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Ashenafi Haile Hailemariam, MD

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Infertility in Rural Ethiopia

By

Ashenafi Haile, MD

Department of Community Health
Faculty of Medicine, Addis Ababa University

Approved by the Examining Board

Dr. Yemane Berhane _____

Chairman, Department Graduate Committee

Dr. Yemane Berhane _____

Advisor

Prof. Mohsen Gadallah _____

Examiner

Dr. Misganaw Fantahun _____

Examiner

DEDICATION

To my brother Dr. Mitiku Haile, his wife Hiwot Abraham, my wife Alem Genanaw and my daughter Higewengel Ashenafi.

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Acknowledgments

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1. ABSTRACT

Infertility is a world-wide problem affecting 8-12% of married couples. The prevalence of infertility in some areas of the sub-Sahara region reaches as high as 30%. Much of the literature on infertility deals with the problems of infertility for women in the western countries and little is known as to what puts women in sub-Sahara Africa vulnerable to infertility and as to how perceive the causes of infertility. A cross-sectional survey was conducted in rural Butajira, Ethiopia, in the period between the 13th of May and 23rd of June, 1999 to determine the magnitude and potential risk factors of infertility. A total of 901 women in the age group 20 to 29 years were enrolled into the study from surveillance register.

The prevalence of primary and secondary infertility was 2.9% and 16.1% respectively. Comparison was made between cases of secondary infertility and fertile women about potential risk factors. Pregnancy wastage, age at first marriage less than 16 years, STDs occurring after the last pregnancy, polygamous marriage, and low level education of the husbands were found significantly associated with secondary infertility. Most women with the problem of infertility in the area visit the witch-craft, more often than the health institutions. It is recommended that public health officials must increase the access to and strengthen programs aiming at the reduction of post-partum and post-abortal infections and STDs. Due attention should be given for developing and implementing protocols for evaluating and managing infertility.

2. INTRODUCTION

The problem of infertility has been of paramount concern to mankind since the time of Genesis(1). In Genesis God has instructed mankind to be fruitful and multiply and failure to do so is considered the result of God's punishment for wrong-doings(1). The Talmud describes three forms of living death; to have poor health, to be poor, and to be barren (2). Most traditional cultures place a high social value on fertility, particularly as a demonstration of the conssumation of the marriage and as one expression of the couples social role (3). For these reasons, complex sets of family and social relationships, beliefs and agreements are incorporated into the marriage systems and procreation.

Infertility has been viewed as punishment for some social transgressions, and failure to bear children is an accepted basis for divorce in many cultures and regardless of whether it represents a cause or effect, childlessness is significantly higher among divorced women in some cultures (3). Efforts to understand the problem began only in the seventeenth century when anatomy became the hallmark of medical investigations. Since then demographers have been trying to understand the magnitude and geographic distribution of the problem by investigating the total fertility rates of populations who do not practice voluntary contraception (3,4). Clinicians and epidemiologists have also been trying to describe the clinical presentations and to identify the risk factors for infertility. However, the problem

of infertility received little attention in countries with fast growing populations in developing countries (5).

Involuntary infertility, inability of a couple to conceive after having unprotected sexual intercourse for twelve or more months, is a world-wide problem. It is thought to affect 60 to 80 million couples Oliver the world (6). Its prevalence ranges from 8 to 12 % among married couples (7). In sub-Sahara Africa prevalence as high as 30 % have been reported (3,8,9). About 5 % of couples are thought to infertile for complex reasons such as genetic, immunologic, endocrinologic, congenital and anatomic factors which are difficult to diagnose (8). The differences in prevalence have been attributed to differential rates of genital infections, exposure to environmental pollutants, substance use, previous reproductive and sexual factors (3,10,11).

Despite the attempts of many investigators to see the effects of individual risk factors, the problems of confounding, recall bias and limitedness of resources for carrying out community based studies on big populations have remained obstacles to the implementations of the scientific studies (9). In the absence of any study in the country, the identification of potential risk factors and the social implications of infertility help public health officials to design and implement preventive measures easily the need for community based studies is obvious in countries where it is a major factor in influencing marriage.

3. LITERATURE REVIEW

Much of the literature on infertility is oriented almost always to the problems of western societies. Little attention is given to the problems posed by infertility for women in the developing world (11,12,13). However, with the limited number of studies conducted in sub-Sahara Africa it is known that this region is epidemiologically different from the rest of the world by having an infertility belt stretching across central Africa from Tanzania in the east to Gabon in the west (4,13). The range of infertility for sub-Sahara Africa was between 12.7% and 16.9% with a mid-point 14.9%. The lowest rates were seen in east Africa and the highest in southern Africa (4). Areas with high rates of secondary infertility are also known to have high rates of pregnancy wastage (both abortion and stillbirth) and childlessness (3,8). The differences in the magnitude of infertility have been attributed to the differences in the rates of risk factors which are grouped into females factors, male factors, factors in both and unexplained factors.

Factors of infertility Female.

The female factors that are known to influence fertility are briefly described below.

1. **Age** -biologically speaking a women's reproductive life begins at menarche and ends at menopause (9,13). The women's natural ability to conceive (fecundity) varies considerably over the

years her reproductive life exists (4,13). It is low both immediately after menarche and before menopause due to hormonal irregularities that may accompany the periods. It also peaks between the age of 18 and 30 years the highest being at around 25 years and then begins to fall with marked drop at about 35 years (9,13).

Moreover, among sexually active women the risk of infertility increases with age for the following reasons.

A. Increased risk of acquiring PID (13).
B. Increased number of pregnancy and it's complications (13).
C. Decreased frequency of ovulatory cycles (9,13).

2. **Tubal blockage**

Post-partum and post-abortal infections are common causes of pelvic inflammatory diseases (PID) which may result into tubal occlusion (4,13). PID secondary to post-partum and post-aboral infections is a common phenomenon in developing countries. This results following obstetric complications like obstructed labour, unhygienic childbirth practices, harmful traditional practices such as placing herbs into the vaginal canal to facilitate labour by enhancing uterine contractions. Improperly performed abortions and tears and damages incurred to reproductive tissues during child birth (12,13,14). Spontaneous abortion may also result in infection if it was incomplete. The rate of secondary

infertility, particularly if primary infertility is low, may be used as a crude indicator of the possible importance of postpartum and post-abortal infections (3,9.11,13)

Pelvic Inflammatory Disease has been seen as a sequelae of STDs like gonorrhoea, chlamydia etc (3,12,13). These infections may cause damage of the Fallopian tubes either directly or by causing secondary infections by other bacteria leading to the obliteration of the tubes (3,15). In developing countries gonorrhoea was found to be the major cause of PID accounting for over 40% of the cases. There are also various studies which had shown that areas with high rates of STDs and subsequent bouts of PID have high rates of infertility (15). The chance to become infertile also increases with increases in the episodes of PID (15,16). In a study in Sweden there was infertility prevalence of 13% in those who had one episode of PID, 36% in those with three episodes (17). The behaviours of adolescents in developing countries had been seen promoting the incidence of these problems recently(18).

3. **Socio-cultural factors**

Women's sexual behaviour, in the absence of which their partnership history and number of polygamous unions, have been used as proxy indicators for high infertility with divorced and separated women more at risk than married ones. Those with a history of multiple partners showed a two fold risk of infertility than monogamous ones (4,13). Polygamous union can

decrease the woman's exposure to conception by causing reduction in the quality of the sperm due to frequent intercourse made between the husband and all his wives which may not allow sufficient time for spermatogenesis (9). Moreover, polygamous union can increase the chance of the woman to get STDS by facilitating the transmission of STDs among the wives (4,13,15).

Age at first coitus has been associated with infertility for two reasons; increased risk of infection by STDS and increased chance of damage to the reproductive tract (4,13). These factors have been observed to be associated with infertility more frequently in countries in East Africa than any other country in the continent (4).

Ethnicity or culture had been found to be associated with infertility through their influence on sexual behaviour by setting norms of age at marriage, multiple partnership unions, and extent to which women may remarry following a termination of previous marriage (4,12,15,18).

Periodic migration of men to urban areas for work may lead to high prevalence of infertility due to absence of exposure to conception or by increasing the chance of acquiring STDs (4).

Access to health services can affect the progress of STDs and can be affected due to differences in culture in seeking for treatment (9,12,15).

Urban residence can also affect the prevalence of infertility by increasing the chances of exposure to STDs (15).

4. **Ovulatory disorders**

Ovulatory disorders due to problems such as; endometriosis, advanced age, polycystic ovarian syndrome and other hormonal disorders, have been more commonly seen in infertile women in developed countries(9,12,13).

5. **Contraceptive use**

Contraceptive use had been seen to have an association with temporary impairment of fertility in various investigations (19). The risk of ovulatory infertility is higher following discontinuation of oral contraceptives than the other methods which is thought to induce inhibition of the hypothalamic gonadotrophin hormone which prevents stimulation of the maturation of the ovarian follicles (19).

Factors of infertility in the Male

There are many factors which can affect male fertility including:

1. **Infectious diseases**

Diseases which can cause blockade of the sperm ducts or failure of the testes to carry out normal spermatogenesis due to infectious diseases (9,11,13,14,20). These diseases include: gonorrhoea, mumps, leprosy, filariasis etc,.There are evidences of high prevalence gonorrhoea and acute and chronic unilateral

and bilateral epididymides which can lead to obliteration of the sperm ducts (9,13).

2. Exposure to Environmental/ Occupational Pollutants

Exposure to environmental and work place hazards has been observed to be associated with infertility (8,9,13,20,21). A high scrotal temperature due to tight underclothing, frequent hot baths and prolonged sitting, as in the case of taxi and truck drivers are suspected to impede sperm maturation (9).
A soil pesticide; dibromochloropropane (DBCP) has clearly been shown to affect testicular function leading to depression of sperm count (9). Sperm abnormalities and sexual malfunction were seen in people exposed to lead, carbondisulfide, chloropren and synthetic estrogens (9).

3. Substance use (Alcohol, Cigarettes)

Use of substances like alcohol, cigarettes, and Marijuana have been observed in men with infertility (20,21).Chronic alcoholics have been seen to have diminished fertility, but it is not known wether the problem reflects other health problems or characterstics of alcoholics (9).

Cigarette smoking has been associated with infertility and spontaneous abortion in various studies (9,13,20). It's effect

might be mediated by one or more of the following ; impairment of sperm production leading to reduced sperm cell count, reduced sex drive, lower sperm motility and abnormal morphologic changes on the sperm cells (13).

4. **Varicocele**

Dilatation of the scrotal portion of the pampiniform plexus of veins that drain the testes is thought by many as the most common treatable cause of male infertility. The incidence of varicocele in the general population is reported to be as high as 20% in Africa (8,21). However, varicocele are discovered in approximately one third of men being evaluated for infertility (21,22). Increased scrotal temperature has been demonstrated in men with varicocele and this is thought to cause abnormal spermatogenesis and defect in testicular androgen production (22).

Factors in both

Both men and women can be affected by any one or combination of the following factors.

1. Sexual frequency is one of the factors associated with infertility. For couples attempting to achieve conception less frequent intercourse is generally recommended on the ground that frequent ejaculations may not be conducive to maintenance of optimal semen quality (9).

2. Psychological factors

The association of psychic stress and impotence is well established. It is estimated that about 90% of the cases of impotence may be due to psychological problems (9). Sever anxiety in recent migrants has been seen to cause oligospermia. Emotional disturbances of women are also associated with menorrhea. Infertile women with vaginismus, dyspareunia, and frigidity are thought to suffer from psychological problems (9).

4. OBJECTIVES

General Objective

To investigate the occurrence of infertility in rural women.

Specific Objectives

1. To determine the magnitude of infertility in married women in rural Butajira.

2. To assess the potential risk factors of infertility among married women in rural Butajira.

3. To describe the perceived causes and outcome of infertility in rural Butajira.

5. MATERIALS AND METHODS

5.1 THE STUDY DESIGN

The study is a cross-sectional survey with internal comparison of infertile women with their fertile counterparts. The survey provides information on the magnitude of infertility. Comparison of fertile women with infertile women allows to identify potential risk factors.

5.2 THE STUDY AREA AND POPULATION

The study area

The study was conducted in 9 Pesant Associations (PAs) under the Butajira Rural Health Program (BRHP) located in a rural area in one of the regions of Ethiopia, the Souther Nations Nationalities and Peoples Regional (SNNPR). The area is located in Meskanena Mareko wereda (formerly Butajira Awraja) and its administrative center is a small town called Butajira. The town is located 130 Kilometres south of the capital city of Ethiopia, Addis Ababa (Figure 1). The town is connected to Addis Abeba by all-weather road. The area is both highland and lowland with altitude ranging from 1500 to 2300 metres above sea level.

The population of the area according to the 1994 census is 227,135 (23). The wereda is inhabited by various ethnic groups

the majority belonging to the Gurage ethnic group (suthern Semitic stoke) with its various sub-groups (lingual) including Meskan, Silti, Sodo and Welene. The other major portion of the population belongs to Mareko, one of the sub-groups of the ethnic group of Hadiya (Hamitic stoke). Most of them are mulems by religion (74.4%) followed by orthodox christens (20.4%). Most of the people live by subsistence farming by producing Enset (false banana) a drought resistant plant whose stem and roots serve as food and Maize.

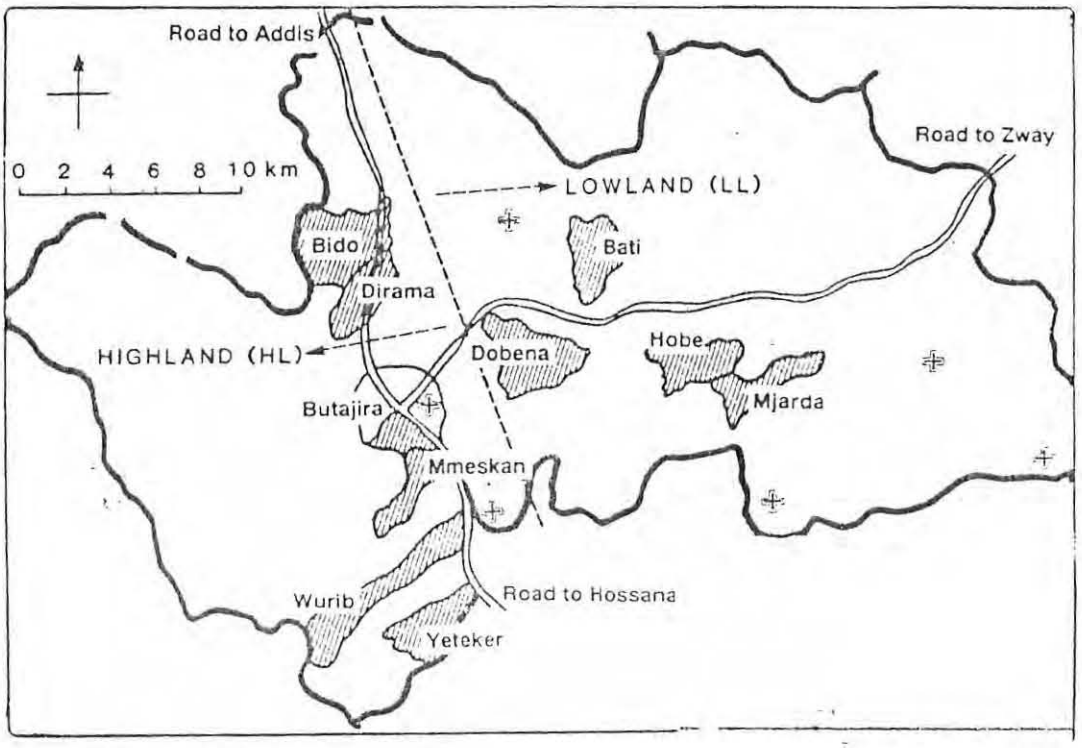


Figure 1. Map of Meskanena Mareko Wereda indicating the 9 study areas.

Study population

The study population was composed ever-married women aged 20 to 29 year. They were selected from the data base maintained by the Butajira Rural Health Program since 1986 through monthly surveillance. This age group was selected based on the suggestions of an expert group on infertility in the WHO (8). It is believed that this age group catches women in their highest reproductive capacity which allows assessment of other risk factors by controlling the effect of age. Moreover, this age group minimizes the possibility of recall bias since most of the questions asked are with regard to events which took place relatively short time ago. This would have been difficult if the study was conducted among women in the reproductive age group i.e., 15-49 years. The way the study population was selected is depicted in figure 2.

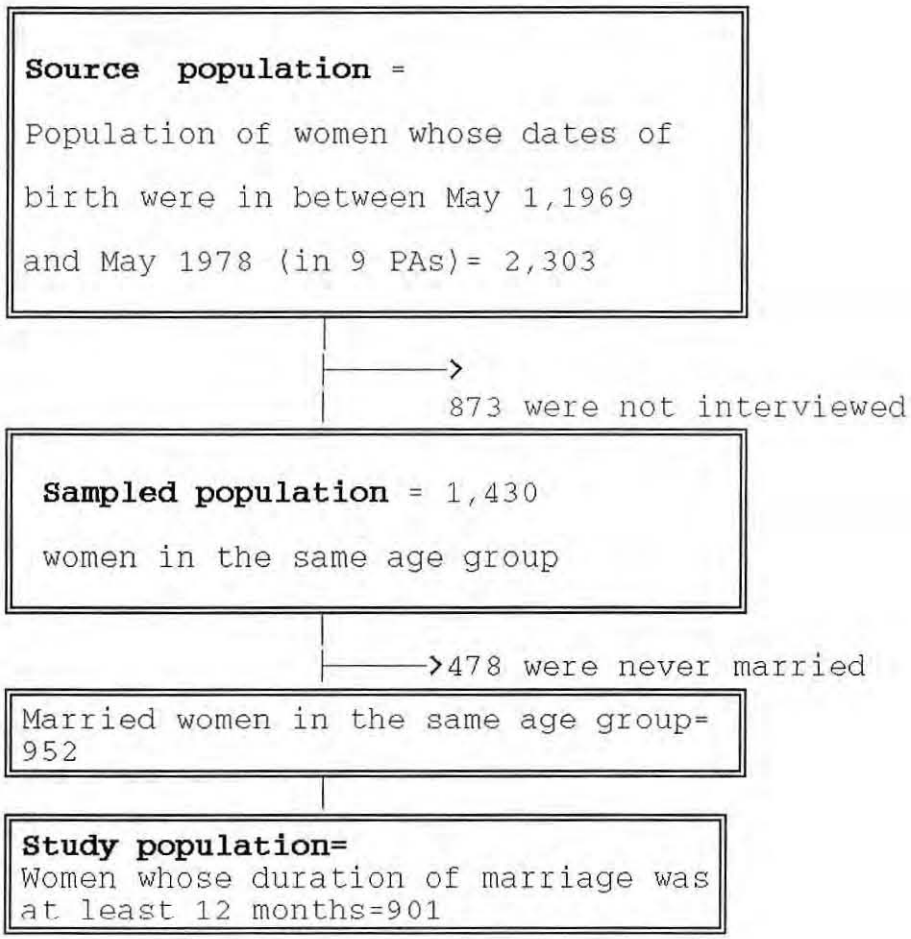


Fig.2. Enrolment procedure (steps).

5.3 SAMPLE SIZE

Sample size was calculated by assuming the prevalence of infertility 14.9%, the mid-point for sub-Sahara Africa and 2.3 % margin of error (the maximum value for the upper and lower limits of the prevalences of infertility for the studied nations) (4).

The actual calculation was made using the formula for cross-sectional studies which is described below.

$$N = \frac{(Z_2)^2 \times P\ (1-P)}{d^2}$$

Where Z = the critical value for 95 % CI (1.96)

P = The mid-point for the prevalence of infertility in sub-Sahara Africa = 14.9%

d = The margin of error for the required sample size = 2.3%

N= The calculated sample size = 921

5.4 STUDY VARIABLES

1. Dependant variables

1.1 Primary infertility-a situation where a couple married for at least one year have never achieved conception.

1.2 Secondary infertility-a situation where a couple had achieved pregnancy but could not achieve it for the last one or more years despite having unprotected sexual intercourse.

2. Independent variables

Independent variables that were studied in the couples are presented in figure 3. These factors are factors which were studied by investigators both in the developed and developing countries. The factors include; socio-demographic, sexual, reproductive, substance use and STDs histories.

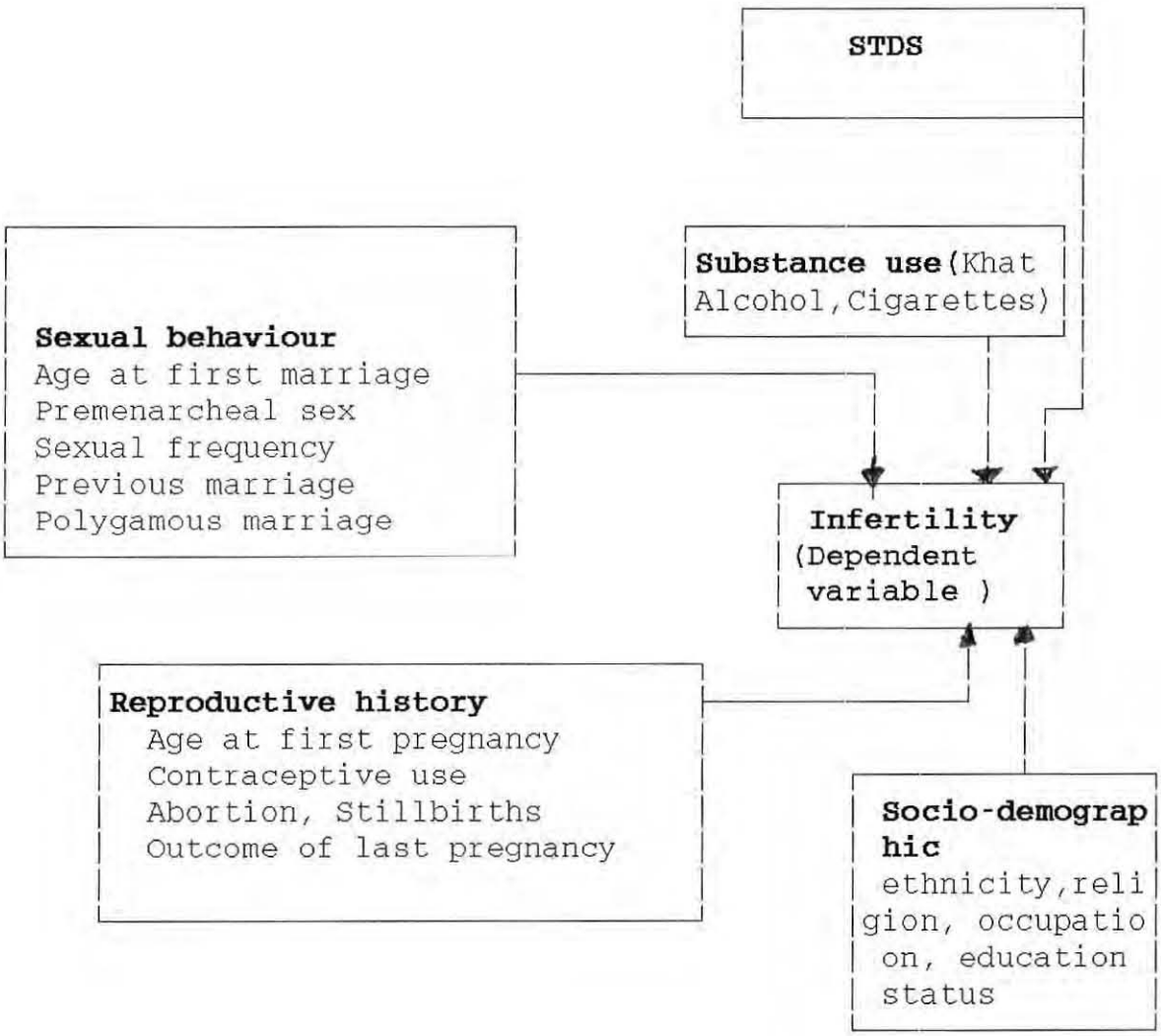


Fig.3. Potential risk factors investigated in the study.

5.5 DATA COLLECTION

Data was collected on a questionnaire in the period between the 13th of May and 23rd of June 1999. The questionnaire has two parts and was developed in English later translated into Amharic and with back translation into English. The first part of the questionnaire identifies eligible women for the study (women who had been married for more than eleven months) and collects information on the socio-economic characterstics of the interviewee. The second part of the questionnaire collects information on the potential risk factors including; the reproductive, substance use, and sexual history of the woman and information on the socio-economic characterstics and substance use by the husband.

The questionnaire was tested on women in the same age group as the study subjects but living in an adjacent village outside the study area. Questions that were found difficult to be answered by the women during the pretesting were dropped out from the final questionnaire. The questions which were omitted after the pretesting include questions about the knowledge of the timing of sexual intercourse in relation to menstrual cycle.

Data collectors were all female in their 20's. They were living in the area and were able to speak the local languages and had completed 12th grade. They all had experience in collecting information on reproductive health problems in the study area.

Quality control was ensured by providing a three days training on the administration of the questionnaire and field supervision was made by a supervisor. All the questionnaires were edited every day after data collection and every incomplete questionnaire was sent back to the corresponding data collector so that the incomplete questionnaire is corrected by revisiting the house of the interviewee.

Ethical clearance was obtained form the ethical committee of the Faculty of Medicine and Department of Community Health. Informed verbal consent of the interviewee was obtained right before the interview after explaining the purposes of the interview.

Exposure status

Exposure to substances alcohol, cigarette and Khat was defined as:

1. Frequent use = use of these substances for at least one day in a week's time.
2. Occasional use = use of these substances only at times of social gatherings and ceremonies.
3, Never use = never use of the substances at any time.

The time of exposure to STDs and contraceptives was assessed in relation to the time of marriage and last pregnancy.

Exposure was classified into before, after and both before and after marriage/ pregnancy.

Pregnancy wastage is the failure to carry pregnancy to term, including both spontaneous abortion and stillbirth (13).

5.7 Data analysis

Data were processed using epi-info version 6.02. Comparison between infertile cases and fertile women was made about the presence of potential risk factors using OR with 95% confidence intervals and proportions after defining what an infertile woman should fullfil.

5.6 OPERATIONAL DEFINITION

Infertility

Infertile cases were defined as if they fulfil the following criteria.

1. Married for at least the past 12 months.
2. Either had not conceived in the past (primary infertility) or, had conceived in the past but not in the last 12 months up to the date of the interview.
3. Who was not using contraceptives in the time period one year prior to the date of interview.
4. Either was not breast-feeding or, was breast-

feeding but had been 12 months or more since she had seen her first post delivery menses.

5. Claims that she is pregnant but was either not told by a health professional or did not have two or more symptoms of pregnancy including amenorrhea, abdominal girth, nausea and vomiting.

All the other women married for 12 months or more and who did not fulfil the above criteria were considered fertile.

6. RESULTS

The study was conducted in the period between the 13 th of May and 23rd of June, 1999. From the 952 interviewees 51 (5.4%) were excluded from the analysis for either they had been separated, divorced, or widowed for one or more years prior to the date of interview or they had been married for a time of less than a year. Analysis was made in the remaining 901 women.

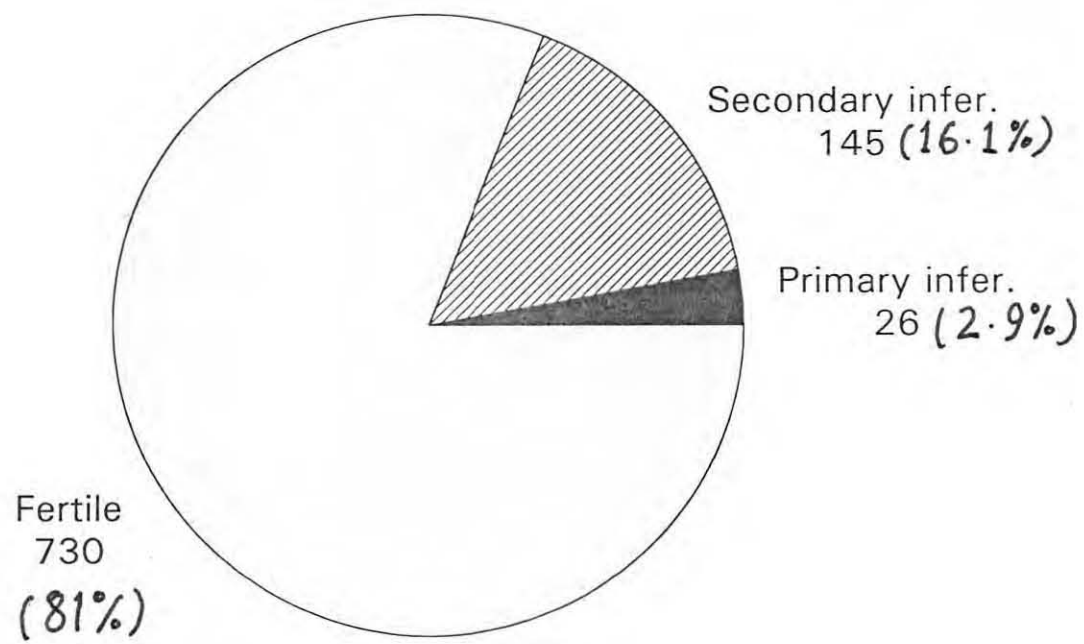
Most of the remaining 901 interviewees were Moslem 674 (74.8%) by religion , belong to the main ethnic group, Meskan 409 (45.4 %), are illiterate (86.2 %), and house wives 810 (89.9%) (table 1).

Table 1. The socio-demographic characterstics of the study population

Charactestic	Number	(%)
Occupation		
House wife	810	(89.9)
Trader	91	(10.1)
Religion		
Muslims	674	(74.8)
Orthodox christens	181	(20.1)
Other	46	(5.1)
Ethnicity		
Meskane	409	(45.4)
Mareko	130	(14.4)
Silti	179	(19.9)
Other	183	(20.3)
Education status		
Illiterate	777	(86.2)
Read and write	25	(2.8)
1-6th grade comple.	89	(9.9)
7-12th grade comple.	10	(1.0)

Of the 901 women 171 (19%) were identified as inferible, 26 (2.9%) as primary infertility and the rest 145 (16%) as secondary infertility (figure 4).

Fig.4. The prevalence of infertility in Butajira, Ethiopia, 1999.



Further analysis into the factors influencing infertility was made only on women with secondary infertility because of a small number of women with primary infertility.

6.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS

The majority of the women were house wives, Muslims and illiterate. However, the characteristics of the study population was similar to the general population of the Wereda.

With regard to the few selected socio-demographic characteristics including; occupation, religion, education status and ethncity there were no statistically significant differences observed between infertile women and fertile ones.

Table 2. Fertility status by selected socio-demographic characteristics of the women in Butajir, Ethiopia, 1999.

Risk factor	Infertile	Fertile	Crude OR	95% CI
Age group				
20-24 years	77	342	1.0	-
25-29 years	68	388	1.29	0.91,1.85
Ethnicity				
Mareko	20	107	1.0	-
Meskan	74	324	1.22	0.69,2.18
Silti	28	145	1.03	0.53,2.02
Other	23	154	-	
Religion				
Muslims	110	544	1.0	-
Christians	35	186	1.02	0.65,1.60
Occupation				
Housewife	131	655	1.0	-
Trader	14	75	1.07	0.58-1.97
Education				
Illiterate	132	627	1.0	-
Read and write	3	22	0.65	0.15-2.27
1-6th Grade com.	9	74	0.58	0.26-1.23
7-12th Grade com	1	7	0.68	0.03-5.52

6.2 REPRODUCTIVE CHARACTERISTICS

The relationship between infertility and history of abortion and stillbirth was evaluated independently, However, there was no statistically significant association (table 3).
However, having no liveborne child (as an indicator for pregnancy wastage i.e., stillbirths and abortions) was also evaluated as a risk factor for infertility . About 8 (5.5%) of the infertile cases and 13 (1.8%) of the fertile women had no live borne child due to pregnancy wastage and the difference was statistically significant [OR (95% CI); 3.2 (1.3, 7.8) (table 3).

There was no statistically significant difference in age at first pregnancy (divided into two age groups i.e, <16 years and 16+) and termination of last pregnancy as abortion or as stillbirth) which were evaluated indipendantly.

Table 3. The relationship between selected reproductive characteristics of women and secondary infertility in Butajira, Ethiopia, 1999.

Factor	Infertile	Fertile	OR	95% CI
Age at first pregnancy				
< 16 years	15	72	1.0	-
16+ years	130	658	1.05	0.56,1.96
Having no live borne due to pregnancy wastage				
No	137	717	1.0	-
Yes	8	13	3.2	1.3, 7.8
Having abortion				
No	119	639	1.0	-
Yes	26	91	1.53	0.92,2.53
Having stillbirth				
No	122	653	1.0	-
Yes	23	77	1.6	0,94, 2.72
Termination of last pregnancy as stillbirth				
No	140	716	1.0	-
Yes	5	14	2.1	0.68, 6.24
Termination of last pregnancy as abortion				
No	140	714	1.0	-
Yes	5	16	1.59	0.50,4.79
Past contraceptive use				
No	143	713	1.0	-
Yes	2	17	0.59	0.07,2.52

6.3 Self-reported history of STDs

The odds of having abnormal vaginal discharge after the last pregnancy was 5 times higher among infertile women compared to fertile ones [OR (95% CI); 5.14 (1.27,20.74)]. The likelihood of having genital ulcer after the last pregnancy was also 10 times more among infertile women [OR (95% CI);10.33 (1.62, 81.88)]. However, this association was not observed when assessed in relation to the time of marriage.

Table 4. Self-reported history of STD in Butajira, Ethiopia, 1999.

History of STD	Infertile (N=145)	Fertile (N=730)	OR	95% CI
Abnormal vaginal discharge (ever)				
No	139	714	1.0	-
Yes	6	16	1.93	0.66,5.35
Abnormal vaginal discharge after marriage				
No	139	714	1.0	-
Yes	5	15	1.71	0.53, 5.13
Abnormal vaginal discharge after the last pregnancy				
No	139	714	1.0	-
Yes	5	5	5.14	1.27, 20.74
Genital ulcer (ever)				
No	140	723	1.0	-
Yes	5	7	3.69	1.00, 13.15
Genital ulcer after marriage				
No	140	723	1.0	-
Yes	4	7	2.95	0.72, 11.39
Genital ulcer after the last pregnancy				
No	140	723	1.0	-
Yes	4	2	10.33	1.62, 81.88

6.4 History of substance use

History of substance use of cigarettes, alcohol and Khat was evaluated among infertile and fertile women. However there was no difference in use after marriage, after the last pregnancy or currently for Alcohol and Khat (table 5). However, no body reported use of cigarettes.

Table 5. Current use of substances by women and secondary infertility in Butajira, Ethiopia, 1999.

Factor	Infertile (N=145)	Fertile (730)	OR	95% CI
Alcoholic beverage				
Never users	67	370	1.00	-
Frequent users	17	53	1.77	0.92, 3.37
Occasional users	61	307	1.10	0.74, 1.63
Khat				
Never users	62	345	1.00	-
Frequent users	54	235	1.28	0.84, 1.95
Occasional users	29	150	1.08	0.65, 1.78

6.5 Sexual History

The chance of being older than 15 years of age at first marriage was by 45% lower among infertile women compared to fertile women [OR (95% CI); 0.55 (0.38,0.88)]. The chance of being in polygamous marriage was by 58% higher among infertile women [OR (95% CI); 1.58 (1.02, 2.44) (table 6).

Table 6. Sexual behaviour and secondary infertility in Butajira, Ethiopia, 1999.

Risk factor in sexual history	Infertile (N=145)	Fertile (730)	Crude OR	95% CI
Age at first marriage				
< 16 years	71	252	1.0	-
16+ years	71	458	0.55	0.38, 0.88
Previous marriage				
NO	131	670	1.0	-
Yes	14	60	1.19	0.62, 2.27
Sex initiated before menarche				
NO	69	332	1.0	-
Yes	76	398	0.92	0.63, 1.33
Duration of Marriage				
12-23 months	2	17	1.00	-
24-35 months	3	25	1.02	0.12, 9.96
36-47 months	11	46	2.03	0.36, 14.82
48-59 months	19	48	3.36	0.64, 23.33
60+ months	110	594	1.57	0.34, 10.00
Being in polygamous marriage				
No	107	596	1.0	-
Yes	38	134	1.58	1.02, 2.44
Frequency of sex in days/week				
0-1	15	100	1.00	-
2	69	364	1.26	0.67, 2.41
3-4	40	167	1.60	0.81, 3.20
4+	7	28	1.67	0.55, 4.92

6.6 Factors in male

Socio-demographic factors

The selected socio-demographic characteristics of the husbands of the infertile and fertile women are listed in table 7. The chance of having primary school education was by 77% higher among the husbands of fertile women compared to those of infertile women [OR(95% CI); 0.23 (0.12, 0.42)].

Table 7. Socio-demographic characteristics of the husbands of women and secondary infertility in Butajira, Ethiopia, 1999

Factor	Infertile	Fertile	Crude OR	95% CI
Age in years				
Not known	14	61	-	
20-29	25	142	1.00	-
30-39	74	386	1.09	0.65, 1.84
40-49	19	98	1.10	0.55, 2.21
50-59	11	30	2.08	0.86, 5.02
60+	2	13	0.87	0.0, 4.47
Occupation				
Farmer	135	670	1.00	-
Other	10	60	0.83	0.39, 1.72
Education status				
Not known	21	81	-	
Illiterate	78	280	1.00	-
Read and write	18	81	1.54	0.84, 2.79
1-6th	14	222	0.23	0.12, 0.42
7-12th	14	66	0.76	0.39, 1.48
Religion				
Muslims	111	541	1.00	-
Other	34	189	0.88	0.56, 1.36
Ethnicity				
Mareko	29	138	1.0	-
Meskan	63	334	0.90	0.54-1.50
Silti	34	137	1.18	0.66-2.12
Other	19	121	-	

Husband's substance use

There was no significant difference between the husbands of fertile women in the use of alcohol, cigarettes and Khat in all levels of use (table 8).

Table 8. Husband's substance use behaviour and secondary infertility in Butajira, Ethiopia, 1999.

Risk factor	Husband's of infertile women(N=145)	Husband's of fertile women(N=730)	Crude OR	95%CI
Alcohol				
-Current use				
Never users	122	612	1.0	-
Frequent users	20	99	1.01	0.58, 1.75
Occasional users	3	9	1.67	0.35, 6.85
Khat				
-Current use				
Never user (ever)	29	147	1.0	-
Frequent users	104	500	1.07	0.67, 1.73
Occasional users	12	83	0.73	0.33, 1.59
Cigarettes				
-Current use				
Never users	60	260	1.0	-
Frequent users	52	300	0.75	0.49, 1.15
Occasional users	33	170	0.84	0.51, 1,37

6.6 PERCEIVED CAUSES AND OUTCOMES OF INFERTILITY

As to the cause of infertility 43.5% of the cases of secondary infertility and 54.3% of the fertile women reported it as a punishment from God and the difference , 41.4% of the infertile and 34.3% of the fertile ones said that they do not know the cause of infertility while the rest of the respondents gave various reasons including genetic and organic diseases and possession by evil spirits (table 9).

The only significant difference observed was in the perceived cause of infertility where the odds of fertile women considering infertility as punishment from God was by 44% less compared to that of infertile ones.

In response to the question "What would you do if you were infertile ?", most of the infertile cases (51.1%) and fertile women (53.1%) said that they would pray to God and only 13.1 % of the infertile women and 12.7% of the fertile women said that they would visit health institutions. About 21.4% of the infertile cases and 19% of the fertile ones responded that they will do nothing. The rest gave mixed answers mostly associated with culture and the orders of a witch craft (table 9).
With regard to question pertaining to " What happens to inferible women in the area in terms of their marriage and social activity due to their infertility ?", most of the infertile women (31.9%) and fertile ones (31.2%) the husband will marry another woman while the supposedly infertile woman is living with him. Twenty-

nine percent of the infertile cases and 32% of the fertile said she will be stigmatized by the society and will not be allowed to participate in various social activities. There was no difference in the type of responses to the questions (table 9).

Table 9. Reported causes, consequences and measures for secondary infertility by women in Butajira, Ethiopia, 1999.

	Infertile(N=145	Fertile(N=730)		
	Number(%)	Number (%)	OR	95%CI
Perceived causes Infertility				
Punishment from God	**63 (43.5)**	**396 (54.3)**	**0.66**	**0.44, 0.99**
Do not know	60 (41.4)	250 (34.3)	1.0	
Organic and genetic disease in either of the couples	20 (13.8)	111 (15.3)	0.75	0.42, 1.35
Evil-eye and other evil spirits	4 (2.8)	23 (3.2)	0.72	0.20, 2.32
Other	7(4.8)	36 (4.9)	0.81	0.31, 2.02
Measures taken against infertility				
Pray to god	74 (51.1	391 (53.6)	0.85	0.52, 1.38
Visit witch craft	21 (14.5)	67 (9.2)	1.41	0.72, 2.75
Visit health institution	19 (13.1)	93 (12.7)	0.92	0.42, 1.79
Perform Chida*	22 (15.2)	75 (10.3)	1.32	0.68, 2.54
Perform Telil*	6 (4.1)	52 (7.1)	0.52	0.18, 1.40
Do nothing	31 (21.0)	139 (19.0)	1.0	
Other	10 (6.9)	87 (11.9)	0.52	0.22, 1.16
Consequences of infertility				
The husband will marry another woman	30 (31.9)	163 (31.8)	2.02	0.43, 13.16
She will be social outcast	27 (28.7)	166 (31.8)	1.79	0.37, 11.68
Marital disharmony	25 (26.6)	96 (18.4)	2.86	0.59, 18.90
No helper in house activity	23 (24.5)	96 (18.4)	2.64	0.54, 17.47
Get divorced	18 (19.2)	99 (19.0)	2.00	0.40, 13.47
No body to inherit property	7 (7.5)	32 (6.1)	2.41	0.40, 18.63
No help in old age	5 (5.3	23 (4.3)	2.39	0.35, 20.12
Nothing will happen	2 (2.1)	22 (3.8)	1.0	
Other	30 (31.9)	171 (32.8)	1.93	0.41, 12.54

* 1. Chida = is a procedure which is conducted by the order of a witch-craft when a person is sick. It involves slaughtering of an animal (sheep, goat, hen etc)
2. Telil (Telel)= is a procedure done by the women alone when they feel that their own spirit or the spirits of their parents are angry with them and make them sick or infertile. Some amount of local cheese is prepared and sufficient amount of spicy and melted better is poured on it. The butter is used as a mirror to show a sick women's face through. The women believe that when they look at their own faces through the better as a mirror, the bad spirit will go out their body. The better and cheese after the procedure is eaten by the sick women. In case it is excess she is assisted by children under 5 years of age.

7. DISCUSSION

In the absence of sufficient knowledge about infertility in Ethiopia, this study attempts to provide the first information on the magnitude and potential risk factors of infertility in a rural set-up.

The study has detected high prevalence (19%) of infertility which is above the critical level of 15% (8). Factors that were significantly associated with secondary infertility include STDs, childlessness, marriage before the age of 16 years, being in polygamous marriage, and low educational status of husbands. Moreover, most women visit the witch-craft more than the health institutions when they become infertile.

The unique opportunity of having a surveillance data base in a rural setting allowed complete identification and enrolment of women in the area.

The involvement of women in the age group 20-29 years which helped to reduce recall bias related to the occurrence of reproductive events and potential risk factors. The use of female interviewers helped to solicit sensitive information related to the study objectives.

However, there may be a slight possibility of missing early pregnancies as it was selected out based on the women's report of pregnancy related signs and symptoms.

Diagnosis of STDs was made based on the history of genital ulcer

and abnormal vaginal discharge and this might have lead to under estimation of the extent of the problem. Women could be symptomless after being infected with STDs.

Information with regard to the husband's situation was collected from the wife and this can cause misclassification biases on the exposure status of the husband to the various risk factors.

The prevalence of infertility in this population (19%) is above the cut-off point of 15% according to the WHO standard (11). The prevalence of primary infertility is low compared to most of the West Africa nations like Gabon and Nigeria which had prevalence of 9.2% and 5.7% respectively (24,25). However, the prevalence is high compared to that in south-east Africa nations. A study by Niles *et al* had found a 1% prevalence of primary infertility of in rural Zimbabwe(26). The differences might be due to racial factors. The prevalence of secondary infertility in this study is much higher compared to the 6% prevalence of secondary in the Gambia (27). However, the prevalence in this study is lower than the prevalence in Nigeria (21.1%) and Gabon (20%) although the age group used in these studies were different than those used in this particular study (24,25).

The findings of no association between religion and secondary infertility is in congruent with the findings of Eriksen and Brunette in the cross-national survey of twenty-seven nations in sub-Sahara Africa (4,). The findings of no association between

secondary infertility and Ethnicity may be due to the fact that most of the study population belong to one ethnic group, Gurage. However, the findings of significant protective association between having primary school education of the husband and infertility might be explained by the fact that educated people might utilise health services (both protective and curative services) more than the non educated ones. This relationship was not observed in those husbands who had secondary school education. Care must be taken in interpreting the results of the findings about the husbands since the information was second hand (collected from their wives) and this can cause misclassification bias.

The findings in this study including a statistically significant association between having no live borne child due to pregnancy wastage and secondary infertility may be secondary to post-abortal and puerperal infections as was seen in Uganda where post-abortal and puerperal infections are thought to be second only to STDs as a cause of infertility (29).

The findings in this study including an association between history of genital ulcer and vaginal discharge that occurred after the last pregnancy and secondary infertility is also consistent to the findings by Cates *et al* in the study in 33 medical centers in 25 nations in the world where the self-reported history of STDs was the highest in sub-Sahara Africa compared to the other regions (8). These findings are also consistent with the findings of higher rates of isolation of

Nisseria gonnorrhoeae in subfertile women compared to matched hospital controls in a study in Uganda where *Nisseria gonorrhoeae* was isolated in 25% and 15% respectively (30).

Age at first marriage at or above the age of 16 years had been found to have significant protective association with secondary infertility in this study as well as in the study by Erikson and Brunette where marriage before the age of 16 years was found to be associated with secondary infertility in Lesotho and Kenya (4). This association might be due to the physical damage that occurs to the immature reproductive organs following coitus and subsequent infection by STDs (4). Premenarcheal sex had been found to have strong association in a study by Okumu *et al* in Kenya (28).

The important findings of this study including an association between polygamous marriage and infertility was also observed in other studies (31). This relationship might be explained by the fact that in addition to other factors, STDs are propagated fast among people with multiple sexual relationships more than among those with single relationships (4).

The findings in this study of a non-significant association between alcohol consumption and infertility has also been demonstrated by Riduan *et al* in a study conducted among 2817 women in Canada and the United States of America (20). However, the findings in this study of a non-significant association between cigarette smoking and secondary infertility is contrary

to the findings of the study by Riduan *et al (20)*. Khat use had also non-significant association with infertility in this study. The absence of non significant association between the use of these substances and secondary infertility might be due to under reporting of exposure to such substances due to second hand information about the husbands.

Similar to the observation in north Mozambique (32), women in Butajira visit traditional healers much more than health institutions. This might be due to lack of knowledge about th e problem and poor availability, accessibility and utilization of health services.

Explanations given as to the causes of infertility originate from the traditional healers than from health professionals as can be extrapolated from the type of the answers given by the mothers. This finding was also observed in the study in Mozambique (32).

9. CONCLUSIONS

The prevalence of secondary infertility is higher than the critical level of 15% set by the WHO. History of STDs, pregnancy wastage, being less than 16 years of age at first marriage , polygamous marriage and low educational status of husbands are associated with secondary infertility.

Infertile women ascribe their problems to punishment from God for their wrong doings or to other evil spirits and only small percentage of them ascribe diseases as causes of infertility.

10. RECOMMENDATIONS

1. Provide and strengthen Programs focusing on the reduction of post-partum and post-abortal infection by:
   - 1.1. Setting the lower limit for age at first marriage for females at 18 years so that the probability of damage to the reproductive tract and the occurrence of subsequent infection is minimized.
   - 1.2. Increasing access to adequate health services by providing proper facilities, drugs, and trained health workers so that adequate hygienic and proper care is provided to pregnant mothers in ANC follow up and at the time of delivery and management of incomplete abortions.
2. Focusing on programs aiming at the reduction of the prevalence of STDs.

   Integration of STD programs with other reproductive health programs such as Ante-Natal Care, family planing, adolescent health etc, and equipping these services with adequate laboratory services, skilled manpower, treatment and counselling services aiming at detecting the diseases early and thereby limiting it's spread to the uninvolved reproductive organs in the couple

3. Focusing on evaluation and management of infertile couples.

3.1 Responsible health officials and professionals should develop guidelines and procedures on the evaluation and management of infertile couples so that the probable results (prognosis) are known at low costs.

3.2. Appropriate, simple and inexpensive facilities for firm diagnosis and management of infertility should be made available at a certain level of the health system.

4. Emphasis should be given to general education of the rural population and to health education programs specifically as to the causes of infertility in the local health institutions and in Family Planing programs.

5. Further research should be conducted in an attempt to identify more risk factors of infertility and the ethnographic description of the various ethnic groups in the country that may play roles in the causation of infertility. Moreover, research should be conducted to assess the health service implications of infertility.

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Questionnaire for Infertility Survey

Among women in the age group of 20 to 29 years

in Butajira, February 1999

Serial	Question	Response category	Coding
101	Name of PA		
102	Household number		
103	Name of household head		
104	Household status	1= Male headed 2= Female headed	
105	What is yours, your father's and grand father's name? (interviewee)		
106	What is your age ? (in completed years)		
107	What is your ethnicity ?	1= Meskan 2= Mareko 3= Silti 4= Welene 5= Other	
108	What is your religion ?	1= Islam 2= Christian 3= Other	
109	What is your educational status ?	00= Illiterate 66=Read and write Grade Completed	
110	What is your occupation ?	1= House wife 2= Trader 3= Labourer 4= Civil servant 5 = Other	

111	What is your marital status ?	1 = Not married->End 2 = Married 3 = Divorced 4 = Separated 5 = Widowed	
If Question 111 = 1 discontinue			
If Question 112 =1, dicontinue			
	For how long have you been married/in partnership ?	2 = More than and / or equal to 1 year (specify the year and month)	
113	For how long have you been separated, divorced or widowed ?	1 = For--- years and--- month 2 = For---months only	

Reproductive History

201	Have you ever been pregnant ?	1 = Yes 2 = No	
If Question 201= 2, skip to Question 301			
202	How many pregnancies do you have till now ?		
203	Are you pregnant now ?	1 = Yes 2 = No	
If Question 201 = 2 skip to Question 205			
204	How do you know that you are pregnant ?	1 = I had been told by a health worker 2 = I am amenorrhic 3 = I had/ have nausea and/or vomiting 4 = I had/ have breast engorgement 5 = I have increased abdominal girth 6 = Others ----------	
205	What was your age at your first pregnancy ?		
206	How many times did you deliver an alive child ?		
207	How many living children do you have now ?		
208	Do you have any pregnancy which ended up in the expulsion of the fetus before it reached gestational age of 7 months ?	1 = Yes 2 = No	
If Question 208 =2, skip to Question 210			

209	How many times did you have expulsion of the fetus before it reached the gestational age of 7 months ?		
210	Have you ever had pregnancies which reached gestational age 7 months and more and that ended up in the delivery of dead fetus ?	1 = Yes 2 = No	
If Question 210 = 2, skip to Question 212			
211	How many times did you have delivery of dead fetus (at gestational age of 7 months and more) ?	For--times	
212	When was the termination of your last pregnancy ?	-- Months ago	
213	What was the outcome of your last pregnancy ?	1 = Abortion 2 = Stillbirth 3 = Live birth	
214	Have you had any problem associated with your health during your last pregnancy/ labour and/ or termination ?	1 = Yes 2 = No	
If Qestion 214 = 2 , skip to Question 301			
215	During your problem in the last pregnancy, did you go to health institution ?	1 = Yes 2 = No	
If Question 215 = 2, skip to Question 217			

216	What was done to you at the health institution during your problem in the last pregnancy ?	1 = Nothing 2 = D and C 3 = Instrumental delivery 4 = Abdominal operation 5 = Other(specify)----------	
217	Are you currently breast feeding ?	1 = Yes 2 = No	
If Question 217 = 2, skip to Question 301			
218	For how long have been breast feeding ?	For--- months	

Contraceptive History

301	Have you ever used any form of contraceptive ?	1 = Yes 2 = No	
If Question 301 = 2, skip to Q 401			
302	When did you use the contraception ? (read options)	1 =Before marriage 2 = After marriage 3 = Both before and after marriage	
Ask Q 303 only those who said "Yes" to question number 201			
303		1= Before the last pregnancy 2 = After the last pregnancy 3 = Both before and after thelast pregnancy	
304	What type of contraception did you use ?	1 = modern	
If Question 304 =2, skip to Question 305			

305	Would you please describe all the types of modern contraceptives you used with the duration you used ?	1 = duration years 2 = duration years 3 = duration years	
306	If you used traditional contraceptives, would you please describe the type/s and the duration of use ?	1 = duration years 2 = duration years 3 = duration years	
307	Are you currently using contraceptive ?	1 = Yes 2 = No	
	If Question 307 = 2 skip to Question 401		
308	What type are you using ?	1 = IUD 2 = Injectable 3 = Nor-plant 4 = OCP 5 = Condom 6 = Tubal ligation 7 = Other	

History of Sexually Transmitted Diseases

401	Have you ever had abnormal vaginal discharge ?	1 = Yes 2 = No	
	If Question 401 = 2, skip to Q 405		
402	When did you have the discharge ?	1 = Before marriage 2 = After marriage 3 = Both before and after marriage	

Ask Q 404 only those who said "Yes" to question number 201			
403	When did you have the discharge ?	1 = Before the last pregnancy 2 = After the last pregnancy 3 = Both before and after the last pregnancy	
404	Did you go to health institution for treatment during the occurrence of the discharge ?	1 = Yes 2 = No	
405	Have you ever had genital ulcer ?	1 = Yes 2 = No	
If Question 405 =2, skip to 501			
406	When did you the genital ulcer?	1 = Before marriage 2 = After marriage 3 = Both before and after marriage	
Ask Q 407 only those who said "Yes" to question number 201			
407	When did you the genital ulcer ?	1 = Before the last pregnancy 2 = After the last pregnancy 3 = Both before and after the last pregnancy	
408	Did you go to health institution for treatment of the genital ulcer ?	1 = Yes 2 = No	

Substance Use

501	Have you ever drunk any alcoholic beverage ?	1 = Yes 2 = No	
If Qurestion 501 = 2, skip to Q 509			
502	When did you start drinking alcoholic beverage ?	1 = Before marriage 2 = After marriage 3 = Both before and after marriage	
Ask Q 503 only those who said "Yes" to question number 201			
503	When did you start drinking alcoholic beverage ?	1 = Before the last pregnancy 2 = After the last pregnancy 3 = Both before and after the last pregnancy	
504	How frequent did you drink alcoholic beverage in a week's time ?	days per week	
505	What was your usual drink ?	1 = Tela 2 = Taj 3 = Areki (katikala) 4 = Beer 5 = Alcoholic spirits 6 = Wine 7 = Other locale drinks 8 = Other factory produced drinks	
506	Do you drink alcoholic beverage currently ?	1 = Yes 2 = No	

If Question 506 = 2, skip to Question 509			
507	What is your usual alcoholic drink currently?	1 = Tela 2 = Taj 3 = Areki (Katikala) 4 = Beer 5 = Alcoholic spirits 6 = Wine 7 = Other locale drinks 8 = Other factory produced drinks	
508	How frequent do you drink alcohol currently ?	days per week	
509	Which of the following have you ever used ?	1 = Suret 2 = Gaya 3 = Both Suret and Gaya 4 = Neither	
510	Have you ever smoked cigarettes ?	1 = Yes 2 = No	
If Question 510 = 2, skip to Question 518			
511	When did you start smoking cigarettes ?	1 = Before marriage 2 = Aftert marriage 3 = Both before and after marriage	
Ask Q 512 only those who said "Yes" to question number 201			

512	When did you start smoking cigarettes ?	1 = Before the last pregnancy 2 = After the last pregnancy 3 = Both before and after the last pregnancy 3 = Both	
513	How many days in a week did you smoke cigarettes ?	days per week	
514	What was the usual number of cigarettes you smoked in a day ?		
515	Do you smoke cigarettes currently ?	1 = Yes 2 = No	
If Question 515 = 2, skip to Question 518			
516	How many days in a week do you smoke cigarettes currently ?	days per week	
517	What is the average number of cigarettes you smoke in a day currently ?		
518	Have you ever chewed khat ?	1 = Yes 2 = No	
If question 518 = 2, skip to Question 601			
519	When did you start chewing khat ?	1 = Before marriage 2 = Aftert marriage 3 = Both before and after marriage	
Ask Q 520 only those who said "Yes" to question number 201			

520	When did you start chewing khat ?	1 = Before the last pregnancy 2 = After the last pregnancy 3 = Both before and after the last pregnancy	
521	How frequent were you chewing khat in a week's time on average ?	days per week	
522	Do you chew Khat currently ?	1 = Yes 2 = No	
If Question 522 = 2,skip to Question 601			
523	How frequent do you chew Khat currently ?	days per week	

Husband's / Partner's History

601	What is the name of your husband ?	Name Father's Gran	
602	What is the age of your husband ?	years	
603	What is the ethnicity of your husband ?	1 = Meskan 2 = Mareko 3 = Silti 4 = Welene 5 = Other	
604	What is the religion of your husband ?	1 = Islam 2 = Christian 3= Other	
605	What is the education status of your husband ?	00 = Illiterate 66 =Read and Write --- grade Complete	
606	What is your husband's occupation ?	1 = Farmer 2 = Trader 3 = Labourer 4 = Civil Servant 5 = Other	
607	Has your husband ever chewed khat ?	1 = Yes 2 = No	
If Question 607 = 2, skip to Question 613			
608	When did your husband start chewing khat ?	1 = Before marriage 2 = Aftert marriage 3 = Both before and after marriage	
Ask Q 609 only those who said "Yes" to question number 201			

609	When did your husband start chewing khat ?	1 = Before the last pregnancy 2 = After the last pregnancy 3 = Both before and after the last pregnancy	
610	How frequent was your husband chewing Khat in a week's time on average ?	days per week	
611	Does your husband chew Khat currently ?	1 = Yes	
If Question 611 = 2, skip to Question 612			
612	How frequent does your husband chew Khat currently ?	---days per week	
613	Which of the following have your husband everr used ?	1 = Suret 2 = Gaya 3 = Both Suret and Gaya 4 = Neither	
614	Has your husband ever smoked cigarettes ?	1 = Yes 2 = No	
If Question 614 = 2, skip to Question 622			
615	When did your husband start smoking cigarettes ?	1 = Before marriage 2 = Aftert marriage 3 = Both before and after marriage	
Ask Q 616 only those who said "Yes" to question number 201			

616	When did your husband start smoking cigarettes ?	1 = Before the last pregnancy 2 = After the last pregnancy 3 = Both before and after the last pregnancy	
617	How frequent did your husband smoke cigarettes ?	days per week	
618	How many Cigarettes did your husband smoke on average ?	cigarettes per day	
619	Does your husband smoke cigarettes currently ?	1 = Yes 2 = No	
If Question 619 = 2, skip to Question 622			
620	How frequent does your husband smoke cigarettes currently ?	---days per week	
621	How many cigarettes does your husband smoke on average daily ?	---cigarettes per day	
622	Has your husband ever drunk alcohol ?	1 = Yes 2 = No	
If Question 622 = 2, skip to Question 630			
623	When did your husband start drinking alcoholic beverages ?	1 = Before marriage 2 = Aftert marriage 3 = Both before and after marriage	
Ask Q 624 only those who said "Yes" to question number 201			

624	When did your husband start drinking alcoholic beverages ?	1 = Before the last pregnancy 2 = After the last pregnancy 3 = Both before and after the last pregnancy	
625	How frequent did your husband drunk alcoholic beverages ?	----days per week	
626	What type of alcohol did your husband drink most of the time ?	1 = Tela 2 = Taj 3 = Arekie (Katikala) 4 = Beer 5 = Alcoholic spirit 6 = Wine 7 = Other local product 8 = Other Factory product	
627	Does your husband drink alcoholic beverages currently ?	1 = Yes 2 = No	
If Question 627 = 2, skip to Question 630			
628	How frequent does your husband drink alcoholic beverages currently ?	days per week	
629	What is your husband's current and usual alcoholic drink ?	1 = Tela 2 = Taj 3 = Areki (Katikala) 4 = Beer 5 = Alcoholic spirit 6 = Wine 7 = Other local product 8 = Other factory product	

630	Does your husband have another wife ?	1 = Yes 2 = No	
If Question 630 = 2, skip to Question 634			
631	How many wives does your husband have including you?		
632	In the order of your husband's marriage to his wives which number are you ?	1 = the first 2 = the second 3 = the third 4 = the fourth 5 = the fifth	
633	From which of his wives (excep you) does your husband have children ?(multiple answers are allowed)	Yes No 1 = From the first --- --- 2 = From the second --- ---- 3 = From the third ---- ---- 4 = From the fifth --- ---- 5 = From the sixth --- ---- 6 = From none of them -- ---	
634	Where does your husband live most of the time ?	1 = With me 2 = With the other wife 3 = Field work 4 = Other	
635	On average how many days in a month does your husband sleep with you ?		

Family Size

701	Do you have the desire to have (more) children ?	1 = Yes 2 = No	
If Question 701 = 2, skip to Question 704			
702	How many (more) children do you want to have ?		
703	Why do you want to have more children ?		
704	Do you know if some women in your area are suffering from infertility ?	1 = Yes 2 = No	
705	What would you do if you have the problem of infertility ?		
706	What do you think is the cause of a woman's infertility ?		
707	Do you know as to what happens to the social life of an infertile woman ?	1 = Yes 2 = No	
If Question 707 = 2, skip to Question 709			
708	If you know what happens to the social life of a woman with infertility, would please mention some of them ?		
709	Do you know what infertile women in your society do to become fertile ?	1 = Yes 2 = No	
If Question 709 = 2, skip to Question 801			
710	In your society what does a woman with infertility do to become fertile ?		

Marital History

801	When did you see your last menstrual bleeding ?	1 = Less than 30 days 2 = Between 30 to 45 days 3 = More than 45 days (please specify in months)	
802	How do you describe the pattern of your last three menstrual cycles ?	1 = Regular 2 = Irregular	
If Question 802 =2 skip to Queston 804			
803	How long did each cycle of the last three last ?		
804	When did you have the first menstrual period following your last pregnancy ?	After months	
805	Is your current (recent) marriage your first ?	1 = Yes 2 = No	
If Question 805 = 2, skip to Question 807			
806	What order is your current (recent) marriage ?		
807	What was your age at your first marriage ?	Years	
808	When did you see your first menses ?	1 = Before the first sex 2 = After the first sex	
809	When did you see your first menses ?	1 = Before marriage 2 = After marriage	

DECLARATION

I, the undersigned, declare that this thesis is my original work, has never been presented in any other university and that all resources of materials have been duly acknowledged.

Name Ashenafi Haile,MD.

Signature 

Place Addis Ababa

Date of submission December, 1999

This thesis has been submitted for examination with my approval as a university advisor.

Name Dr. Yemane Berhane.