while previous condom experience was the predictor of actual condom use.
5. Young people who had symptoms of STIs seldom used the available health institutions. Limited knowledge about STIs, subordinate position and delay in symptoms among women, the stigma associated with STIs and premarital sex were the barriers of health seeking among youth in the study area.
6. Health professionals in the study area had limited knowledge about young people's sexual and reproductive health.

- 
7. Rural youth realise government health institutions as major providers of treatment for SRH. Unfortunately, the public health institutions are not user-friendly to such sensitive health issues.



---

## 7.2 Recommendations

### 7.2.1 For practical measures

1. Strengthen the traditional norm of staying virgin until marriage.
2. Attitude and subjective norms were the predictors of intention to condom use in this study. Therefore, health education programmes should direct their messages to:
  - Building positive attitudes towards condom use, and
  - Encouraging the youth to resist negative subjective norms.
3. Special attention should be given to young women in polygamous marriage and to those who are married to men who travel outside their home place frequently and hence:
  - VCT after a long period of separation between married couples should be advocated.
  - The feasibility of the use of female condoms among married women should be explored.
4. Mutual-monogamy, VCT before marriage and condom use in all extra partner affairs should be encouraged.
5. Community based health education programmes should address rural girls, both married and never- married, with regard to STIs including HIV.

### 7.2.2 For research considerations

1. Distinct from existing studies among the youth, this thesis showed the sexual behaviour and its outcomes among young adults of 10-24 years of age regardless of their marital status at a community level. Ethiopia is a country with diversified culture and values. Different values are attached to pre-marital sex in different parts of Ethiopia. Therefore a study conducted in different settings could give a better understanding

---

of the sexual behaviour of youth in Ethiopia and help to plan custom-oriented interventions based on outcomes.

2. Low health service use by young people for STIs and lack of health service readiness for youth sexual and reproductive health problems were some of the findings of this study. Intervention studies providing appropriate facilities and/or health education would help to understand the health service use among young people for STI problems.
3. We used the Theory of Planned Behaviour (TPB) in a cohort of sexually active youth. Intervention studies will improve performance of the model in predicting the factors affecting condom use behaviour.

### **7.2.3 For policy measures**

1. Policy makers should emphasize the need to address young adults' sexual and reproductive health needs at health institutions, schools and communities.
2. Health workers should be trained on sexual and reproductive health care of young people.
3. Health workers should get periodic updates to track new developments.
4. Private practitioners should be included in the training of all sexual and reproductive health programmes. Updates in treatment of STIs should be important elements of the training programmes.
5. Youth friendly health programmes with respect to access and professional attitudes should be essential components of health institutions at each level.
6. Health education programmes on promoting the use of condoms and abstinence should be strengthened.
7. HIV health education programmes should include information about STIs.

- 
8. The existing public health service provision system should be strengthened so as to make it youth friendly. This would help to minimize the risk of using the informal sector

---

## Source of data

1. The World Bank. World development report 2007: Development and the next generation. Washington DC 2007 [cited 2007 June 28]; Available from:  
[http://www.sdnxbd.org/sdi/issues/sustainable\\_development/359990WDR0complete.pdf](http://www.sdnxbd.org/sdi/issues/sustainable_development/359990WDR0complete.pdf)
2. UNDP/UNFPA/WHO/World Bank special Program of Research, Development and Research Training in Human Reproduction (HPR). Preparing for adulthood: adolescent sexual and reproductive health. Geneva; 2003; (No.64).
3. WHO/UNDP/UNFPA/World Bank, Special Program of Research, Development and Research Training In Human Reproduction. Sexual and reproductive health of adolescents. Geneva; Rep 2002;(No.58).
4. Kleinert S. Adolescent health: an opportunity not to be missed. Lancet 2007 Mar 31;369(9567):1057-8.
5. Zabin SL. Adolescent Reproductive Health: Challenges and change. J Reprod Contracept 2004; 15(3):172-80.
6. UNDP/UNFPA/World Bank, Special Programme of Research, Development and Research Training in Human Reproduction. Reproductive health research: the new directions, 1996-1997, 25th Anniversary Issue 1998.
7. Erulkar AS, Mekbib T, Simie N, Gulema T. The experience of adolescence in rural Amhara region Ethiopia2004 [cited; Available from:  
[http://search.yahoo.com/search;\\_ylt=A0geu6HTlnZGh6oAXh5XNyoA?](http://search.yahoo.com/search;_ylt=A0geu6HTlnZGh6oAXh5XNyoA?)
8. WHO/UNICEF/World Bank. Program of action of the UN ICPD, Reproductive health rights and reproductive health. International Conference on Population and Development Cairo; 1994.
9. Bayley O. Improvement of sexual and reproductive health requires focusing on adolescents. Lancet 2003 Sep 6;362(9386):830-1.
10. Joint United Nations Programme on HIV/AIDS. Reports of the global AIDS epidemic 2004 [cited 2007 May 13]; Available from:  
<http://www.unaids.org>
11. Mensh BS. The changing context of sexual initiation in sub-Saharan Africa. Promoting healthy safe and productive transitions to adulthood

---

2007 [cited 2008 May 29th]; Available from:  
[http://www.popcouncil.org/pdfs/TABriefs/PGY\\_Brief26\\_SexualInitiation.pdf](http://www.popcouncil.org/pdfs/TABriefs/PGY_Brief26_SexualInitiation.pdf)

12. UNICEF, UNAIDS, WHO. Young people and HIV/AIDS. Switzerland; 2002.
13. Ezzati M, Lopez AD, Rogeres A, Vander Hoorn S, Murry CJL, and the Comparative Risk Assessment Collaborating Group. Selected major risk factors and global and regional burden of disease. *Lancet* 2002;360:1347-60.
14. WHO. Global prevalence and incidence of selected curable sexually transmitted infections: Overview and estimates. Geneva; 2001.
15. Brown AD, Jejeebhoy SJ, Shah I, Yount KM. Sexual relations among young people in developing countries: evidence from WHO case studies. Geneva: UNDP/UNFPA/WHO/World Bank Special Program of Research and Development and Research Training in Human Reproduction (HRP); *Rep* 2001; (No.01.8).
16. Gebre A. Community knowledge and perceptions about HIV/AIDS and other sexually transmitted diseases in Bahir Dar. *Northeast Afr Stud* 2000; 7(1):127-46.
17. Michelo C, Sandoy IF, Dzekedzeke K, Siziya S, Fylkesnes K. Steep HIV prevalence declines among young people in selected Zambian communities: population-based observations (1995-2003). *BMC Public Health* 2006;6:279.
18. United Nations Office of the High Commission for Human Rights. Universal declaration of human rights. 1948 Dec 10.
19. United Nations Office of the High Commission for Human Rights. Proclamation of Tehran, International Conference on Human Rights. April 22- May 13 Tehran; 1968.
20. United Nations. Report of the International Conference on Population and Development 5-13 September 1994, Cairo: United Nations, New York; 1995.
21. UNDP/UNFPA/WHO/WORLD Bank Special Program of Research and Development and Research Training in Human Reproduction (HRP). Sexual health, a new focus for WHO. Geneva; 2004.
22. Germain A. Reproductive health and human rights. *Lancet* 2004 Jan

---

3;363(9402):65-6.

23. Uneke CJ, Alo M, Ogbu O. Mandatory pre-marital HIV testing in Nigeria: the public health and social implications. *AIDS Care* 2007 Jan;19(1):116-21.
24. Glasier A, Gulmezoglu AM, Schmid GP, Moreno CG, Van Look PF. Sexual and reproductive health: a matter of life and death. *Lancet* 2006 Nov 4;368(9547):1595-607.
25. Abebe A, Lukashov VV, Rinke De Wit TF, Fisseha B, Tegbaru B, Kliphuis A, et al. Timing of the introduction into Ethiopia of subcluster C' of HIV type 1 subtype C. *AIDS Res Hum Retroviruses* 2001 May 1;17(7):657-61.
26. Tsega E, Mengesha B, Nordenfelt E. Serological survey of human immunodeficiency virus infection in Ethiopia. *Ethiop Med J* 1988;26(4):179-84.
27. Ministry of Health of Ethiopia. *AIDS in Ethiopia, First Report 1996*.
28. Central Statistics Agency of Ethiopia. *Ethiopia Demographic and Health Survey 2005*. Addis Ababa, CSA, 2006.
29. Meheret M, Khodakevich L, Zewdie D. HIV-1 infection and related risk factors among female sex workers in urban areas in Ethiopia. *Ethiop J Health Dev* 1990;4(2):163-70.
30. Meheret M, Khodakevich L, Zewdie D. HIV-1 infection among employees of the Ethiopian Freight Transport Corporation. *Ethiop J Health Dev* 1990;4(2):17-28.
31. UNAIDS, WHO. *A history of the HIV/AIDS Epidemic with Emphasis on Africa*. 2003 [cited 2008 16/08/08]; Available from: [http://www.un.org/esa/population/publications/adultmort/UNAIDS\\_WHO\\_Paper2.pdf](http://www.un.org/esa/population/publications/adultmort/UNAIDS_WHO_Paper2.pdf)
32. Kloos H, Haile Mariam D, Lindtjørn B. The AIDS Epidemic in a Low-Income country: Ethiopia. *Human Ecology Review* 2007;14(1):39-50.
33. Ismail S, Larson CP. Urban to rural routes of HIV infection spread in Ethiopia. *J Trop Med Hyg* 1995;98(5):338-42
34. Mehrete M, Levkhodakevich. Surveillance of human immunodeficiency virus infection in Ethiopia. *Ethiop J of Health Dev* 1990;4(2):101-5.

- 
35. Mekonen Y. Patterns of maternity care service utilization in Southern Ethiopia: Evidence from a community and family survey. *Ethiop J Health Dev* 2003;17(1):27-33.
  36. Fantahun M, Olwit G, Sahmeboo D. Determinants of antenatal care attendance and preference of site of delivery in Addis Ababa. *Ethiop J Health Dev* 1992;6(2):17-21.
  37. Central Statistics Agency of Ethiopia. Ethiopia Demographic and Health Survey 2005. Addis Ababa: 2006.
  38. Assefa T, Davey G, Dukers N, Wolday D, Worku A, Messele T, et al. Overall HIV-1 prevalence in pregnant women over estimates HIV-1 in predominantly rural population of Afar region. *Ethiop Med J* 2003;41(Supp-1):43-9.
  39. Berhane Y, Wuhib T, Sanders E, Lulseged S, Ismail S, Melaku Z, et al. HIV/AIDS: In: Berhane Y, Hailemariam D, Kloos H, editors. *Epidemiology and Ecology of Health and Disease in Ethiopia*. Addis Ababa: Shama Books 2006. p. 446-74
  40. Ministry of Health of Ethiopia. AIDS in Ethiopia, Third Report 2000.
  41. Ministry of Health of Ethiopia. AIDS in Ethiopia, Fourth Report 2002.
  42. Ministry of Health of Ethiopia. AIDS in Ethiopia, Fifth Report. 2004.
  43. Ministry of Health of Ethiopia/National HIV/AIDS Prevention and Control Office. AIDS in Ethiopia, Sixth Report 2006.
  44. ORC Macro. Ethiopian Demographic and Health Survey, Measure DHS; 2005.
  45. Hladik W, I Shabbir, A Jelaludin, A Woldu, M Tsehaynesh, W Tadesse. HIV/AIDS in Ethiopia: where is the epidemic heading? *Sex Transm Inf* 2006;82:32-5.
  46. Lulu K. Socio-demographic differentials of adult deaths in a rural population. *Ethiop Med J*. 2002:50.
  47. Sanders E, Araya T, Kebede D, Schaap A. Mortality impact of AIDS in Addis Ababa, Ethiopia. *AIDS* 2003;17(8):1209-16.
  48. Taffa N, Sundby J, Holm-Hansen C, Bjune G. HIV prevalence and socio-cultural contexts of sexuality among youth in Addis Ababa, Ethiopia. *Ethiop J Health Dev* 2002;16(2):139-46.

- 
49. Andarge G, Kassu A, Moges F, Kebede, Gedefaw M, Wale F, et al. Low prevalence of HIV infection, and knowledge, attitude and practice on HIV/AIDS among high school students in Gondar, Northwest Ethiopia. *Ethiop J Health Dev* 2007;21(2):179-82
  50. Federal Democratic Republic of Ethiopia, Ministry of Health, Addis Ababa University, HIV/AIDS Prevention and Control Office, Ethiopian Public Health Association. HIV/AIDS Behavioural Surveillance Survey (BSS) Ethiopia 2000. Addis Ababa; 2002.
  51. Tesfaye F, Kassaye M, Kebede D. Community-based survey of sexually transmitted disease syndromes in Adami-Tullu. *Ethiop J Health Dev* 2000;14(1):7-12.
  52. Taffa N, Bjune G, Sundby J, Gaustad P, Alestrøm A. Prevalence of gonococcal and chlamydial Infections and sexual risk behaviours among youth in Addis Ababa, Ethiopia. *Sex Transm Dis* 2002;29(12):823-33..
  53. Ismail S, Bitsuamlak H, Alemu K. High risk sexual behaviours for STD/HIV, pregnancies and contraception among high school students in rural town, North Western Ethiopia. *Ethiop J Health Dev* 1997 29-36;11(1).
  54. Gebrekidan K, Azeze B. Survey of condom use among college students *Ethiop J Health Dev* 1995;9(1):7-11.
  55. Eshetu F, Zakus D, Kebede D. The attitudes of students, parents and teachers towards the promotion and provision of condoms fro adolescents. *Ethiop J Health Dev* 1997;11(1):7-16.
  56. Versnel M, Berhane Y, Wendte J. Sexuality and contraception among never married high school students in Butajira, Ethiopia. *Ethiop Med J* 2002;40(1):41-51.
  57. Fekadu Z. Casual sex-debuts among female adolescents in Addis Ababa. *Ethiop J Health Dev* 2001;15(2):109-16.
  58. Taffa N, Haimanot R, Desalegn S, Tesfaye A. Do parents and young people communicate on sexual matters? The situation of family life education in Ethiopia. *Ethiop J Health Dev* 1999;13(3):205-10.
  59. Kora A, Haile M. Sexual behaviour and level of awareness on reproductive health among youths: Evidence from Harar, Eastern Ethiopia. *Ethiop J Health Dev* 1999;13(2):107-13.



- 
60. Taffa N. Sexual activity of out-of-school youth, and their knowledge and attitude about STDs and HIV/AIDS in Southern Ethiopia. *Ethiop J Health Dev* 1998;12:17-22.
  61. Petros B, Belyneh S, Mekonen Y. AIDS and college students in Addis Ababa: A study of knowledge, attitude and behaviour. *Ethiop J Health Dev* 1997;11(2):115-23.
  62. Federal Democratic Republic of Ethiopia Ministry of Health. National Reproductive Health Strategy 2006-2015. Addis Ababa: MOH; 2006.
  63. Federal Democratic Republic of Ethiopia Ministry of Health. National Adolescent and Youth Reproductive Health Strategy 2007-2015. Addis Ababa: MOH; 2006.
  64. UNAIDS/WHO. AIDS Epidemic Update: UNAIDS/WHO, 2003.
  65. De Cock K., Mbori-Ngacha D., Marum E. Shadow on the continent: public health and HIV/AIDS in Africa in the 21st century. *Lancet* 2002;360:67-72.
  66. Ministry of Health of Ethiopia/ National AIDS Control Programme. Strategic Framework for The National Response to HIV/AIDS in Ethiopia for 2000-2004. Addis Ababa: 1999.
  67. Jennifer L, Maggs K, Hurrelmann K. Do substance use and delinquency have differential association with adolescents' peer relations? *Int J Behav Dev* 1998;22:367.
  68. UNAIDS/ WHO. AIDS Epidemic Update: UNAIDS/ WHO, 2002.
  69. Morgan D, Whitworth J. The natural history of HIV-1 infection in Africa. *Nat Med*. 2001 Feb;7(2):143-5.
  70. Rutherford WG, Lifson RA, Hessel AN, Darrow WW, O'Mally MP, Buchinder PS, et al. Course of HIV-1 infection in a cohort of homosexual and bisexual men :an 11 year follow up study. *BMJ*. 1990;301:1183-7.
  71. Jejeebhoy SJ. Sexual reproductive health of young people: expanding the research and program agenda. 2006 [cited 2007 June 18]; Available from: [http://www.who.int/reproductive-health/publications/RHR\\_01\\_8/sexual\\_relations\\_among\\_young\\_people\\_developing\\_countries.pdf](http://www.who.int/reproductive-health/publications/RHR_01_8/sexual_relations_among_young_people_developing_countries.pdf)
  72. Conner M, Norman P, editors. Predicting health behaviour. Buckingham: Open University Press; 2003.

- 
73. Ajzen I, Fishbein M. Understanding attitudes and predicting social behaviour. Englewood Cliffs, N.J : Prentice-Hall 1980.
  74. Assefa A, Ishak A, Stevens R, Fergusson E, Giles M. Prevalence of HIV, syphilis and genital chlamydial infection among women in North-West Ethiopia. *Epidemiol Infect* 1997;120:171-7.
  75. Salomon JA, Murray CJ. Modelling HIV/AIDS epidemics in sub-Saharan Africa using seroprevalence data from antenatal clinics. *Bull World Health Organ* 2001;79(7):596-607.
  76. INDEPTH. Population and Health in Developing Countries: Population, Health, and Survival in INDEPTH Sites International Development Research Centre. Ottawa, ON, Canada K1G3H9, [cited May, 13 2002]; Available from: <http://www.idrc.ca>;
  77. Central Statistics Authority of Ethiopia. Demographic and Health Survey 2000. Addis Ababa: Central Statistics Authority and ORC Macro; 2001.
  78. National Geography Society. People and places, Ethiopia. [cited 26 May, 2007]; Available at: [http://www3.nationalgeographic.com/places/countries/country\\_ethiopia.html?source=G1105&kwid=ethiopia%20map|751138045](http://www3.nationalgeographic.com/places/countries/country_ethiopia.html?source=G1105&kwid=ethiopia%20map|751138045)
  79. Encyclopaedia of the Nations 2007. [Accessed 26 May, 2007]; Available from: <http://www.nationsencyclopedia.com/economies/Africa/Ethiopia.html>.
  80. Federal Democratic Republic of Ethiopia, Ministry of Information. Country profile, facts about Ethiopia 2004 [cited 2007 07 June]; Available from: <http://www.moinfo.gov.et/>
  81. Central Statistics Agency of Ethiopia. 1994 Population and Housing Census. Addis Ababa: CSA; 1996.
  82. Central Statistics Agency of Ethiopia. The 2006 National Statistics Projections. [cited 2007 May 26]; Available from: [http://www.csa.gov.et/text\\_files/2006\\_national\\_statistics.htm](http://www.csa.gov.et/text_files/2006_national_statistics.htm)
  83. The World Bank. Ethiopia, data and statistics: World Bank; 2004.
  84. The World Bank. Ethiopia data and statistics. 2006 [cited 2007 May 28]; Available from: [http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICA\\_EXT/ETHIOPIAEXTN/0,,menuPK:295955~pagePK:141132~piPK:141109~theSitePK:295930,00.html](http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICA_EXT/ETHIOPIAEXTN/0,,menuPK:295955~pagePK:141132~piPK:141109~theSitePK:295930,00.html)

- 
85. Ministry of Health of Ethiopia. Health Sector Development Programme II, 2002 [cited 2007 May 28]; Available from: [http://www.moh.gov.et/index.php?option=com\\_remository&Itemid=47&func=select&id=4](http://www.moh.gov.et/index.php?option=com_remository&Itemid=47&func=select&id=4)
  86. Federal Democratic Republic of Ethiopia, Ministry of Health. Health and Health related indicators 2004/5, Planning and Programming Department; 2005.
  87. Meskan Woreda Administration Office. Annual report summary for 2005/2006. Butajira; 2006.
  88. Berhane Y. Women's health and reproductive outcome in rural Ethiopia. Umeå: Umeå University; 2000.
  89. Shamebo D, Sandstrom A, Wall S. The Butajira Rural Health Project in Ethiopia: Epidemiological surveillance for research and intervention in primary health care *Scan J Prim Health Care* 1992;10:198-205.
  90. Berhane Y, Wall S, Kebede D, Emmelin A, Enquselassie F, Byass P, et al. Establishing an epidemiological field laboratory in rural areas-potentials for public health research and interventions: The Butajira Rural Health Program 1987-99. *Ethiop J Health Dev* 1999;13(Supp):1-47.
  91. Deressa W, Fantahun M, Ali Ahmed. Malaria-related mortality based on verbal autopsy in an area of low endemicity in predominantly rural population in Ethiopia. *Malaria Journal* 2007;6(128).
  92. Fantahun M, Fottrell E, Berhane Y, Wall S, Hogberg U, Byass P. Assessing a new approach to verbal autopsy interpretation in a rural Ethiopian community: the InterVA model. *Bull World Health Organ* 2006 Mar;84(3):204-10.
  93. Fottrell E, Byass p. Demonstrating the robustness of population surveillance data: implications of error rates on demographic and mortality estimates. *BMC Med Res Methodo* 2008, **8**:13.
  94. Ajzen I. The theory of planned behaviour. *Organizational behaviour and human decision process* 1991;50(2):179-211.
  95. Bandura A. Social foundation of thought and action, a social cognitive theory. new jersey: Englewood cliffs; 1986.
  96. Ajzen I. From intentions to actions. In: T M, editor. From intentions to actions. London: Open University Press; 1988:( 113-8).

- 
97. Johanson B, Onwuegbuzi AJ. Mixed Methods Research. *Educational Researcher* 2004; 33(7):14-26.
  98. O'Cathain A, Murphy E, Nicholl J. Why, and how, mixed methods research is undertaken in health services research in England: a mixed methods study. *BMC Health Services Research* 2007; 7:85.
  99. Sandelowski M. Focus on Research Methods, Combining Qualitative and Quantitative Sampling, Data Collection, and Analysis Techniques in Mixed-Method Studies *Research in Nursing and Health* 2000;23:246-55.
  100. Bowling A, Ebrahim S, editors. Combined qualitative and quantitative designs. New York: Open University Press; 2005.
  101. Dahlgren L, Emmelin M, Winkvist A. Qualitative Methodology for International Public Health. *Umeå*; 2004:12-15.
  102. Mason J. Mixing methods in qualitative driven way. *Qualitative Research*. 2006;6(1):9-25.
  103. Berhane F, Berhane Y, Fantahun M. Adolescents' health service utilization pattern and preferences: consultation for reproductive health problems and mental stress are less likely. *Ethiop J Health Dev* 2005;19(1):29-36.
  104. Epidemiology and Public Health Sciences, Public Health and Clinical Medicine University of Umeå, Sweden, Open Cod. Umeå 1997.
  105. Graneheim U.H., Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today* 2003;24:105-12.
  106. Umeå University Department of Epidemiology and Public Health S. Cohort, Beta version B1.0. 1997.
  107. Brownson RC, Petitti DB. Key Methodological Concepts and Issues. In: Brownson RC, Petitti DB, editors. *Applied Epidemiology, Theory to Practice*, New York: Oxford University Press; 1998:. 35-70.
  108. Hennekens CH, Buring JE. Types of epidemiological studies. In: SL M, editor. *Epidemiology in Medicine*. 1st ed. Boston/Toronto: Little Brown and Company; 1987: 101-212.
  109. Kalix P, Braenden O. Pharmacological aspects of the chewing of khat leaves. *Pharmacol Rev.* 1985 Jun;37(2):149-64.

- 
110. Kalix P, Khan I. Khat: an amphetamine-like plant material. *Bull World Health Organ.* 1984;62(5):681-6.
  111. Rothman KJ, Greenland S. Types of epidemiological studies. In: Winters R, O'Conner E, editors. *Modern Epidemiology* 2nd ed. Philadelphia: Lippincott-aven Publishers, 227 East Washington Square, Philadelphia PA 19106-3780; 1998. p. 67-114.
  112. Rothman KJ, Greenland S. Precision and Validity. In: Winters R, O'Conner E, editors. *Modern Epidemiology* 2nd ed. Philadelphia: Lippincott-aven Publishers, 227 East Washington Square, Philadelphia, PA 19106-3780; 1998. p. 115-34.
  113. Hennekens CH, Buring JE. Analysis of Epidemiological Studies: Evaluating the role of Bias. In: SL M, editor. *Epidemiology in Medicine.* 1st ed. Boston/Toronto: Little Brown and Company; 1987.p. 272-85.
  114. Rothman KJ, S G. Effect -Measure modification versus confounding. In: Winters R, Conner E, editors. *Modern Epidemiology*, Los Angeles: Lippincott-Raven; 1998 .p. 54-55
  115. Kirkwood BR, Sterne JAC. Effect Modification. In: Goodgame F, editor. *Medical statistics.* Massachusetts: Blackwell Publishing Company; 2006. p. 185-188.
  116. Byass p, Worku A, Emmelin A, Berhane Y. DSS and DHS: longitudinal and cross-sectional viewpoints on child and adolescent mortality in Ethiopia. *Popul Health Metr* 2007, **5**:12
  117. Clark S. Early marriage and HIV risks in sub-Saharan Africa. *Stud Fam Plann* 2004;35(3):149-60.
  118. Bankole A, Singh S, Woog V, Wulf D. Risk and Protection: Youth and HIV/AIDS in Sub-Saharan Africa. New York and Washington: The Allen Guttmacher Institute; 2004.
  119. Negash Y, Gebre B, Benti D, Bejiga M. A community based study on knowledge attitude and practice (KAP) on HIV/AIDS in Gambella Town, Western Ethiopia. *Ethiop J Health De.* 2003;17(3):205-13.
  120. Astatke H, Black M M, Serpell R. Use of Jessor's Theoretical Framework of Adolescent Risk Behaviour in Ethiopia: Implication for HIV/AIDS programme. *Northeast African Studies*2000;7(1):63-84.
  121. UNAIDS. Sexual behaviour change for HIV: Where have theories taken us? Geneva; 1999.

- 
122. Eaton L, Flisher AJ, Aarø LE. Unsafe sexual behaviour in South African Youth. *Soc science and medicine* 2003;56:149-56.
  123. Armitage CJ, Conner M. Efficacy of the theory of planned behaviour: A meta-analytic review. *Br J Soc Psychol* 2001;40:471-99.
  124. Sheeran P, Taylor S. Predicting intentions to use condoms; A meta analysis and comparison of the theories of reasoned action and planned behavior. *Journal of Applied Social Psychology* 1999;28(8):1624-75.
  125. Taffa N, Klepp K. I, Sundby J, Bjune G. Psychosocial determinants of sexual activity and condom use intention among youth in Addis Ababa, Ethiopia. *Int J STD AIDS*. 2002 Oct; 13(10):714-9.
  126. Dehne K. L, Riedner G. Sexually transmitted infections among adolescents: the need for adequate health services. *Reproductive Health Matters* 2001;9(17):170-83.
  127. Kapiga SH, Aitken IW. Role of sexually transmitted diseases in HIV-1 transmission. In: Essex M, Mboup PJ, Marlink RG, Tlou SD, editors. *AIDS in Africa*. New York: Kluwer Academic/Plenum Publishers; 2002: 231-50.
  128. World Health Organization. Estimation of the incidence and prevalence of sexually transmitted infections. Report of a WHO consultation. Treviso; /2002.
  129. Chen XS, Ping Y, Chen LP, et.al. Sexually Transmitted Infections Among Pregnant Women Attending an Antenatal Clinic in Fuzhou, China. *Sexually Transmitted diseases*. 2006;33(5):296-301.
  130. WHO. Guidelines for the management of sexually transmitted infections. 2003 [cited 2008 September 15]; Available from: <http://whqlibdoc.who.int/publications/2003/9241546263.pdf>
  131. Bulatao RA, Ross JA. Rating maternal and neonatal health services in developing countries. *Bull World Health Organ* 2002;80(9):721-7.
  132. Duncan EM, Tibaus G, Pelzer A, Mehari L, Peutherer, Young H, et al. Prevalence and significance of sexually transmitted diseases among Ethiopian women attending antenatal clinics in Addis Ababa. *Ethiop J Health Dev* 1995;9(1):31-40.
  133. Mugrditchian. Managing sexually transmitted diseases with limited resources. *venereology* 1995;8(4):251-5.

- 
134. Duncal EM, Tibaus G, Pelzer A, Mehari L, Perine LP, Peutherer J, et al. A sociological and serological study of attendees of family planning clinics in Addis Ababa. *Ethiop J Health Dev* 1995;9(1):19-30.
  135. Walker D, Muyinda H, Foster S, Kengeya-Kayondo J, Whitworth J. The quality of care by private practitioners for sexually transmitted diseases in Uganda. *Health Policy Plan.* 2001 Mar; 16(1):35-40.
  136. Chabikuli N, Schneider H, Balaauw D. Quality and equity of private sector care for sexually transmitted diseases in South Africa. *Health Policy Plan.* 2002;17(Supp 1):40-6.
  137. Ngom P, Binka FN, Phillips JF, Pence B, Macleod B. Demographic surveillance and health equity in sub-Saharan Africa. *Health Policy Plan.* 2001 Dec;16(4):337-44.
  138. Lautze S, Aklilu Y, Raven-Roberts A, Young H, Kebede G, Leaning J. Risk and vulnerability in Ethiopia: Learning from the past, responding to the present and preparing for the future. A Report for the U.S. Agency for International Development; 2003.