

**FACTORS INFLUENCING UTILIZATION OF FAMILY PLANNING
INFORMATION (FPI) BY RURAL HOUSEHOLDS: THE CASE OF
KOMBOLCHA DISTRICT, ETHIOPIA**

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ABSTRACT

The population in the country is largely rural (83 percent) and young, with 44 percent under the age of 15. Such a structure results in a high dependency ratio as well as a future rapid exponential population growth. If this growth does not decline in the coming years, it is expected that the population of Ethiopia will double in about 25 years. A young and rapidly growing population is putting pressure on agricultural land, especially in potential highland areas of the country. For keeping the balance between the population growth rate and economic growth rate of the country, mitigating or controlling the rapidly growing population through the help of family planning package services is an important measure to be taken. A longer period of time has passed without reaching the intended target in relation to FPI utilization in the country, particularly in Oromia region. This study was designed to assess the level of family planning information utilization and factors affecting FPI utilization among rural women in Kombolcha woreda. The study used multistage sampling technique to select sample respondents and both probability and non-probability sampling methods. Among the districts in Eastern Hararghe Zone, Kombolcha woreda was purposively selected and a total of 120 sample couples were randomly selected from three peasant associations, key informants' and focus group discussions were used to triangulate the survey data. In addition, secondary data were collected from relevant secondary sources. Data were analyzed using qualitative methods, descriptive statistics and binary logit model. The study results showed that 93.3% of the respondents had information on family planning services and birth control methods. From the total sampled couples, 40.9% are users of some types of modern FPI at the time of the survey. From the nine birth control methods provided by family planning extension packages, only four methods were well known and only two methods (injectables and oral pills) were widely used by rural women. Results of the binary logistic regression model analysis showed that among the 10 explanatory variables entered into the model, seven of them viz. family size preference, land holding, information seeking behavior, husband education, fear of side effects, extension contact and ideal number of children desired were found to be statistically significant factors that influence the utilization of FPI among rural women in the study area. The community had information on family planning services, yet, further provision of adequate and quality education is required to make the family planning more effective. Therefore, targeting the identified factors, and making policy and development interventions can promote the level of utilization of FPI among rural women in the study area.

Key word: family planning, rural population growth, birth control

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1. INTRODUCTION

1.1. Background

Ethiopia is located in the horn of Africa between 3 and 15 degrees north latitude, and 33 and 48 degrees east longitude. It is home for diversified people with multi-cultural and multi-lingual richness. Over 80 ethnic groups and languages are believed to exist in Ethiopia. Christianity and Islam are the two major religions. Orthodox Christians, Muslims and Protestants account for 51%, 33%, and 10% of the population, respectively. The remaining 6% are followers of other religions including traditional ones.

Agriculture is the mainstay of the Ethiopian economy and it accounts for the major share of the total GDP, in foreign currency earnings and in the employment creation. Both industry and services are dependent on the performance of agriculture, which provides raw materials, generates foreign currency for the implementation of essential inputs and feeds the fast growing population. In spite of its importance in the national economy, agriculture is based on subsistence farming, and people's modes of life and operation have remained unchanged for centuries.

Despite the agricultural potential in the country, the agricultural sector is dominated by small-scale farmers following a traditional low input and low output farming technologies. The small farm unit, the most important component of agriculture sector happens to be the lifeline for survival and prosperity of large sector of the society. However, the condition of the small farms and the agriculture sector in general is not very healthy. The food

produced on small farm is not keeping pace with the increasing rate of population growth, which is estimated to be about 3 percent per annum. As described in Food Security Conference (2003), annual food production need to be improved by about 4 percent per annum. It has also been reported that we are losing productivity of our lands by 3 percent per annum. If one is observant of the condition of the farmer, it generally remained unchanged over the years.

A young and rapidly growing population is putting pressure on agricultural lands, especially potential highland areas of the country. The population size was 42.6 million in 1984 and increased to 53.5 million in 1994. There was a slight decline in the population growth rate over the decade from 3.1 percent in 1984 to 2.9 percent in 1994. In 2003, Ethiopia's population count was 69.1 million. The population growth was recorded at an average of 2 million annually, between 2000 and 2005, representing a growth rate of 2.73 percent, which is slightly higher than the Sub-Saharan African average of 2.5 percent. The population is largely rural (83 percent) and young, with 44 percent under the age of 15 (CSA, 2006). Such a structure results in a high dependency ratio as well as a future rapid exponential population growth. If this growth does not decline in the coming years, it is expected that the population of Ethiopia will double in about 25 years. The population density is very high in the highlands, about 23.2 percent of the population is concentrated in 9 percent of the land areas putting pressure on cultivable lands and contributing to environmental degradation (World Bank, 2004).

The other contributing factors to population growth are high level of fertility (5.4 children per woman) and a low level of contraceptive use 14 percent (CSA, 2006). Rapid population growth can have negative

consequences on the health care system, especially where the level of economic development is low and when resources are scarce.

By recognizing the impacts of high population growth, the government of Ethiopia formulated a national health sector strategy covering the period 2006 -2015. The national strategy is based primarily on the existing health policy, health sector development program, and the health extension program and envisions in contributing to the national development program and achieving the MDGs. The strategy has identified six priority areas of intervention: the social and cultural determinants of women's reproductive health; fertility and family planning; maternal and new born health; HIV/AIDS; reproductive health of young people; and reproductive organ cancers (MoH, 2006).

For the purpose of keeping the balance of the population with the level of the economy of the country, the national reproductive health strategy sets specific targets for the provision of family planning services, where it has focused on addressing reduction of unwanted pregnancies and enabling individuals to achieve their desired family size. The intervention areas outlined in the strategy include creating demand for FP and increasing access to and utilization of quality of FP services, as well as delegating service delivery to the lowest level possible (MoH, 2006).

Towards achieving the targets, FP contributes a significant role. On broader scale, increased access to FP can improve women's education and employment opportunities and their participation in the social and political arenas. Couples with the means to control their fertility are usually able to invest more resources in each child, which ultimately raises the standard of health, education, and wealth in a population. There is a consensus that

investment in FP advances general social and economic growth and development through these and other channels (Sedgh et al., 2007).

With support of FP extension packages and policy measures, the progress in fertility is promising in towns even though it has been a challenge in rural areas. As a country the TFR is reduced to 5.4 births per woman which can be considered as a significant change or promising result. But, there are great differentials in fertility rate among regions which range from low (1.4) in Addis Ababa to high (6.2) in rural Oromia (CSA, 2006).

Conducting a survey may assist in examining the effectiveness of the program under implementation. This study was, therefore, conducted to evaluate FP extension packages in Eastern Hararghe Zone, particularly in Kombolcha district, a district with limited access to basic services and infrastructure. It was designed to investigate the level of knowledge in family planning and information utilization among rural society, as well as to assess the factors influencing the usage of family planning services in the study area.

RESEARCH METHODOLOGY

2.1. Description of the Study Area

2.1.2. Profile of Kombolcha district

The study was undertaken in Kombolcha wereda, Eastern Hararghe zone, of Ethiopia.

The wereda is located at 542 km east of Addis Ababa, and 17 km north of Harar city. It lies in an altitude between 1200 and 1600 meters above sea level. According to the traditional agro-climatic zonation, the study site is

categorized as semi-arid and sub-humid environment. The annual rainfall is ranging between 600 to 900 mm and the mean annual temperature ranges from 16 to 25⁰c (KWBOA, 1996). The high land of the woreda is densely populated and the average land holding is estimated at about 0.35 hectare per household.

Wide varieties of vegetables are grown throughout the year by using irrigation and also crops like sorghum, maize, barley and wheat are grown under rain-fed system. In some parts pulses, like haricot bean and faba bean are intercropped with stalk cereals like maize and sorghum. There is no surplus production of food grains in most areas of the woreda. As a result, many of the households' cereal food shortage is fulfilled with purchase from cash sells of live-stocks, vegetables, and chat (*kata edulis*). The later crop is important, considered as green golden crop both in terms of the extent of the cultivated area and its contribution to cash earning of the farmers. Large acreage of land in the area is devoted for chat production, and the other crops were given less attention due to small land holding of the households.

In Kombolcha woreda, there were two health centers (Kombolcha and Felana) and 17 health posts with about 35 health extension workers. In these health centers, there are 3 health officers, 2 public nurses, 2 midwife nurses, and 9 clinical nurses. The total population in the woreda was estimated to be 128,183. Among the population in the woreda 11,734 (9.2 percent) were living in town and 116,449 (91 percent) were living in rural part of the woreda (KWHOB, 2009).

2.2. Sampling and Sampling Technique

The precision of facts are always obtained from census. Nevertheless, due to financial and time constraints, absolute coverage of the entire community is impractical. Therefore, sampling is one of the methods which allow the researcher to study relatively small number of units representing the whole population (Sarantakos, 1998). By taking this into account, this survey used sampling for data collection. The study used multistage sampling technique to select sample respondents and it used both probability and non-probability sampling methods.

Almost all the districts in Eastern Hararghe Zone have similar socio-cultural and socio-economic situations. Conducting this study in one of the districts in the zone was expected to reflect similar result for all. In the beginning, from the total districts of Eastern Hararghe Zone, Kombolcha district was purposively selected because of its relative convenience and accessibility to the researcher to conduct the study close to his working area. In the second stage, the 19 PAs were stratified into three, based on distance from the Kombolcha town as: nearby PAs (located in less than 5 kms radius from the town), middle PAs (located between 5.1 kms and 11 kms), and remote PAs (located more than 11 kms away from the town). At the third stage, a list of the PAs in the three categories was prepared and one PA was selected from each category by simple random sampling method.

For each selected PA, the number of households to be selected was determined by proportionate probability sampling and 120 couple households were selected by simple random sampling method. Among the sampled couples 49 were users and the remaining 71 were non-users of FP.

Bilisuma was the kebele randomly selected among the nearby PAs, Ijagna and Laga Hama were the kebeles randomly selected from the middle and remote Pas, respectively. From the total of 3391 couples, only 120 were used to conduct the study. Out of 1413 couples in Bilisuma, 50 couples were randomly selected, and similarly, from the total couples in Ijagna and Laga hama, 46 and 24 couples were randomly selected, respectively (Table 1). As described above, the sample size for the kebeles was determined by proportionate probability sampling.

Table 1. Distribution of couples in the selected PAs and sample size

Name of PAs	Total couples in the PAs	Sample size
Bilisuma	1413	50
Ijagna	1300	46
Laga hama	678	24
Total	3391	120

source: own survey

2.3. Data and Data Sources

For this study both primary and secondary data were collected from different sources. Primary data comprise socio-cultural/economic, psychological, demographic, personal and institutional characteristics of the couples. Secondary data were collected on current level family planning service utilization, socio-economic and other general information about the woreda from sources like health office, health centers, health posts, finance office, regional office of population and statistics bureau, and woreda agriculture office.

2.4. Methods of Data Collection

A structured and semi-structured interview schedule was developed and used in order to allow the respondents to freely express their opinion on issues related to research topics by explaining the purpose of the research. The semi-structured interview schedule was used during focus group discussions to fill the gap of the structured interview schedule. After formulating the interview schedules, necessary editing was made for its observed consistency and logical sequence with frame of reference of the respondents. Then it was subjected to a pilot survey in non-sample respondents with a minimum and adequate small sample of 10 respondents residing near Kombolcha town. Based on the nature and extent of responses obtained, necessary modifications and further editing was made to ensure its clarity and completeness for generating the needed information from the respondents.

Primary data necessary for this study was collected from sample respondents by using pre-tested and structured interview schedule. For this purpose six female enumerators, who have acquaintance with socio- economic concepts and knowledge of the culture of the society as well as local language proficiency, were selected, trained and employed for the data collection. To conduct the interview female enumerators were used since women relatively discuss their issues openly to females than males.

Four days training was given to the enumerators on how to approach the interviewees, how to ask questions, how to collect data, the challenges and difficulties' they may face in the field during data collection. In the interviewing process, first both wife and husband were asked similar questions together and then wife was asked additional questions as it was used by Haile (2007).

There were frequent supervision of the data collection process and on weekly basis, the collected data were checked by the researcher. Personal observations and transect walk watching was used in verifying, elaborating and enriching the data to get relevant evidences about socio-economic, and environmental realities of the research area by the researcher. In order to carry out the study discussions with the concerned experts in the woreda health office were made frequently on variety of issues. Furthermore, focus group discussions were held with community leaders and elders.

To master over the reality, information that were obtained from the interviews, discussions with the concerned experts and focus group discussions were triangulated to enhance reliability and validity of the collected information.

2.5. Methods of Data Analysis

With respect to the expected output of the study, the qualitative and quantitative data obtained were analyzed using descriptive statistics and econometric analysis model. Qualitative data were analyzed and used through interpretation and conceptual generalization. For quantitative data, both descriptive statistics and econometric model were employed and all findings were combined to give meaningful picture and reliable information.

2.5.1. Descriptive Statistics

Statistical tools were used for measurement and analysis of data gathered from individuals and couples. The modern family planning information utilization or contraceptive use, which is the dependent variable, was analyzed at couple level. Kulczycki (2005) supports this view by arguing

that measurement of contraceptive use is typically based solely on women's self reports of current contraceptive use responses to surveys. However, a married couple is the appropriate unit of analysis because human fertility, by nature and the vast majority of child bearing in the world occurs within the marital units. Hence, assessments of the couple level responses permit validation of the accuracy of the responses and help to assess the reliability of the responses. It also provides more complete picture of couple's contraceptive practice and reproductive decision making.

The available data were compiled using statistical package for social science (SPSS) software. The data were analyzed using descriptive statistics which are relevant and appropriate tools For such studies. Descriptive statistics like percentage, range, mean, minimum, maximum, standard deviation and frequency were used where it is necessary.

2.5.2. Econometric analysis

In general, this study focuses on identifying the socio-cultural, demographic, psychological, and personal factors affecting utilization of FPI.

The regression analysis with the method of ordinary least squares (OLS) is used for quantitative dependant variable while logistic and probit regressions are applied for the cases of qualitative (binary) dependant variable. The dependant variable in this case is a dummy variable which takes a value of one if the couples use FPI, and zero if they do not use FPI.

Chi-square and t-test were used for cross tabulation and mean comparison, respectively, to observe the mean differences between users and non users, which further show the existence of relationship between the independent variable and the dependent variable. T-test was used to compare the means

of users and non-users for continuous variables, while chi-square was used to compare the means of users and non users for discrete variables. Variables that were significant in chi-square and t-test were put in the binary logit model for further analysis to identify potential factors influencing the dependent variable.

In binary choice model, individuals are forced with a choice between the two alternatives and their choice depends on their characteristics. Thus, one purpose of qualitative choice is to determine the probability that an individual with a given set of attribute will make one choice among the alternatives (in this study FPI users or non-users). Logit and probit model specify a functional relation between the probability of the utilization of FPI and various explanatory variables. Hence, factors (independent variables) that affect the couple's decision in the FPI can be expressed both quantitatively and qualitatively.

Logit model is the most commonly used qualitative model that corresponds with a logistic distribution function and probit model corresponds with the normal distribution function. Both models have been used interchangeably and give similar results. However, logit model is simpler in estimation than probit model.

The logistic function is used because it represents a close approximation to the cumulative normal distribution and is simpler to work with. Hosmer and Lemeshow (1989) has pointed out that the logistic distribution has advantages over the others in the analysis of dichotomous dependent variable because it is extremely flexible, relatively simple from mathematical point of view and lends itself to a meaningful interpretation.

Drawing up on Gujarati (1998), the logistic regression model for the utilization of FPI is econometrically specified as follows, where P_i denotes the probability of FPI to be utilized that is $Y_i = 1$ and e^{z_i} or $\exp(z_i)$ stands for the irrational number e to the power of z_i and the model can be written as:

$$P_i = \frac{1}{1 + e^{-z_i}}$$

(1)

This implies that:

$$1 - P_i = \frac{1}{1 + e^{z_i}}$$

(2)

The unobservable stimulus index z_i assumes any value; however, the logistic transformation limits each corresponding value of p to fall between 0 and 1. In fact, z_i is a linear function of m explanatory variables (X_i) and is specified hereunder.

$$z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_m X_m$$

(3)

Where X_1, X_2, \dots, X_m are explanatory variables, β_0 -is the intercept while $\beta_1, \beta_2, \dots, \beta_m$ are the logit parameters (slopes) to be estimated in the model.

The slope tells how the logs of odds in favor of deciding to utilize FPI changes as the independent variable increases by one unit. Interpretation of the coefficients will be understandable if the logistic model can be written in terms of the logs of odds. The stimulus index Z_i is also referred to as the log of the odds ratio in favor of deciding to use FPI. The odds ratio is defined as the ratio of the probability that couples use FPI (p_i) to the probability that the couples will not use FPI ($1 - p_i$).

$$\text{Therefore, } \frac{p_i}{1-p_i} = \frac{1+e^{z_i}}{1+e^{-z_i}} = e^{z_i} = e^{\beta_0 + \sum_{i=1}^m \beta_i X_i}$$

(4)

Taking the natural logarithms of the odds ratio of equation (4) will give us:

$$\ln \frac{p_i}{1-p_i} = \ln \left(e^{\beta_0 + \sum_{i=1}^m \beta_i X_i} \right) =: z_i$$

(5)

If the disturbance term μ is taken into account the logit model becomes:

$$z_i = \beta_0 + \sum_{i=1}^m \beta_i X_i + \mu_i$$

(6)

The above logit model will be used to identify the potential variables that determine the couple's behavior of using FPI and the data was analyzed by SPSS.

2.5.2.1. Parameter estimation

In order to examine the relationship and level of influence of the independent variables in favor of odds ratio of the logistic regression the estimation of the values of the unknown parameters β_0 and β_i 's is required. Unlike the linear regression, which uses the least square estimation (OLS) method, this model estimates the parameters using the Maximum Likelihood (ML) (Gujarati, 1998). Due to the nonlinearity of the logistic regression model, ML is a very general method of estimation that is applicable to a large variety of problems. The ML method of estimation suggests choosing as estimates the values of the parameters that maximize the likelihood of the function (Maddala, 1983). In many cases, it is convenient to maximize the

logarithm of the likelihood function rather than the likelihood function itself and the same results are obtained.

Before entering the selected variables into the logit model, it is necessary to check for the existence of multicollinearity among the continuous variables and verify the degree of the association among discrete variables. The reason is that the existence of multicollinearity will affect the parameter estimates seriously. The variance inflation factor (VIF) is used to test for the existence of multicollinearity between continuous explanatory variables.

VIF shows how the existence of an estimator is inflated by the presence of multi-collinearity (Gujarati, 1998). If R_i^2 of the multiple correlation coefficients that results when the explanatory variable X_i is regressed against all the other explanatory variables, VIF is computed as follows:

$$VIF(X_i) = (1 - R_i^2)^{-1}$$

(7)

As R_i^2 approaches 1, the VIF approaches infinity. That is as collinearity between variables increases, the variance of the estimator increases, and in the limit it can become infinity. If there is no collinearity between regressors, the value of VIF will be 1. As a rule of thumb, values of VIF greater than 10 is often taken as a signal for the existence of multicollinearity problem in the model.

Similarly, there may also be interaction between qualitative variables, which can lead to problem of multicollinearity or association. To detect this problem, contingency coefficient was computed from the survey data. Contingency coefficient is a chi-square based measure of association. A

value of 0.75 or more indicates a stronger relationship. The contingency coefficient is computed as follows:

$$C = \sqrt{\frac{\chi^2}{N + \chi^2}}$$

(8)

where C is coefficient of contingency, χ^2 is chi-square value and N is the total sample size.

2.6. Definition of Variables and Hypothesis Formation

Based on review of the empirical findings and experiences in relation to the existing conditions of the study area, the following variables are hypothesized to affect the use of FPI.

2.6.1. Dependent variable

The dependent variable of the logit model is FPI utilization which is dichotomous in nature. It is represented in the model by 1 for those couples who are users of FPI and by 0 for non-users.

2.6.2. Definitions of independent variables and related hypothesis

Demographic/ Personal variables

1. Wife's age (WIFAGE): It is a continuous variable measured in number of years completed by the woman at the time of interview. Child bearing is highly desired and expected culturally after marriage and couples need for children is high. Woman with higher age can have more exposure to FPI and use it. Hence, it was hypothesized that age would have positive relationship with access to and utilization of FPI. Solomon and Misganaw (2006)

reported the existence of positive relationship between age and utilization of contraceptives.

2. Wife's education status (WIFEDU): Education is expected to increase the ability to obtain access and use information. As education of wife (woman) increases, her access to information, and exposure to outside world increases. This in turn increases her analytical and problem solving ability. The educated wives have more confidence to discuss reproductive and sexual matters with their husband's than the not-educated ones. Education affects positively women's attitude towards modern FP, and thereby motivates them to seek information on methods of birth control and makes them to negotiate contraception use with their sexual partners. Hence, education level of the respondents was expected to influence the access and utilization of FPI positively. Tilahun (2008) indicated the presence of positive association between educational status of women and utilization of FPI.

3. Husband's education status (HUSEDU): Education increases the ability of obtaining, possessing, and utilization of information that is outside the surrounding of an individual. Education increases the analytical and problem solving capacity of an individual. Husband education highly influences the women's access to social, cultural and economic services and information. According to Jeejeebohoy (1998) and Haile (2007) husband's education widens the information source of the family, and husband education level is one of the factors that determine the access to and utilization of FPI of the family. Hence, educated husbands in the families were expected to increase access to and utilization of FPI to rural women.

4. Duration of marriage (DURMAR): It refers to the number of years the couple's has passed in marriage. Newly married couples usually do not use birth control methods until they have the number of children they desire to have and after that they start to respond to fertility control. Therefore, it was expected that duration of marriage will have positive influence on the use of FPI. Haile (2007) reported the existence of some relationship between duration of marriage and use of birth control methods.

Socio-cultural variables

5. Religion (RELGON): It is a dummy variable that takes the value of 1, if the religion of the couples is Muslim and 0 otherwise. Religion is one of the important factors that determine access to and utilization of FPI. It was hypothesized that woman with firm religious belief have less access to and utilization of FPI. Tilahun (2008) reported as religion had significant influence on decision of family planning.

6. Decision making power in a family (DMPCHB): Decision making power of the women on social, environmental, and development is limited. Decision power and the relationship that women and men have in the family influence the right to decide on use of resources and other social services that believed to develop people including women and men power relation and women's position to decide on resources and services is expected to be one of the factors that influence utilization decision of the FPI. Hence, it was hypothesized that if the decision power on resources and services are only by men/ husband it influences access and utilization decision of FPI negatively. Tilahun (2008) study result showed the existence of strong association between power relations in the family and utilization decision of FPI.

7. Marriage type (MARTYP): It is a dummy variable that takes 1 if a person is monogamous and 0 if a person is polygamous. A husband with two or more wives may have a more chance to have more number of children and it takes more burden over monogamous. Hence, it was hypothesized that a marriage with polygamy type will have positive relationship with the utilization of FPI. This hypothesis has similarity with Haile's (2007) hypothesis.

8. Number of children the couple has (NUMBCH): It refers to the number of children the couple already has during interview. According to CSA (2006), women generally do not begin to use contraception until they have at least one child in Ethiopia. Those couples who have many children due to their burden in giving care of them, and many other responsibility load to manage the family, they may be forced to use existing information and services. Therefore, the number of children the couple has was hypothesized to affect the use of FPI positively.

9. Number of children the couple's desire to have (NUCHDE): It refers to the total number of children the couple needs to have in their life time. Due to different socio-cultural beliefs couples may desire to have more number of children ideally. An increase in the couple's number of children desire leads to hinder the utilization of FPI and it was hypothesized to influence use of FPI negatively. As indicated in CSA (2006) report the number of children the couple's desire to have is one of the factors affecting the use of FPI.

ECONOMIC VARIABLES

10. Income (INCOM): It is a continuous and measured as the total earnings of a household from sale of agriculture produce, off-farm, and non-farm activities. It is expected that as the household have more income, affording the required materials to the family will be easy. It is one of essential factors that enable the people to make use the existing services like information. And hence, it was hypothesized to influence the utilization of FPI positively. The study result of Amaha and Enqusilassie (2006) indicated that contraceptive use was higher among couples who earned better monthly/annual income.

11. Land holding (LANDHOL): It represents the area of land under the ownership of the household in timad (four timad is approximately equal to one hectare). An increase in land holding increases the demand for children. Therefore, the household's land holding was hypothesized to affect the use of FPI negatively. Caldwell et al. (1999) and Haile (2007) reported that the existence of negative relationship between land holding and the adoption of contraceptive methods.

PSYCHOLOGICAL VARIABLES

12. Attitude towards family planning (ATTIFP): Attitude is one of the psychological determinants that govern an individual's behavior. If an individual does not have favorable attitude, towards FP his motivation to obtain information from the potential sources and media will be less. It was hypothesized that those women who have favorable attitude towards FP have high access to than those, who have unfavorable attitude. Tilahun

(2008) revealed that the attitude of women towards FPI was the psychological variable that influenced FPI among rural women.

13. Information seeking behavior (INFOSEBH): Information seeking behavior is a broad term encompassing the ways individuals articulate their information needs, seek, evaluate, select and use information. Information seeking behavior is purposive in nature and is a consequence of a need to satisfy some goal (Meho and Hass, 2001). To measure the variable range of information, range of sources of information and need and interest of obtaining the information will be considered. In order to measure this variable five relevant points were presented to the respondents together with score ranging from 0 to 2 (0=nil information, 1=some information and 2=more information). The final information seeking of the couple is the average of score given on the five points. Daniel (1995) used similar procedure, to measure the variable. Therefore, it was hypothesized that the variable will have positive influence on access and utilization of FPI.

14. Family size preferences (FAMSZPR): It is a dummy variable and it takes 1 if the couples prefer smaller family size and 0 if they prefer larger family size. Couple having larger family size preference will have less chance of using birth control methods. Hence, it was expected that larger family size preference affects FPI utilization negatively. Haile (2007) indicated that the presence of significant relationship between family size preferences and use of FPI.

15. Fear of side effects (FERSIDEF): It refers to fear of any health risks that might occur to them because using birth control methods. Women usually fear that they may permanently sterile or lose their sexual control derives, if they use birth control methods. It will be represented as one if

woman fears or zero otherwise. Hence, fear of side effects is hypothesized to influence use of contraceptives negatively. Fear of side effect influences the use of birth control methods negatively Haile (2007).

INSTITUTIONAL VARIABLES

16. Availability of contraceptive centers (AVACOCN): Availability of the contraceptive centers in the PAs of the women is essential to influence the utilization decision of FPI among the women. Thus it was expected that the availability and more number of contraceptive distribution centers increase the probability of utilizing FPI.

17. Distance from contraceptive center (DISCONT): It is a continuous variable and measured in kilometers. It is the distance from home of the couples to nearby town. As the woman is near the town, the higher will be the chances of getting information on family planning and it is used. The variable was expected to have a positive relationship with the dependent variable that is utilization of FPI. Tilahun (2008) reported as closeness of the service centers of health had positive relationship with the utilization of the FP services.

18. Extension contacts (EXTCONT): This variable is a dummy variable that takes 1 if a woman has contact with health extension workers on issue related to family planning services and 0 otherwise. The contact may be in the form of trainings, home visits, and interpersonal, group discussions or meetings on FP services as it was used by Tilahun (2008). Extension contact increases access to information and knowledge of FP and facilitates utilization of information by rural women. Hence, the variable is expected to influence access and utilization of FPI positively.

INFORMATION VARIABLES

19. Cosmopolitaness (COSMOP): It is the degree of orientation of the respondents towards outside the social system to which she belongs. It is measured in terms of frequency of visits to the nearby town/city. Cosmopolitaness was expected to have positive relationship with the dependent variables since it provides more chance of exposure to external information.

20. Ownership of mass media device (OWSHMD): It is a dummy variable that takes a value of 1 if a family has a radio and/or television and 0 otherwise. Mass media devices ownership enhances access to general and FPI broadcasted worldwide. Therefore, ownership of mass media devices was expected to have positive association on the utilization of FPI. Haile (2007) and Tilahun (2008) reported the existence of positive relationship between this variable and utilization of FPI.

3. RESULTS AND DISCUSSION

3.1. Family Planning Information Access and Knowledge among Rural women

3.1.1. Access to information on family planning

Family planning information plays a crucial role in the use of birth control methods. Rural people get information from limited outside sources. Low access to modern communication medias hinders their access to important sources of information. In order to use family planning services access to FPI it is crucial for decision making among rural couples. Individuals in a

community should get information on a new idea or practice to adopt the idea or the practice. To examine the level of utilization of FPI by rural couples it is important to understand the level of information the rural community possessed.

In this study area, 93.3% of the couples interviewed were having information about family planning services or birth control methods and only 6.7% of the couples had not heard about family planning services (Table 2).

3.1.2. Sources of family planning information

Acquiring family planning information from a variety of sources increases the chances of accepting contraceptive methods. Acquiring and utilizing family planning information increase the use of birth control methods.

The majority of sample respondents in the study area have heard family planning messages from a variety of sources. Health extension workers were the main sources of FPI for 65.8% of the couples. About 16.7% of the couples (16.3% of the users and 16.9% of the non-users) got information from their friends (Table 2).

Table 2. Sources of family planning information (N=120)

Sources	FPI Utilization				Total	
	Users		Non-users			
	No	%	No	%	No	%
Radio	4	8.2	9	12.7	13	10.8
Friends	8	16.3	12	16.9	20	16.7
Health extension workers	37	75.5	42	59.2	79	65.8
Not heard	0	0	8	11.3	8	6.7
Total	49	100	71	100	120	100

Source: Analysis of own survey data, July 2010

3.1.3. Couples' knowledge of contraceptives and utilization

Family planning helps couples to have the number of children when they want to have and also assures the well being of the children and the mother. To make the community beneficiary from the family planning, family planning extension packages has been developed by FMOH (2003a) and it is under implementation by respective regional government states. One of the main and major components in the family planning extension package is provision of modern family planning services. Under modern family planning services, it has been planned to provide adequate information services on 9 modern birth control methods to the people in order to acquire knowledge and still on their utilization based on their choices. The information areas were: oral contraceptives, emergency contraceptives, male condom, female condom, injectable contraceptives, implantable contraceptives, intrauterine contraceptive, female voluntary surgical contraceptives, and male voluntary surgical contraception.

From among the modern methods of family planning described in the family planning extension packages, only four methods were known and only two methods were used by rural women respondents in the study area (Table 3).

Table 3. Frequency distribution of couples on knowledge of modern contraceptives and Utilization methods

Contraceptive methods	Contraceptives known		Contraceptives used	
	No	(%)	No	(%)
Oral pills	22	18.3	9	18.4
Injectables	60	50.0	35	71.4
Condoms	2	1.7	0	0
Implanting	8	6.7	0	0
Oral pills & injectables	20	16.7	5	10.2
Don't know	8	6.7		
Total	120	100.0	49	100.0

Source: Analysis of own survey data, July 2010

From 120 couples, half of them (50%) knew about injectables, 18.3% about oral pills, 16.7% on oral pills and injectables, 6.7% implanting and 1.7% condoms. The rest, 6.7% of the couples didn't know anything about contraceptives. From the total 49 contraceptive users 71.4% were using injectables, 18.4% were using pills and 10.2 were using both injectables and pills (Table 3).

3.1.4. Family planning information utilization by rural women

Out of the total couples under study, modern FPI users were 40.9% (14.2% past users and 26.7% current users) while 59.1% were non-users, where 35.8% never need to use contraceptives and 23.3% were intending to use it in the future. From the total FPI utilizing couples 65.3% were current users during the survey work while the rest 34.7% were past users. From the non-users 60.6% never need to use FPI and 23.3% of the non-users were intending to use it in the future (Table 4).

Table 4. Distribution of couples on FPI utilization and user categories

User categories	User		Non user		Total	
	No	(%)	No	(%)	No	(%)
Never use contraceptives	0	0	43	60.6	43	35.8
Past user	17	34.7	0	0	17	14.2
Current user	32	65.3	0	0	32	26.7
Intending future use	0	0	28	39.4	28	23.3
Total	49	100	71	100	120	100

Source: Analysis of own survey data, July 2010

3.2. Information Variables

3.2.1. Ownership of media device

Radio and television are the major media devices bringing information to the populations' ear in the country. In rural areas of the country radio plays an important role in providing information to the rural society.

Possessing of these media devices helps the households to have adequate information about family planning service and may increase the FPI utilization of the rural couples. Among the couples included in study, 71.4% of users and 54.9% of non-users owned radio while 28.6% of users and 45.1% of non-users did not own radio (Table 5).

Table 5 Frequency Distribution of couples on the basis of radio ownership (N=120)

Radio ownership	FPI Utilization				Total		X ² -value	P-value
	Users		Non users					
	No	%	No	%	No	%		
Own radio	35	71.4	39	54.9	74	61.7	3.339NS	.268
Not own	14	28.6	32	45.1	46	38.3		
Total	49	100	71	100	120	100		

Source: Analysis of own survey data, July 2010; NS=non significant

3.2.2. Radio program regarding FPI

In order to increase the awareness level of the community about family planning information to enhance the utilization, broadcasting sufficient FPI programme at convenient time is important. Out of 120 couples 61.7% owned radio (Table 5) and out of 74 radio owners 89.2% of the respondents reported that there was radio programme regarding FPI, but 10.8% reported that they did not hear any FPI through their radio (Table 6).

Table 6. Reaction of couples regarding FPI radio program

Items	Positive Responses		Negative Responses	
	No	(%)	No	(%)
Availability of FPI radio program	66	89.2	8	10.8
Adequacy of the program	31	47.0	35	53.0
Time convenience to listen	23	34.8	43	63.2

Source: Analysis of own survey data, July 2010

However, 53% of the couples, had indicated that the FPI radio programme was inadequate (Table 6). Broadcasting adequate FPI at convenient time

have greater impact in reaching the information to the community to enhance the utilization of the FP information. Out of the 66 couples who heard FPI through their radio, 63.2% of them had complained that the FP programme was not transmitted at convenient time.

3.2.3. Cosmopoliteness

Cosmopoliteness is the degree of orientation of the respondent towards outside the social system to which she/he belongs. It provides more chance of the exposure to the external information. The mobility of an individual out of his social environment is one of the factors that increase the individual's access to more information.

Therefore, cosmopoliteness was expected to have positive and significant association with utilization decision of family planning information. As indicated in Table 7, out of the total couples 50.8%, 9.2%, 21.7%, and 18.3% of the couples visit the nearby town sometimes, once a week, most often, and daily, respectively. Among the FPI user couples, 57.1%, 12.2%, 16.3% and 14.3% of them made a visit sometimes, once a week, most often and daily, respectively. And similarly from the non-users 46.5%, 7.0%, 25.4%, and 21.1% of them visit the nearby town sometimes, once a week, most often and daily respectively (Table 7). The chi-square test shows that there is no statistically significant mean differences between users and non-users in terms of cosmopoliteness. The result of the test indicated the absence of association between cosmopoliteness and utilization of FPI. The probable reason for the insignificance of the result of chi-test is the majority of both users and non-users visit the nearby town sometimes.

Table 7. Couples distribution with frequency of visit to the nearby town/city (cosmopoliteness) and purpose of visit

Cosmopoliteness	FPI Utilization						X ² - value	P-value
	Users		Non-users		Total			
	No	%	No	%	No	%		
Daily	7	14.3	15	21.1	22	18.3	3.335NS	.343
Most Often	8	16.3	18	25.4	26	21.7		
Once a week	6	12.2	5	7.0	11	9.2		
Sometimes	28	57.1	33	46.5	61	50.8		
Total	49	100	71	100	120	100		
Purpose of the visit								
ARA	41	83.7	57	80.3	98	81.7		
To visit friends	0	0	2	2.8	2	1.7		
To get MT	8	16.3	12	16.9	20	16.7		
Total	49	100	71	100	120	100		

Source: Analysis of own survey data, July 2010; NS=non significant; MT= Medical Treatment; ARA= Agricultural Related Activities

As indicated in table 7, the purposes of the visit to the nearby town were agricultural related, such as purchasing (shopping) and marketing, to get medical treatment and to visit friends/relatives by 81.7%, 16.7% and 1.7% of the total couples, respectively. Among the users 83.7% visit the nearby town for reason of agricultural related purchases and marketing and the rest 16.3% visit to get medical treatment. Agriculture marketing, medical treatment and visiting relatives/friends were the purposes of the visit to the nearby town for 80.3%, 16.9% and 2.8% of the non-users, respectively.

3.3. Socio-cultural Variables

3.3.1. Religious background of the respondents

Religion is one of the important factors that determine access to and utilization of FPI (Tilahun, 2008). It is hypothesized that woman with firm religious beliefs have less access to and utilization of FPI. In the study area, even though there were some Orthodox Christians and Protestants, almost all the couples were Muslims, both users and non-users. During group discussions with religious leaders and community leaders there was no opposition to the use of birth control methods. Religious leaders have favorable attitudes towards the use of contraceptives to limit number of children with the level of their income to raise them properly and to lead a better life. During group discussions religious leaders and community leaders highly opposed abortion and they reported that once a woman become pregnant she has to bear it and otherwise abortion is considered as sin and not allowed by Islam.

3.3.2. Marriage type of the couples

Monogamy and polygamy are the common and familiar marriage types in the rural parts of the country. During the research period the community leaders and religious leaders had indicated that polygamy was culturally accepted and a common marriage type in past years in the area. The leaders also pointed out that polygamy has steadily abandoned in their society in recent years. The majority (97.5%) of the couples were monogamous and only 2.5% of them were in polygamy marriage bondage.

Table 8. Marriage type the sample couples

Marriage type	FPI Utilization						X ² -value	P-value
	Users		Non users		Total			
	N	%	No	%	No	%		
	47	96	70	98.6	117	97.5	0.850NS	0.357
Monogamy	47	96	70	98.6	117	97.5		
Polygamy	2	4	1	1.4	3	2.5		
Total	49	100	71	100	120	100		

Source: Analysis of own survey data, July 2010; NS= Non significant

As shown in table 8, 96% of the users were monogamous and 4% were polygamous, while 98.6% of the non-users were monogamous while 1.4 % had polygamous marriage. A husband with two or more wives may have a better chance to have more children. But the chi-square test indicates that there is no statistically significant difference between users and non-users ($\chi^2 = 0.850$, $p = .357$). in FPI utilizations as related to type of marriage. Polygamy and the use FPI have no significant relationship. The reason for insignificance of the relation is that the majority of the users and non users have monogamous marriages.

3.3.3. Decision making power in a family

Decision making process involves communication between husband and wife on reproductive matters especially the use of modern contraception (Thaim and Aya, 2004 as cited in Haile, 2007). Spousal discussion increases the flow of FPI between the partners. It also addresses gender equity by creating an opportunity for wives to discuss their reproductive issues with their spouses. It empowers women and creates confidence for women to deal with their reproductive lives. It ensures the participation of both partners.

Spousal discussion increases intimacy between the partners. All of these would increase the chance of using birth control methods. Spousal communication helps women to get confidence to discuss reproductive issues with their husbands and crucially important in approval of the use of birth control methods.

Of the sample couples, 76.7% reported that they had discussed on reproductive issues, particularly on the number of children they bear while the remaining 23.3% of the couples stated that they did not have the habit of discussion on the issue with their partners. Around 59.2% of the responding couples had indicated that they have experienced discussion on birth control methods and the remaining 40.8% had not discussed on the issue with their partners. With regard to time of child bearing, 71.7% had reported that decisions were made by both husband and wife (Table9).

Table 9. Distribution of couples' decision making power on time of child bearing

Decision maker on time of child bearing	FPI Utilization				Total	X ² -value	P-value
	Users		Non-users				
	No	%	N	%			
						8.524**	0.036
Husband	4	8.2	11	15.5	15		
Wife	4	8.2	7	9.9	11		
Both W&H	41	83.7	45	63.4	86		
God	0	0	8	11.3	8		
Total	49	100	71	100	120		

Source: Analysis of own survey data, July 2010; ** Significant at less than 5% level of significance; W&H refers to wife and husband

When disaggregated into users and non-users, time of child bearing was decided through negotiation by both wife and husband by 83.7% of FPI user couples and by 63.4% of FPI non-users. On the other hand, 8.2% and 15.5% of the users and the non-users, respectively, had claimed that the decision was made by the husband. The remaining 11.3% of the non-user couples stated that decision of child bearing time is not our concern but it is God's responsibility. The participation of wives in decision making on time of child bearing was more among FPI users as compared to the non-users (Table 9). The chi-square test indicates that, statistically there is significant mean difference between users and non-user couples in deciding the time of child bearing. The test result confirms the presence of some association between women's decision making power and utilization of FPI.

3.3.4. Number of children the couples have

It is clear that the livelihood of rural community mainly relies on agriculture, which embraces animal rearing and crop cultivation. Rural parents gain important labor contribution from children in Ethiopia. Children have responsibility of rendering labor services to their parents. According to the elders and community leaders, in order to broaden relation and to win respect in the society, having a large family size was relatively preferred than smaller size in the past years. But, gradually the situation is changing due to a variety of factors, such as, decrease of land holding, difficulty to provide the basic necessities (education, clothing, foods, housing and the like). In the group discussion the elders confirmed that couples prefer to have a small family size.

Table 10. Couples' family size preferences

Family Size Preferences	FPI Utilization				Total	X ² -value	p-value	
	Users		Non-users					
	No	(%)	No	(%)				
Larger	8	16.3	33	6.5	41	34.2	1.718***	0.001
Smaller	41	83.5	38	3.5	79	65.8		
Total	49	100.0	71	100.0	120	100.0		

Source: Analysis of own survey data, July 2010; *** Significant at less than 1% level of significance

Among the couples, in general, 65.8% preferred smaller family size. However, 85.5% of FPI users and 53.5% of non-users preferred smaller family size (Table 10). There is significant difference between the user and non-user respondents with regard to family size preferences. This indicates

that the family size preference of the couples and utilization of FPI have some relationship.

In the study area the number of children the couples have varies from 0 to 11, whereas, the ideal number of children the couple's desire to have varies from 2 to 15. The combined mean number of children is 4.64 and the combined mean ideal number of children is 5.98 per household. Mean number of children and ideal number of children of FPI users were 3.84 and 5.02, respectively, whereas mean number of children and ideal number of children of FPI non-users were 5.20 and 6.65, respectively (Table 11).

Table 11. Mean number of children and ideal number of children

Item	FPI Utilization						t value	P-value
	Users		Non users		Combined			
	Mean	SD	Mean	SD	Mean	SD		
Number of children	3.84	2.21	5.20	2.46	4.64	2.4	-	0.002
Ideal No of children	5.02	1.00	6.65	5.00	5.98	49	3.097**	0.000

Source: Analysis of own survey data, July 2010: *** Significant at less than 1% level of significance

The result of t-test shows that there is statistically significant difference between the two groups with regard to number of children the couple have. There is also relationship between the numbers of children the couples have and the use of FPI. With regard to the ideal number of children that the couples desire to have, the t-test shows the presence of significant mean difference between user, and non-user, groups at 5% probability level and it indicates the existence of relationship between the ideal number of children the couples' desire to have and the couples' use of FPI.

REPRODUCTIVE PERFORMANCE OF TWO AND THREE WAY CROSSED COWS

Tadesse Bekele¹, Alemu G. Wold², and Roman H/Silassie²

ABSTRACT

Reproductive performance of Bos indicus breeds is lower than that of Bos taurus breeds. This low Performance could be improved through crossbreeding and maintaining heterosis. Two and three ways crossbreeding (Boran, Friesian and Jersey) study was carried out at Holeta Research Center. Data on 150 primiparous and 287 multiparous cows were used to evaluate reproductive performances. There was no significant difference ($p>0.05$) in age at first calving and number of services per conception between two and three breed crosses in primiparous and multiparous cows. Age at first calving and services per conception significantly ($p<0.05$) varied between exotic blood levels in two breed crosses. Reproductive performances of three ways crosses were similar to two way crosses, indicating that there will be no loss in reproductive performances while using three ways crossing to maintain productivity heterosis achieved in the two ways crossings.

Key words: - crossbreed reproduction, two ways, three ways

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INTRODUCTION

Reproductive performance is one of the important aspects, which contribute to dairy cattle productivity. Female cattle with high fertility rate, short calving interval, and younger age at first calving are important for productive dairy herd. More than 90% of cows used for dairy purpose in Ethiopia are Zebu types, *Bos indicus* (C.S.A., 2009). However, reproductive performances of these cattle are low. They have longer age at first calving and calving intervals than *Bos taurus* cattle. Age at first calving, and calving interval for zebu cows were reported 44 and 26.6 months, respectively (Mukassa Mugerwa, 1989). On the average, zebu heifers reach puberty 6-12 months later than that of *Bos taurus* (Warnick, 1965; Wiltbank et al 1969). Zebu cows also have silent heat, which prolongs age at first calving and calving interval. Crossing these low performing Zebus with high performing exotic breeds was widely accepted idea in the tropics to improve their performance.

McDowell (1985) found that crosses of Zebu with European breeds calved earlier than local herd mates, gave more milk per lactation and had slightly shorter calving interval. Therefore, a long term crossbreeding study was initiated employing pure local Borans, exotic Friesians and Jerseys. From the initial two breeds crossing study productive and reproductive performance of 50% crosses was substantially improved. However, it was understood that the supply of 50% crosses for smallholder farmers for production purpose demands continuous process. Otherwise backcrossing these 50% cross heifers would result in a drop in dairy performance. Therefore, to maintain heterosis obtained in these heifers three ways crossing was proposed as an alternative solution. It has been also indicated that in three breed rotational crossing scheme heterosis coefficient stabilize fairly rapidly (Hohenboken, 1985). Information on reproductive

performance of three breed crossing is lacking in Ethiopia. The objective of this paper is to evaluate reproductive performance of three-breed-crosses relative to their contemporary two-breed crosses.

MATERIALS AND METHODS

Location

This study was conducted at Holeta Agricultural Research Center, which is located in the cool central highlands of Ethiopia with 2400m altitude above sea level. It has annual mean minimum and maximum temperature ranging from 18-24 °C and annual rainfall ranging from 800-1200 mm.

Animals

Crossbreeding activities were carried out during 1990-1997. Data from 150 primiparous and 287 multiparous cows at Holetta Research Center were used to evaluate age at first calving, calving intervals, days open and services per conception.

Mating plan

Mating plan was designed to produce two and three way crosses of different exotic blood levels for contemporary comparison as follows. In the two way crossing (Fig.1) Boran local cattle were used as foundation dam breeds to be crosses with either Friesian or Jersey breed to produce first (F₁) generations (50% exotic, 50% local) Friesian cross Boran or Jersey cross Boran off-springs during first phase. During second phase, the first generation off-springs were mated to be upgraded to produce either 75% F 25%Bo or 75%J 25%Bo blood levels. The other groups were selfed to produce either F₂ Friesian cross Boran or F₂ Jersey cross Boran genotypes. During third phase, F₂ crosses were again selfed to produce either F₃ Friesian cross Boran or F₃ Jersey cross Boran third generations.

The high grades obtained during second phase (75%F 25% Bo and 75% J 25% Bo) were mated to either F₁ Friesian cross Borans or F₁ Jersey cross Borans to produce 62.5% F 37.5%Bo, or 62.5% J 37.5%Bo blood levels, respectively.

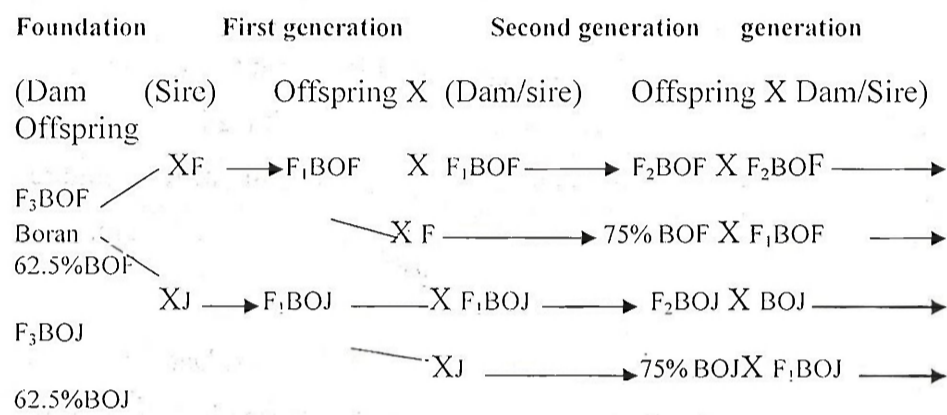


Fig.1. Breeding plan for two breeds crossing[†]

In the three ways crossing (Fig 2), local Boran cattle were used as foundation dam breeds, which were crossed either with pure Friesian or pure Jersey exotic cattle breeds using artificial insemination (AI). During first phase, F₁ generations of either Friesian cross Boran (50%J 50%Bo) or Jersey cross Boran (50%J, 50%Bo) were obtained. During second phase, the first generation (F₁) female crosses of Friesian cross Borans were mated to three groups of sires. They were F₁ Friesian cross Borans, Pure Friesians, and F₁ Jersey cross Boran sires to produce F₂ Friesian cross

[†] BOF = ♂Boran ♀Friesian
 BOJ = ♂Boran ♀Jersey
 BOF (62.5%) = ♂Boran ♀Friesian
 BOJ (62.5%) = ♂Boran ♀Jersey
 BOF (75%) = ♂Boran ♀Friesian
 BOJ (75%) = ♂Boran ♀Jersey

3.4. Demographic/ Personal Variables

3.4.1. Woman's age, duration of marriage and woman's age at marriage

The mean age of the 120 women in the study area was 28.48 years with standard deviation of 5.454. The minimum and maximum ages of the rural women in the area were 17.00 and 40.00 years, respectively. However, 88.3% of the sample women's age was between 20 and 35 years indicating a high potential for more births in the future. The mean age of user women and non-users was 27.49 and 29.15 years, respectively (Table 12). The result of mean test showed that the absence of significant difference in the mean age of users and non user rural women at 5% probability level which implies that there is no significant relationship between the age of women and FPI use.

Table 12. Mean age of women, duration of marriage and age of women at marriage

	FPI Utilization					
	Age of wife		Duration of marriage		Woman age at marriage	
	Users	Non-users	Users	Non-users	users	Non-users
N	49	71	49	71	49	71
Mean	27.49	29.15	11.29	13.51	17.29	16.48
Std. Dev.	5.44	5.40	5.33	6.76	2.73	2.24
t-value	1.656NS		1.924NS		0.179	
P-value	0.100		0.257			

Source: Analysis of own survey data, July 2010; NS= non significant

The mean rural women age at marriage of all respondents was 16.80. The minimum and maximum ages at marriage of the respondents were 12 and

27 years, respectively. Around 93.3% of the sample respondents' age at marriage was found to be 20 and less than 20 years. Early marriage increases the chance of bearing more children. Marriage at early age indicates the high fertility potential of women in the future. The women's age at marriage of the user respondents was 17.29 years and the non-users' was 16.48. The t test result showed that there is no statistically significant mean difference between users and non-users regarding women's age at marriage and it indicates the absence of relationship between women's age at marriage and FPI utilization.

The mean duration of marriage of all couples was about 12.6 years with the standard deviation of 6.288. The number of years in marriage union influences the contraception use by couples. Newly married couples are less likely to adopt FPI because they have not yet produced children whereas those who stayed in marriage union for a long time, already having some children, are more likely to adopt contraception to control their fertility. The mean duration of marriage for FPI user respondents and non-users was 11.29 and 13.51 years, respectively (Table 12). The mean comparison t-test result shows that there is no statistically significant mean difference with duration of marriage between the user and non-user couples, showing that the number of years in marriage and use of birth control methods have no relationship.

3.4.2. Wife's and husband's education status

Education is one of the important variables which increase an individual's ability to acquire, process, and use FP information. Low level of education and high illiteracy rate is typical in developing countries like Ethiopia. As education of wife (woman) increases, her access to information and

exposure to outside world increases. The educated wives have confidence to deal reproductive and sexual matters with her husband than uneducated ones. In fact, education level of individuals assumed to increase the ability to use the obtained information in a better way. Husband education highly influences the women's access to social, cultural, economic services and information. Husband education is important as source of information in a family and influences the utilization of FPI.

Wife's education has an important role in women's decision to adopt family planning practices. From the wives included in the study, 84.17% were illiterate and 15.83% of wives had education level of grade 1-4. The survey data shows 79.6% of the user wives were illiterate and the rest (20.4%) of them have education level of grade 1-4, whereas, 87.3% of the non-user wives were illiterate, 12.7% and 1.4% of them have education level of grade 1-4 and 5-8, respectively (Table 13). The chi-square test result shows that there is no statistically significant difference between users and non-users in relation to wife's education. This result indicates absence of relationship between wife's level of education and the use of FPI in the study area.

Table 13. Education levels of wife and husband

Wife education	FPI Utilization				X ² -value	Total		P- value
	Users		Non-users			No	%	
	No	%	No	%				
Illiterate	39	79.6	62	87.3	1.924NS	101	84.17	0.382
1-4	10	20.4	9	12.7		19	15.83	
5-8	0	0	1	1.4		1	0.08	
Husband education								
Illiterate	20	40.8	41	57.7	8.678**	61	50.83	0.034
1-4	17	34.7	25	35.2		42	35.00	
5-8	10	20.4	5	7.0		15	12.50	
9-12	2	4.1	0	0.0		2	1.67	

Source: Analysis of own survey data, July 2010; NS= non significant, ** significant at less than 5% level of significance

Education enhances individual's capacity of analyzing ones life situations and solving the problems. Education influences the decision of adopting family planning information. Husband's education, the important component of the household's education, has an enormous decision making power in the family.

As illustrated in table 13, in general, 50.83% of husbands included in the survey were illiterate while 35%, 12.5% and 1.67% of the husbands have education level of grade 1-4, 5-8, and 9-12, respectively. From among user wives' husbands, 59.2% were literate (34.7% grade 1-4, 20.4% grade 5-8, and 4.4% grade 9-12) and the remaining 40.8% were illiterate, whereas, around 42.2% of non-user wives' husbands were literate, with 35.2% and 7% have education level of grade 1-4, and 5-8, respectively, and 57.7% of them were illiterate. The chi-square test indicates that there is statistically

significant mean difference between the users and non-user groups with reference to husband's education at 5% probability level. The result illustrates the existence of some association between husband's education level and the utilization of FPI.

3.5. Economic Variables

3.5.1. Land holding of the households

Due to the fact that the majority of households in the research area were agrarian, land is the most important economic variable on which the lives of the community depend. The households cultivate mainly chat (cash crop) on their lands and grow maize and sorghum for consumption by intercropping with chat during the rainy season. In addition, different types of vegetables were grown by using underground water irrigation system during the off-season. The average land holding of sample couples was around 0.51 ha with the standard deviation of 0.338. The smallest and the largest landholdings of the sample couples were 0.13 and 1.50 ha, respectively.

Table 14. Relationship of household's landholding with decision to use FPI

Land holding	Users	Non-users	t-value	p-value
Mean	0.42	0.57	-2.499**	0.014
Std. Dev.	0.253	0.375		

Source: Analysis of own survey data, July 2010; ** Significant at less than 5% level

The land holding size and land covered by chat are among the major criteria for measuring the wealth status of a family in the study area. Families share lands to their children when the children become adult and establish their own family. Elders and community leaders had reported that the land

holding of households is decreasing from time to time and families are facing difficulties to provide land to their children during group discussions.

The mean land holding of users is 0.42 ha and that of non-users is 0.57 ha showing a mean difference of 0.15 ha. Land holding is related to having children. The land creates demand for labor and thereby indirectly affect contraception decision in rural areas. The t-test indicates that there is statistically significant difference between the FPI users and non-users in landholding size, and showing the presence of relationship between household's landholding and utilization of FPI.

3.5.2. Income of the households

The total annual earnings of a family from sale of agricultural produce, off-farm service, and non-farm activities are referred to as an income for the purpose the study. It is expected that as the family has more income, providing the required materials to the household will be easy and hence it is hypothesized to influence the use of FPI positively. In the study area the average annual income earning of the sample couples was Birr 8,806.00 with standard deviation of 3284.64. The annual minimum and maximum income obtained by the couples were Birr 4200 and 20,000.00. The annual mean income of the user couples and the non-users was Birr 9100.00 and 8640.40, respectively (Table 15). The t-test showed the absence of significant mean difference between the two groups and illustrates that there is no association between household's income and adoption of family planning information.

Table 15. Relationship of income with the decision to use FPI

Income	Users	Non-users	t-value	p-value
Mean	9100.00	8604.40	0.811NS	0.419
Std. Dev.	3166.08	3371.31		

Source: Analysis of own survey data, July 2010; NS= non significance

3.6. Institutional Variables

3.6.1 Availability and distance of contraceptive centers

3.6.1.1. Availability

In order to ensure access to and utilization of FPI, the availability of contraceptive in the residential places of the community is necessary to enhance the use of FPI. It facilitates easy access to and utilization of family planning services to rural couples. Thus, it was expected that the availability and number of contraceptive distribution centers increase the probability of utilizing FPI. The availability of one contraceptive center at each PA of the woreda has been proven to be ideal, according to the community leaders and elders during group discussion and also from the woreda health office.

Furthermore, to measure the awareness level of the community about the presence of contraceptive centers near their residential places and to evaluate its adequacy, respondents were asked about the availability of contraceptive and the responses are presented on Table 16. More than 77% of the total couples confirmed the availability contraceptives centers in their villages, while 22% had stated the non-availability of the centers in their areas. The reasons for complaints of couples for non-availability of contraceptive centers in some villages were the location being long distance

from their homes, according to the explanation of community leaders and the key informants during group discussions (Table 16).

Table 16. Couples' reaction on the availability of contraceptive centers

Availability of contraceptive center	FPI Utilization						X ² -value	p-value
	Users		Non-users		Total			
	No	(%)	No	(%)	No	(%)		
• Adequately available	37	75.5	56	78.9	93	77.5	0.188NS	0.665
Inadequately available	12	24.5	15	21.1	27	22.5		
Total	49	100.0	71	100.0	120	100.0		

Source: Analysis of own survey data, July 2010; NS= non significant

The chi-square test showed that there was no significant mean difference between users and non-users in relation to the availability of contraceptive distributing centers in their residential places and depicted the absence of relationship between the availability of contraceptive centers and utilization of FPI.

3.6.1.2. Distance

It is clear that rural communities are living in more dispersed manner near to their farm steads in order to protect the farm from damages caused by wild animals and intruders, and also, for ease of access to forages and grasses to their domestic animals in most parts of the country, and the same is true in the study area. One contraceptive center is available in each rural PA of the district, which is similar to the other PAs of the country. The distance of the contraceptive centers in a PA varies with residences of households in the

PA. It is expected that couples who are relatively nearer to the contraceptive distributing centers would possess more information about FP and services than those who are living farther away. Hence, decision to use FPI can be affected by proximity of the households from the PAs contraceptive centers.

The average distance of contraceptive center from the respondents was 3.76 km with the standard deviation of 1.91 km. The mean distance of contraceptive center for users and non-users was 3.33 and 4.06 km respectively (Table 17). The t-test result indicates that there is statistically significant mean difference between users and non-user groups in the distance of contraceptive centers, indicating the presence of association between distance of women's residential home to contraceptive center and utilization of FPI.

Table 17. Mean distance of users and non users from contraceptive center in PA

Distance from contraceptive center	Users	Non-users	t-value	p-value
Mean	3.33	4.06	-2.092**	0.039
Std. Dev.	1.39	2.16		

Source: Analysis of own survey data, July 2010; ** Significant at less than 5% level of significance

3.6.2. Extension Contacts

To improve the health situations of rural community health extension workers are assigned in each PAs in rural parties of the country to carry out diseases prevention activities. Health extension workers are expected to educate the people how to keep personal and home sanitation and improve nutrition and also provide FPI and services. They have to create healthy

living environment by initiating the people to that end. In order to reach those targets, devotion is expected from the extension workers to pursue the rural HHs to participate and use disease prevention package. Extension contact refers to the contact of the women have with the extension health agent to obtain health services including family planning. Hence, they are primary and major sources for family planning information and services. Based on this facts it was expected that contact of women with health extension workers influences the utilization of decision of FPI positively.

Out of the total couples only 32.5% of women had contacted health extension agents frequently and 50% of them had contact sometimes and more than 17% had rarely contacted the health extension agents. while more than 42% of the users had contacted the health extension agents frequently, only 25.4% of the non-users did it. About 49% of the users and 50.7% of the non-users had contact with the health agents sometimes. About 8.2% of the users and 23.9% of the non-users had rarely contacted the health agents (Table 18).

Table 18 Distribution of respondents with frequency of extension contacts to decision to use FPI

Frequency of Extension Contact	FPI Utilization						X ² -value	p-value
	Users		Non-users		Total			
	No	(%)	No	(%)	No	(%)		
Rarely	4	8.2	17	23.9	21	17.5	6.876**	0.032
Sometimes	24	49.0	36	50.7	60	50.0		
Frequently	21	42.9	18	25.4	39	32.5		
Total	49	100.0	71	100.0	120	100.0		

Source: Analysis of own survey data, July 2010; ** Significant at less than 5% level of significance

The chi square test shows that there is statistically significant mean differences between the users and non users in referring to the frequency of extension contact the women made. The mean comparison test also indicated that the presence of some association in between the frequency of the extension contact of the women and the decision to use the FPI.

3.7. Psychological Variables

3.7.1. Information seeking behavior

Information seeking behavior involves personal reasons for seeking and getting information, the kinds of information which are being sought, the ways and sources with which needed information is being sought. Information seeking is a conscious effort to acquire information from various sources on different roles you perform in response to a need or gap in your knowledge (Tibbo, 2002). This was measured in terms of how much information was sought, how frequently from where the information was sought. Five relevant points were presented to the couples pertaining to how much information they need to get, accordingly, score was given to the responses that range from 0 to 2. Based on this the information seeking behavior of the couples' was computed. The higher the score the higher is the information seeking behavior of the respondents.

The mean score of information seeking behaviour of users was obtained to be 3.674 while for non users was 2.531. There is statistically significant mean difference between the users and non-users and this indicates the presence of relationship between the respondents' information seeking behaviour and use of FPI (Table 19).

Table 19. Relationship of couples' information seeking behaviour with the use of FPI

Information seeking	Users	Non-users	t-value	p-value
Mean	3.674	2.531	3.254**	0.032
Std. Dev.	1.635	1.524		

Source: Analysis of own survey data, July 2010; ** Significant at less than 5% level of significance

3.7.2. Fear of side effects

Among all women included in the study, 56.7% reported that they had fear of the side effects of contraceptives. However 72% of the non-users and only 34.7% of the users had fear of contraceptives side effect (Table 20). The fear of side effect is less among the users while more among the non-users. The mean comparison of chi-square test indicates that there is statistically significant mean difference between the users and non users and this shows the presence of some relationship between the fear of contraceptives' side effects and use of FPI.

Table 20. Distribution of respondents in relation to fear of contraceptive side effects

Fear of side effects	FPI utilization				Total	X ² -value	p-value	
	Users		Non-users					
	No	Percent (%)	No	Percent (%)				
Yes	17	34.7	51	71.8	68	56.7	16.283***	0.000
No	32	65.3	20	28.2	52	43.3		
Total	49	100.0	71	100.0	120	100.0		

Source: Analysis of own survey data, July 2010; *** Significant at less than 1% level of significance

During group discussion, key informants had expressed that some FPI users had experienced some side effects from contraceptives. According to the key informants, more bleeding, untimed menstruations and some temporary illness were the commonly experienced side effects among the users. Out of the user respondents, 55.1% had experienced side effects from contraceptives.

3.7.3. Attitude towards family planning

Attitude measures the degree of liking or disliking of an individual towards an object, idea or practice. The women's attitude towards family planning services, either positive or negative, plays a significant role in making decision for using FPI. It was hypothesized that favorable attitude of the couples towards FPI will have positive and significant influence on utilization decisions.

The level of attitude towards family planning packages was measured by using average attitude score of the women and thus, it becomes continuous.

Six statements (three positive statements and three negative) were used with five point scale. In this scale, for all statements, scores are allotted on the following basis: strongly agree=5; agree=4; neutral=3; disagree=2; and strongly disagree=1. The t-test of independent samples shows that there is insignificant difference between users and non-users in their attitude towards the family planning services delivered to them. The highest average attitude score of users and non-users was 3.33 and the lowest average score were 1.83 for users and 2.00 for non-users, respectively (Table 21). The mean attitude score of users and non-users were 2.476 and 2.464, respectively, out of an obtainable potential score of 5. The relation between intensity of FPI utilization and attitude of couples found to be insignificant (Table 21), and this is because of highly homogenous social setting (ethnicity, production pattern, religion and social networking and learning) and the closer interaction of these elements, whereby ones' attitude had as influence on community members. The result of bivariate analysis test supported the existence of weak positive and insignificant correlation ($r=0.012$, $p=0.899$) between attitude and decision to use FPI, which contradicts with Tilahun's (2008) findings.

Table 21. Relationship of attitude with utilization decision of FPI (N=120)

Attitude score	Users	Non-users	t-value	p-value
Mean	2.476	2.464	0.190NS	0.850
Std. Dev.	0.417	0.256		
Minimum	1.83	2.00		
Maximum	3.33	3.33		

Source: Analysis of own survey data, July 2010; NS= non significant

3.8. Summary on Relationships between the Independent Variables and Dependent Variable

Twenty independent variables were considered for analysis for determining relationship with decision on utilization of FPI among rural women. The finding had revealed that 10 of them had some relationship with the dependent variable (Tables 22 and 23).

Table 22 Summary of results of continuous independent variables

Variable	Mean		t-value
	users	Non users	
Number of children	3.84	5.20	-3.097***
Ideal number of children	5.02	6.65	-3.783***
Age of women	27.49	29.15	-1.656NS
Duration of marriage	11.29	13.51	-1.924NS
Wife's age at marriage	17.29	16.48	1.771NS
Land holding	0.42	0.57	-2.499**
Income	9100	8604	0.811NS
Distance from contraceptive Centers	3.33	4.06	-2.092**
Information seeking behaviour	3.674	2.531	3.254**
Attitude towards family planning	2.476	2.464	0.190NS

Source: Analysis of own survey data, July 2010; NS= non significant, **, *** refers significant 5% and 1% probability level respectively

Table 23. Summary of the results of dummy/ discrete variables

Variable	label	Percent		X ² - value
		Users	Non users	
Radio ownership	Own radio	71.4	54.9	3.339NS
	Not own	28.6	45.1	
Cosmopolitaness	Daily	14.3	21.1	3.335NS
	Most often	16.3	25.4	
	Once a week	12.2	7.0	
	Sometimes	57.1	46.5	
Marriage type	Polygamy	96	98.6	0.850NS
	Monogamy	4	1.4	
Decision maker on time of child bearing	Husband	4	1.4	8.524**
	Wife	8.2	15.5	
	Both	8.2	9.9	
Family size preference	God	83.7	63.4	11.718***
	Larger	0	11.3	
Women education	Smaller	16.3	46.5	1.924NS
	Illustrate	83.5	53.5	
	1-4	79.6	87.3	
Husband education	5-8	20.4	12.7	8.678**
	Illustrate	0	1.4	
	1-4	40.8	57.7	
	5-8	34.7	35.2	
Availability of contraceptive center	Available	20.4	7.0	0.188NS
	Not available	4.1	0	
Frequency of extension contact	Rarely	75.5	78.9	6.876**
	Sometimes	24.5	21.1	
	Frequently	8.2	23.9	
Fear of side effects	Yes	49	50.7	16.283***
	No	42.9	25.4	
		34.7	71.8	
		65.3	28.2	

Source: Analysis of own survey data, July 2010; NS= non significant, **, *** refers significant 5% and 1% probability level respectively

3.9. Econometric Results and Discussion of Factors Influencing Utilization of FPI

Prior to the analysis of the data, it was necessary to look into the problem of multicollinearity or linear association among the hypothesized variables. Variance inflation factors (VIF) were used to check the multicollinearity problem in continuous variables, and similarly contingency coefficient was used for dummy variables. In order to identify variables influencing the utilization of FPI, the binary logit model (regression) was estimated using maximum likelihood estimation procedure as it is described in the methodology section.

Based on the results of these tests, variables that have showed high degree of correlation were eliminated from further analysis. It was concluded that there were no multicollinearity and association problems between a set of continuous and discrete variables, as the respective coefficients were very low (less than 10 for continuous variables and less than 0.75 for dummy variables) (Appendix Table 1 and 2). Finally, the five potential continuous and the five discrete variables were entered into the logistic regression analysis. In the course of analysis, enter method of variable selection was employed.

The model was assessed for its goodness of fit by examining how well the model classifies the observed data (in the classification table) or by examination of how likely the sample results actually are, given the estimates of model parameters (Hosmer and Lemeshow, 1989). The result indicates that (the model chi-square value) the parameters included in the model taken together were significantly different from zero at less than 1 percent level of significance. Thus, the hypothesis set that the entire

coefficient except the intercept was rejected. The value of chi-square ($\chi^2=60.269$) indicates also the goodness of fitted model (Table 24).

Another measure of goodness-of fit in the logistic regression model was seeing how much the observed value is correctly predicted. The fit is considered to be good if the overall-correct prediction rate exceeds 50% (Callet, 1991 as cited in Tilahun, 2008). In other words, the observation is grouped as users if the computed probability of adoption is greater than or equal to 0.5 (50%), and as non-users, otherwise. Based on this, the result showed that about 87.3% of the non-users, and 79.6% of the users were correctly predicted using the cut-off value of 0.5. Overall, the model correctly predicted 84.2 % of the sample cases (Table 24). Thus, the model predicted both user and non-user groups of FPI accurately.

Table 24. Logistic regression estimates of determinants of utilization of FPI

Explanator y variables	Estimated		Wald statistics	Sig. level	Odds ratio Exp(B)
	coefficient(B)	S.E.			
NUMBCH	0.108	0.158	1.144	0.492	1.115
FAMSZPR	-0.790	0.739	9.135	0.002***	2.204
DISCONT	0.173	0.158	1.188	0.276	1.189
LANDHOL	-2.737	0.874	9.390	0.002***	5.442
INFOSEBH	0.310	0.101	4.430	0.023**	0.734
HUSEDU	2.043	1.034	1.511	0.076*	3.001
FERSIDEF	-2.924	0.613	9.800	0.000***	8.619
EXTCONT	1.720	0.562	3.523	0.046**	1.437
IDNCHDE	-0.330	0.269	2.734	0.073*	1.391
DMPCHB	2.065	1.253	0.853	0.864	0.371
CONSTANT	-4.041	1.431	7.973	0.005	0.018
Pearson-x ² value	= 60.269***		df=10		
p=	.000				
-2log Likelihood	=102.030				
Prediction success	=84.2				
Correctly predicted non-user	=87.3				
Correctly predicted user	=79.6				

*, **, *** refers significant at 10%, 5% and 1% probability level respectively

Source: Model output

3.9.1. Explanation of the significant variables influencing adoption of FPI

In previous section, the independent variables were analyzed through descriptive statistics and out of 20 independent variables 10 variables had shown significant mean differences between user and non-user groups. In order to identify potential determining variables, the 10 variables were included into binary logit regression model. Out of the hypothesized ten

independent variables seven were found to influence the use of family planning information among rural women. These are family size preference (FAMSZPR), land holding (LANDHOL), information seeking behavior (INFOSEBH), husband education (HUSEDU), fear of side effects (FERSIDEF), extension contact (EXTONT) and ideal number of children desired (IDNCHDE). These significant variables are discussed in detail in the following section (Table 23).

Family size preference (AMSZPR): Preference on increase in family size of the couple hinders the decision on utilization of FPI, as it is consistent with the prior expectation. Larger family size preference reduces the use of FPI. Negative relation shows the inverse relationship between family size preference and use of FPI and the desire to larger family size reduces the information seeking behavior towards better knowledge and acceptance of FPI. The influence of family size preference on the utilization of FPI is significant at 1% probability level (Table 24). As a result, the model holding other things constant, when family size preference changes from small to large the odds ratio in favor of using FPI decreases by a factor of 2.204. This finding is in line with the findings of Haile (2007).

Land holding (LANDHOL): The livelihood of rural households mainly relies on land for agriculture. The increase in land holding increases the demand for children for a variety of reasons, like labor support on cultivation, weeding, harvesting and threshing. The model result shows that the land holding of the households is associated with the decision to use FPI negatively and significantly at 1% probability level (Table 24). The negative association implies that for one hectare increase in land holding size, there will be less chance for decision to use FPI, which is consistent with the hypothesized expectations. When other things kept constant, a unit increase

in the value of the land holding decreases the odds ratio in favor of using FPI by a factor of 5.442. The increase in the total land holding confirms the households to increase their agricultural income, that enables the family to provide adequate foods and the like to their children, which affects the use of FPI inversely in the study area.

Information seeking behavior (INFOSEBH): This variable was found to influence the utilization of FPI positively and significantly at 5% probability level (Table 24). The result confirms the hypothesis set forth. The implication of positive association was that the increase in information seeking of the women increases the utilization of FPI. When a woman is eager and willing to get information, she will have more chance to have more knowledge that helps to build confidence to use the accessed information. Keeping other factors constant, information seeking behaviour of women increases the odds ratio in favor of using FPI by a factor of 0.734. And this shows that women that have more information seeking behaviour will have more chance to use FPI.

Husband education (HUSEDU): This variable was found to influence the utilization of FPI positively and significantly at 10% probability level (Table 24). This indicates that all other things kept constant, the odds ratio in favor of deciding to use modern FPI increases by a factor of 3.001 for women who has literate husband. As the women possess literate husband, the power relation in the family can be improved and participation in discussion regarding family resources and issues is more relative to illiterate husbands. The result is similar with Haile (2007) and Tilahun (2008).

Fear of side effects (FERSIDEF): The coefficient of this explanatory variable is negative as expected and its influence on the use of FPI is

significant at 1% probability level (Table 24). Keeping the influences of other variables constant, fear of side effects decreases the odds ratio in favor of using modern FPI among rural women by a factor of 8.619 in the study area. Modern birth control methods have their own specific side effects for different women. During group discussion the participants described disturbances of menstrual cycles, more bleeding and weight loss was the common side effects of contraceptives. The appearance of these side effects hinders the utilization of FPI among rural women in the study area.

Extension contact (EXTCONT): The frequency of contact to health extension agents of rural women was found to have significant and positive impact on utilization of FPI at 5% probability level (Table 24). Keeping all other factors constant, increasing the frequency of extension contacts to the rural women increases the odds ratio in favor of using the accessed FPI by the factor of 1.437. Furthermore, the result shows that those women who have more contact with the health extension agents will have more chance to make decision to use FPI than those who do not have less contact. This result agrees with what Tilahun (2008) found out in Adama district's rural women.

Number of children the couple desire to have (IDNUCHDE): It refers to the number of children that the couples need to have in their life time. The variable was found to influence utilization of FPI negatively and significantly, as expected at 10% probability level (Table 24). The result implies that increase in number of children the couples' need to have decreases the chance of using FPI. If the couple ideally needs to have more number of children in their life time, their need/chance to use FPI will be less. When other things kept constant an increase in the value of the number

of children the couple desire to have decreases the odds ratio in favor of using FPI by a factor of 1.391. Having more number of children would add some social and cultural values such as social respect in the community could be the probable reasons for needing ideally more number of children in the study area according to the community leaders and elders explanation during the group discussion.

Conclusion

The study has clearly demonstrated that demographic, socio-economic and institutional factors have influence on utilization and availability of family planning information at rural settings. Among the factors known to limit family size, the level of education of the couples and availability of contraceptives are important. Even under strong traditional imposition there is an indication for women to break the social barrier in order to use contraceptives and limit their family size by having less number of children.

With concerted effort by all stake holders users of contraceptives would be enhanced and family size will be limited to an affordable level.

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Appendix Table 1. Tables of Multicollinearity Test**Appendix Table 1. Contingency coefficients for dummy/ discrete variables**

Variables	RADO	FAMSP	DETCB	NUMW	WIFEDU	HUSED	EXTCO	COSM
RADO	1							
FAMSP	0.062	1						
DETCB	0.294	0.332	1					
NUMW	0.016	0.003	0.179	1				
WIFED	0.116	0.180	0.187	0.071	1			
HUSED	0.219	0.349	0.349	0.111	0.323	1		
EXTCO	0.222	0.343	0.381	0.122	0.169	0.381	1	
COSM	0.190	0.267	0.228	0.156	0.131	0.314	0.191	1

Source: Analysis of own survey data, July 2010

Appendix Table 2. Result of multicollinearity test for continuous variables (N=120)

Variable	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
Cosmopolitaness	.814	1.228
Number of children	.401	2.495
Number of children the couples desire to have	.462	2.163
Woman age	.174	5.733
Duration of marriage	.150	6.655
Wife age at marriage	.603	1.659
Distance from nearby contraceptive centers	.935	1.070
Land holding	.694	1.440
Income	.805	1.243
Information seeking behavior	.855	1.169
Attitude towards family planning	.963	1.039

Source: Analysis of own survey data, July 2010