DIFFERENTIALS IN USE OF CONTRACEPTIVES IN DALE WOREDA, SOUTH ETHIOPIA

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Differentials in Use-Effectiveness

of Contraceptives in Dale Woreda,

South Ethiopia

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DEDICATED TO THE RURAL WOMEN OF ETHIOPIA FOR WHOM THE BELL TOLLS

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LISTS OF ABBREVIATION

CPC	-	Contraceptive prevalence rate
CP	-	Contraceptive prevalence
DHS	-	Demographic Health Survey
FGDs	-	Focus Group Discussions
FGEA	-	Family Guidance Association Of Ethiopia
FP(F/P)	-	Family Planning
H.C.	-	Health Center
H.S.	-	Health Station
Inj	-	Injectable
IEC	-	Information, education, and communication
IUD\IUCD	-	Intra Uterine Contraceptive Device
Oc	-	Oral contraceptives
P.A	-	Peasant Associations
P.S.	-	Project Sites
SSD	-	Site of Service Delivery
WFS	-	World Fertility Survey
VSC	-	Voluntary Surgical Contraception
Y/alem	-	Yirgalem

ABSTRACT

Global population is increasing at an alarming rate and Ethiopia is contributing 1.5 million persons/year. The pyramid shaped age structure of the population as in most developing countries is a prima facie evidence of high fertility and imminent population explosion.

Single and multiple decrement life table techniques were used to analyze pattern of acceptance and use effectiveness of contraceptive methods in Dale Woreda Yirgalem Family Planning Project, Ethiopia. The majority of acceptors (59%) never had formal education. Substantial percentage (79%) of acceptors were in the age group 20-34. Continuation rate was high 94.1% for pill,(97.1%) for injectable,(82.6%) for other methods and (95.1%) for all methods combined. Single decrement life table technique showed that educational status, number of living children and husband's attitudes were found to be important factors for high continuation rates. Focus group discussion identified very poor, and in some cases non existent service as a barrier preventing many clients from using IUDs and VSC.

A relatively high use of contraception by rural areas (62.8%) compared to (36.1%) urban showed a substantial penetration of the rural areas by the program. The paper argues that given the proper time and effort, contraceptive practices may prove effective in controlling population growth rates.

The study concludes by establishing a strong case for a wide and integrated family planning programs that emphasize on effective methods with a high rate of acceptance and continuation.

considerable effort will have to be devoted to increasing the availability of FP services particularly

VSC, IUD, inclusion of Norplant and improving the quality of counselling.

It is recommended that a community based operational research should be conducted to provide strong evidence and substantial conclusion.

1. INTRODUCTION

Global population grows by an incredible 1 million more births than deaths every four days, and human population has exploded five fold in the past century and a half (1). It still continues to increase at an alarming rate and expected roughly to reach 10 billion in 2050 (2). It has been estimated that 97 percent of this increase will occur in the developing world, where more than one third of the population is younger than 15 years,just entering the reproductive years (3,4). When the developing nations are seen by sub-groups, i.e., Asia, Africa, Latin America, etc., "Africa is seen to be the forerunner of the population increase race". Between 1980 and 1989 the fastest annual growth rate was found in Africa (3%) followed by Latin America (2.2%) and Asia (1.9%). This high population growth rate of Africa is expected to continue until 1990-1999 and start decreasing after this period to reach 1.9% in 2020-2025 (5). Such growth will probably be associated with more poor and hungry people; more urban migration , migration to richer countries, and more pressure on the world's reserves of food, water and natural resources (4,5). There is a growing rural to urban migration to top-off the dreadful crowding already existent in major cities of these countries.

Indeed the problem has reached such a proportion that a

recent study grimly concluded that Africa is being falling-off the map for all practical purposes (6).

The state of demographic process in Ethiopia has never been comforting. Ethiopia ranks as the third populous country in Africa and 22nd in the world (7). Ethiopia is currently among the nations with the highest fertility rate, not only in Africa but in the entire world. Ethiopia's population was estimated to be 11.8 million in the year 1900 and was growing at 2% per annum until the middle of the twentieth. In 1989 it reached 49.9 million growing at 2.96% annually with an estimated 7.5 births per women(8).

Currently the population is estimated to be 52 million with a doubling time of less than two decades and it is expected to reach about 67.8 millions by the turn of the century (9,10).

The projection for the year 2015 indicate it would reach 114.4 million by growing at a rate of 3.7% per annum (9,10). The recent acceleration in population growth could be attributed to declining mortality rates and persisting high or even increasing fertility rates. The pyramid shaped age structure of the Ethiopian population, as in most developing countries is a prima facie evidence of high fertility and impending population explosion.

The estimated rate of growth poses a serious

challenge to the nation, particularly in the provision of health, education services, employment, and environmental degradation.

Rapid population increase in rural areas has forced farmers to extend cropping into inhospitable areas that should not even be grazed (11,12,13).

It is clearly shown that over 25% of the population is below 14 years of age with the proportion under 14 years constituting 45.3% of the Ethiopian population with the implication that:

- Birth rates shall remain high for some time even if the mothers have fewer children;
- The increasing number of young people entering the labor force will exacerbate problems of unemployment (14). Poverty, war and their accelerated low levels of education and health, weak infrastructure, and low agricultural land, industrial production exacerbated the problem of over population. Economic decline and stagnation, demand for health and educational services have been increasing ,while savings, investment,and per capita labor productivity have been declining. Urbanization and un employment rates are growing, and the general standard of living of the population has been deteriorating since the 1980's(15).

A recent study has estimated that the percentage of people earning an income level below mere subsistence might reach as high as 73%in Addis Abeba in 1990(16). Considering the interwoven trends of rapid population growth, continued ecological deterioration, declining per capita agricultural production, and rather a huge educational and health service requirements represent an almost insurmountable obstacle to Ethiopia's prospects for future development (13,14). High fertility and very low contraceptive use rate (about 4% in Ethiopia) are specially marked in the rural areas of the country.In the history of the nation successive governments have realized the adverse effect of rapid population growth on the nation's economy yet it is only recently that a population policy was adopted(10). With a broadly based age structure and likely reduction in mortality rates, the presently high population growth rate will continue in the future unless an appropriate and effective population policy is implemented.

Back Ground of The Study Area

High fertility and very low contraceptive use rate are especially marked in the rural areas of the country.In the history of the nation successive governments have realized the adverse effects of rapid population growth on the nation's economy yet it is only recently (July 1993) that a population policy was

adopted.

Modern family planning methods were introduced into the country in 1950's by people who were educated abroad (7).

Gradually as people became aware of the deleterious effect of rapid population growth on the quality of life, of the harmful effect of having too many children or wide spread clandestine abortion have on family health and welfare, the practice began to take roots. The Family Guidance Association of Ethiopia (FGAE) was thus founded in 1966 by volunteers who recognized the above reality, and started to offer F/P services in the capital in a limited scale now the scope and nature of the services provided by FGAE have expanded. As the government realized the value and utility of such services it took over much of the delivery services.

A directive issued by the council of ministers in 1982 stated that, in order to promote the health of mothers and children and in order to enable families to space or delay births, F/P services should be offered in all government owned health facilities as part of the maternal child health care program. Since then, F/P service have expanded tremendously(17). But despite the above rapid growth the CPR is still only 4 %. When one considers the fact that in order to have an impact on population growth the CPR should be at least 40%.

One realizes the difficult task ahead especially in the light of the fact that population continues to grow unabated at the rate of 3.7 per annum. This unfortunately bleak reality that elevated population issues into the fore front and attracted the attention of policy makers.

Family planning program activity in the woreda did start some 15 years back using Yirgalem H.C. It was offered as part of maternal and child health service. However,reasons related to limited resource (shortage of equipment, drugs and contraceptive supplies) and trained man power,resulted in low productivity and unacceptably low quality of service.

An organized and comprehensive F/P project was launched by the Ethiopian Family Guidance Association in collaboration with Population Concern at the end of 1991. The Y/Alem F/P project initially started offering F/P services in a few outlying rural areas of the woreda. Now after two years, the service has been extended to sixteen mobile distribution sites, serving 30,000 married couples (more than 50% of the peasant associations) (18). In general, the project sites, which offer an integrated EPI and F/P service at the village level relies heavily on community level resources and leadership which extend the regular family planning programs by (1) conducting intensive motivational campaigns in selected villages and;

(2) providing family planning services to those motivated following each campaign. A"multi-mix approach" is used in which voluntary surgical contraception (VSC), oral contraceptive, injectable, IUD, condoms and vaginal methods (foam tabs. and creams) are provided. Access to a range of FP sources include hospital, health center, health stations and village level at project sites. The project has remarkable input in strengthening the health institutions by supplying equipment, drug, contraceptives and training of health workers, such as VSC team, MCH/FP nurses and health assistance, which are readily accessible to only limited segments of the population. The inadequate infrastructure of the clinics to carry out the family planning activities, has been supplemented and access to F/P is increased to women living far from health institution. The project provides mobile field workers and logistic support for this effort.

A typical community Family Planning worker of the project teaches F/P through individual contacts, home visits, in church and in other informal gatherings, and gives appointments to women who want to use contraceptives.Once in a month the project health workers go to these areas to do more IEC works and begin F/P services.

The F/P motivator follow up drop outs and do counselling. Some times rural mothers drop out of F/P programs for such reasons as funeral ceremonies, sick children etc. Therefore, this motivator, go to such women and give the pills in person. For repeat cases of injectable clients they provide barrier contraceptives such as condom and foam after they clearly knew the reasons for not coming on the date of appointment. In a way there is assessment also if they can distribute the pills even to new clients.

With regard to improving method mix, as of July 1992 in addition to oral contraceptives and condom. Injectable, IUD and foams are available in the Y/Alem H.C. VSC in Y/Alem Hospital (A missionary affiliated regional referral hospital) in the woreda. The health station and project sites started to offer injectable and foam besides pill and condom as of June 1993. Injectable is going very well both in the urban and rural distribution sites.There is also a very impressive achievement in VSC. The demand for this service is extremely high but sterilization service is far from being easily available for the majority of the population who are needy. The IUD programs in the area also operate under numerous restraints some of which can be eased(18).

This study is an attempt to shed light on the subject in one of predominantly rural area of South Ethiopia where a wide range of contraceptives are available and contraceptive prevalence rate is rising. The anticipated utility of the study is by identifying potential determinants of acceptance, continuation, method changes, and discontinuations which pin points program intervention which can help program managers design more effective counselling and follow up care.

General and Specific Objectives

1. General Objectives

1.1. To analyze the pattern of acceptance and use effectiveness of contraception for the major program segments.

1.2. To identify the barriers to acceptance and use of the two program methods, IUD and sterilization.

2. Specific Objectives

2.1 To estimate the continuation and contraceptive failure rates following acceptance.

2.2. To determine the percentage distribution of FP drop outs by reason after initiating use.

2.3.To describe reasons and extent of changes of contraceptive methods.

2.4.To measure the differentials in contraceptive use effectiveness.

2. LITERATURE REVIEW

Determinants of Fertility

Bongaarts, based on a number of studies has classified the factors that influence fertility directly, which he termed the proximate determinants of fertility (19). The four most important proximate determinants of fertility are:

(1). The use of effective contraception;

(2) The age at first marriage, reflecting the start of regular sexual relations;

(3) Post-partum infecundability (because of breast feeding or sexual abstinence following child birth);

(4)Induced abortion: Other proximate determinants of fertility include infertility levels, the frequency of intercourse, and spontaneous abortion (19).

In Bongaart's framework the effect on fertility of women's education, occupation, income, and social status are termed indirect determinants because they influence fertility indirectly, through one or more of the proximate determinants. Because they are indirect, their relationship to fertility is less easily measured. Although it is more difficult for a survey alone to measure the effect on fertility of social, economic and cultural factors, statistics from other sources on the availability and quality of F/P services, support from family planning programs, the status of women and other

factors can be analyzed together with survey data to understand why fertility falls and how population and F/P programs can contribute to further declines.

High lights of world fertility surveys

In the past two decades changes in the use of family planning have largely determined national fertility trends. Fertility levels have dropped in countries where there have been increases in the percentage of married women of reproductive age currently using contraception. On average, among countries surveyed by the demographic and health survey (DHS), an increase of approximately 15 percentage points in contraceptive prevalence has accounted for a decrease of one birth in the total fertility rates (TFR) (20,21).

Regarding current use of family planning in virtually every surveyed country some combination of the three methods ie. Female sterilization, Oral contraceptives, and IUDs - account for most use of modern methods (20). Voluntary female sterilization is the world's most widely used FP and one of the fast growing. An estimated 138 million women of reproductive age use this method today - 43 million more in a couple of years.The major reason for the growth of voluntary female sterilization in developing countries is expanding services.

Kenya is a prominent example in that female voluntary sterilization has become the most widely used contraceptive method among women aged 30. In 1990 more then 11,000 procedures were performed but, just a few years ago female sterilization was almost un heard of (22). Female sterilization is a very effective contraceptive method. Among the widely used techniques fewer than one women in 100 will become pregnant in 2 years(23). Today nearly 63 million married women throughout the world are using oral contraceptives. Over 60 percent of these Oc users live in developing countries - this represents almost 14 percent of married women. In terms of use effectiveness, all widely available types of pills - combined oestrogen progestrol, progestin only, and multi phasic - are highly effective. Among women using combined oestrogen-progestin OCs correctly, pregnancy occurs in fewer than one in every 100 in the first year of use (23,24). In some developing countries Oc failures have been much higher.For example, according to WFS data from five Latin American countries in the 1970s, the pregnancy rate among Oc users was 8 per 100 women per year, by comparison, the pregnancy rate among IUD users was 5 per 100 (25).

About four million women are recently using some form of long acting hormonal contraceptives. Fewer than one women in 100 is likely to conceive in one year (26).

Norplant implants are a new contraceptive method, hoped to expand the range of FP choices available to women. Currently more than 1.8 million women in 51 countries use Norplant. The IUD also is an important method in some surveyed countries. The IUD is a highly effective method of contraception in large multi center clinical trial of different devices pregnancy rates ranged from 0.5 to about 5 per 100 women per year. By comparison, the pregnancy rate for oral contraceptives was 2.5 per 100 users in developing countries where women are not accustomed to taking a pill every day, IUDs often have lower pregnancy rates than orals (27). For example, using world fertility survey data from five Latin American countries, the unplanned pregnancy rate in the 12 - month interval after marriage or a previous birth was 5 percent for women who had used an IUD at some time during that period, compared with 8 percent for Oc users, 18 percent for condom users, and 40 percent for those using no contraception (28,29).

The use of condom in Sub-Saharan Africa, where overall use of contraception is slim, is less than 1% of married couples(30).

The two methods, male sterilization and chemical method (spermicide)-are used much less than any other methods in the surveyed countries.

Typical pregnancy rates among condom and spermicide users are 10-15, and 18-21 pregnancies per 100 women in the first year of use respectively. The recent findings support the idea that the provision of birth-control methods has the greatest direct impact on fertility rates. Moreover the survey also demonstrated that having an education or living in a city is not a prerequisite for using contraception. In some countries where methods of birth control have become more widely available and interest in smaller families has spread, fertility has declined substantially among rural and less educated women. In Indonesia, where the government family-planning program has tried to reach every couple fertility has fallen among all members of society more equivalently than in many other countries (31, 32). The changes that can be seen in the fertility rates of three Sub-Saharan countries strikingly illustrate this new trend of decline fertility. Traditional beliefs and kin ship systems supported high fertility. Nevertheless, since the 1970s, fertility declined, 35 per cent in Kenya, 26% in Botswana and 18 percent in Zimbabwe.
Despite these differences, Botswana, Kenya, Zimbabwe could represent the vanguard rather than the exception. In Kenya, for example, the culture favors large families. Early attempts to encourage F/P made little progress.

But, a rapid population growth began to put pressure on agriculture land as a result, the appeal of big families diminished.

Better education and rising status of women also promoted a new view of family size. At the same time, strong commitments by the Kenyan government and donor organizations have enabled the country to meet a large part of the demand for contraceptives. Between 1984 and 1989 contraceptive use rose by 59% and the number of children desired declined 24%. Fertility fell by 16 percent (32,33). The availability of effective contraceptives supplies and services gives developing countries an advantage over European societies that experienced the fertility transition earlier.Before modern, effective methods existed, most European societies managed to reduce their fertility through wide spread use of less effective methods such as sexual abstinence and with withdrawals (21).

2.1. Evaluation of Family Planning Programs

Like many other social programs, Family planning has been difficult to evaluate and a variety of approaches have been used. The earliest method was to examine program "effort" or " input" and to obtain a count of the number of new clinics opened, the number of new personnel trained, and the number of new admissions to the program's clinic. These variables were thought to reflect "continuity of service" and accomplishments.

However, determination of the extent of "effort" is of limited usefulness unless one also knows something about the extent of the problem to which the effort is directed and about some of the consequences of this effort (34)

Knowledge Attitude and Practice (KAP) studies even after hundred of surveys completed, were usually addressed to "ever use", and if so, "to which method", "how recently" and to "current" or potential satisfaction. The main purpose of these data was to make the case for F/P program; beyond establishing a generalized need, little was or could be done with it (35).

As Cleland recently noted, these studies have little explanatory power. Whereas the need is for information about what people actually do in specific local situations, without doubt the most influential approach to the study of contraceptive use has been that developed to assess the "use - effectiveness" of specific contraceptive methods and this has supplemented demographic and attitudinal surveys with clinical questions (36, 37).

In addition to information about availability, knowledge and use of contraception, FP programs need accurate information on the dynamics of the contraceptive use, including contraceptive failures and discontinuation rates and the reason behind them. Information about the effectiveness of contraceptives and the extent to which couples abandon or switch methods helps program managers design more effective counselling and follow up care (38). Information on the dynamics of contraceptive use also plays an important role in fertility analysis for example, in countries where most couples want to have small families, contraceptive effectiveness is closely related to fertility levels, particularly where abortions are uncommon. Thus, as Fp planning becomes more wide spread, interest is growing in the measurement of contraceptive effectiveness (39).

The KAP approach has influenced the study of continuation and discontinuation. One curious characteristics of KAP studies has been the distinction between questions about practices on the one hand and attitude on the other, as if they could be neatly separated (31). The issue of continuation discontinuation strikes precisely at this point, for the process by which users adopt, change or stop using a method is a complex and evolving set of actions. Neither demographic categories nor sweeping distinctions of 'practices' and 'attitudes' cope with this. It was quickly realized that 'acceptance' and 'practice' were meaningless unless a part of consistent patterns of continuation. The idea that patterns of continuation also imply patterns of discontinuation has waited much longer to receive attention. It seems impossible to understand discontinuation - continuation in isolation, i.e. with out considering them as a normal part of patterns of contraceptive continuation and discontinuation (40). The physiologic effects of methods such as the IUCD and oral contraceptives, the differing needs of women at different periods of their life cycle, and the diverse influence of culture make it inevitable that there are several such patterns in any contracepting population (41).

Use-Effectiveness Concept and Related Issues

The advent of National Family Planning programs and the expansion of local program have recently created an acute need for accurate evaluation of contraceptive methods. Use-effectiveness in terms of continuation, pregnancy rates and discontinuation of use of the contraceptive methods under study have emerged as the major criteria in such evaluation.

Until the 1970s there was little information available on the effectiveness of contraceptive practice. In recent years, the subject has received more attention: contraceptive effectiveness has become a more important determinant of fertility because of rising contraceptive prevalence, decreasing desired family sizes and the in availability of abortion in many developing countries (42, 43). Given the limited and perhaps dwindling resources for financing contraceptive services in developing countries, the answers to important questions like why do some women stop using a method, while others still continue and how often and why do they switch method, how do changes in their contraceptive behavior affect the risk of an unintended pregnancy maybe understood through the analysis of use effectiveness(43).

A comparison of the effectiveness of a contraceptive method with that of other contraceptive methods requires consideration of the difference between the theoretical effectiveness and use effectiveness. The comprehension of these concepts will help to dispel the confusion which sometimes occurs when the effectiveness of contraception is discussed.

The theoretical effectiveness reflects the assumption that the method is currently used according to instructions. It is the measure of protection against unwanted pregnancy afforded by a specific contraceptive method under ideal conditions i.e., used consistently and correctly according to instructions without omissions or errors of technique. Such ideal conditions are rarely present.Even when there are, it is not possible to observe and verify them (44).

The use effectiveness of a method is the measure of protection achieved by a group of couples using contraception more or less with care and skill. Use effectiveness reflects a theoretical effectiveness but is necessarily modified by the nature of the human population concerned. Use-effectiveness is generally higher for the same method among the more intelligent and better educated segments of the population than among, the back ward and underprivileged.

It is higher among couples seeking contraceptive advice on their own initiative than among those who have been persuaded to attend a clinic (44). The use effectiveness of a method may be expected to be significantly lower than the theoretical effectiveness of the same method if periodic action is required regardless of whether or not such action is coitus related. With such methods, the theoretical effectiveness may be inferred from the level of use-effectiveness that are achieved by the most successful groups of highly motivated users. With quasi - permanent methods such as IUD, use effectiveness tends to approach the theoretical effectiveness, since the method requires neither daily nor any manipulation at all before, during, or after intercourse (42, 27, 44).

In terms of theoretical effectiveness, IUDs are less reliable than oral contraceptives if the latter were taken according to the combined or the sequential regimen. The IUDS are probably not more effective than the diaphragm or condom if the conventional forms of contraception are used correctly.

When it comes to use-effectiveness in clinic patients, how ever, the IUDs, have proved far more reliable than the traditional methods and only sightly less reliable than injectable contraceptives (27, 44).

increasing attention is being directed to the question of how successfully additional pregnancies are prevented once a certain contraceptive method has been accepted by a group of women.

It has been suggested that although a contraceptive method may be effective in preventing pregnancies, if it is not acceptable (e.g., because of inconvenience of use or prevalence of side effects), discontinuation may be frequent, resulting in unintended pregnancies for which, to a certain extent the method should be held responsible (45). The objective of extended use effectiveness approach is to find out whether or not a woman had become pregnant intentionally or unintentionally, after accepting contraceptives.

The unintended pregnancy that occurs after discontinuation is attributed to the contraceptive method on the ground that, had the method been satisfactory, a woman exposed to the risks of unintended pregnancy would not have discontinued use. The extended use failure in some way may be similar to a contraceptive failure during use. In the other, the woman gets pregnant after she has discontinued the method and has not yet adopted another. In both cases, the method has "failed". In the second case, the method she continued failed because the woman did not like it, she could not use it, or she abandoned it for whatever reason.

Indeed, when we look at the women who experience the second type of failure after their pregnancy they behave very much like women who got pregnant while using a method. Both are a little less likely to return to the method they abandoned, didn't immediately start another method and left them selves exposed to the risk of unintended pregnancy (46). The success of any contraceptive method depends not only on its effectiveness in preventing pregnancy but on the rate of continuation of its use which in turn depends on all these factors which may promote or discourage continued reliance on the method, including the availability and access to alternative forms of contraception, and age, parity, socio-cultural and other demographic - characteristics of the user. The relative rates of continuation for various contraceptives can not be assessed accurately because no studies have been reported in which the various methods were offered to comparable populations in comparable circumstance. Fragmentary evidence suggests that in the lowest socio economic group with minimal education, rates of continuation are higher with the IUDs than oral compounds, but adequate information about non clinic patients is not available (39, 42).

In a nut-shell use-effectiveness of contraception has two basic dimensions, continuation and effectiveness. Effectiveness is the average extent to which natural fecundability; the woman's monthly chance of conception during a fecundable month, is reduced by use of the contraceptive. Continuation relates to the number of months she practices it. A perfectly effective contraceptive can offer but limited protection, if practiced only a few months. An inferior method used with complete consistency is far better than an effective method used irregularly. Given the high effectiveness of modern contraceptives, the continuation aspect becomes crucial.

Use and extended use-effectiveness of a contraception is conventionally assessed by means of a multiple and or a single decrement life table techniques (Appendix c).

The methods of analysis applied to the continuation rates must take cognizance of the correlations encountered in the review of client characteristics. Thus it is insufficient to simply measure, for example, the relationship between the age of the contraceptor and her likelihood of continuing participation, for age may in turn be related to method related factors such as the mechanism of action and route of administration of the contraceptive being used, the timing of contraceptive

regimen, the method's side effects, and the type of instruction and support the acceptor receives. It is possible that various client - related factors may also influence the likelihood that a woman will use a contraceptive method correctly.

Some of the client related factors in using a contraceptive method are, her educational status, and her psychological orientation to sex and contraception, and some other factors contribute to the likelihood of continuation (47).

From an analytical standpoint therefore, we must first identify a series of independent variables that reflect the characteristics of the population being served; then we must introduce a dependent variable - probability of program continuance in a prescribed time period - and relate this variable simultaneously to the several critical independent variables

4. MATERIALS AND METHODS

1. Study design

This is a retrospective study of the contraceptive experience of acceptors in Dale Woreda. The study also included Focus Group Discussions to identify the barrier to acceptances of IUD and VSC

Study area : The study area, Dale Woreda is one of the nine woreda's in Sidama Zone,with a population slightly more than 300,000 and covers roughly 1500 sq km with a population density of 208 per sq km(48).

3. The Study Populations and Period Under Study

All acceptors of various contraceptive methods in Y/Alem Health Center, Health Stations and project sites, during the period July 1, 1992 (H.C.) and June 1, 1993 (H.S. and Project Sites) to 31 Dec. 1993 were included in the study. This made the study period 18 months for the (H.C.) and 6 months for the (H.S. and project sites) acceptors. The samples of the client group for the FGDs were drawn from rural and urban acceptors of FP methods, similarly samples were drawn from providers and related health personnel with VSC and IUCD delivery services.

4. Definition of terms

1. Multi-mix methods : modern contraceptive methods including VSC, Oc, IUD, condoms, and vaginal methods (foam tabs and creams)
2. Acceptance rate(percentage distribution of acceptors by a characteristics) - is the number of acceptors per 100 married woman, as data permit.
3. Continuation rate - measures the probability that a woman who accepts a method of contraception will still be protected at the end of a particular ordinal month following acceptance.
4. Pregnancy rates - Two kinds of pregnancy rates are considered:

a) Cumulative first method failure rate - is the proportion of acceptors who became pregnant during the specified time period while using the first method.

b) The overall post-acceptance pregnancy rate - the proportion of acceptors who became pregnant during a specified period of acceptance , during or after use stopped.

5. "Differentials in continuation and pregnancy rates" refers to the determinants in the continuation and pregnancy rates of the various independent variables selected.

6. "Contraceptive use segment" is a period of time during which a woman's contraceptive use or non-use status doesn't change. For example, a pill use segment that is seven months long is seven months of continuous pill use, preceded and followed by some thing else.

7. Method change - the change from the use of one method to another.

There were four types of segments in the data set:

(1) became pregnant while using the method and subsequent to use stopped; (2) stopped to get pregnant and (3) non - use of the method due to non-pregnancy related reasons(4) continuing use (active users).

Measurement

5.1. Study Variables

The major independent variables identified in this study were:

type of method accepted,age of client,number of living children,and desire for additional children at the time of acceptance.

The dependant variable introduced for measurement were: Continuation and pregnancy rates which include first method continuation , first method use failure rate and over all post acceptance pregnancy rate (extended use effectiveness rates).

Acceptance rate is calculated by dividing the number of acceptors in a sub group to total number of acceptors, and multiplying by 100.

Data Collection

Two sets of complementary data necessary for a proper analysis were collected using review of records and follow-up survey (see Fig 1). The data collected by the review of the client records were:

The current birth control method of the acceptor; duration of contraceptive use, and the change over time in their contraceptive preferences. House to house visit to the above clients allowed to collect the missing socio-demographic characteristics and the terminal status (use, dis-use).

3. Conduct of the Study

Before interviewing in an area was begun, and again during subsequent supervisory trips, visits were paid to local leaders to explain the nature and purpose of the survey. District officers, chiefs,sub chiefs,elders and local religious leaders, local politician, and many others were approached.Receptiveness and help from this group were given with remarkable generosity. The individual case card of acceptors which were included in the study were reviewed by the principal investigator and his assistants (Figure 1) and these acceptors were identified, followed up and were located in their respective urban and rural areas. With an excellent cooperation and active participation of kebeles and P.A leaders, a total of 60 enumerators were selected from each kebele and P.A. Project staff and head of health stations under study were recruited mainly for making spot checks on the work of enumerators, editing as will as preparing data sheets for completed questionnaires. Before launching the field survey a two day training program was organized for supervisors and enumerators. The training included class room discussion, mock interviews and actual field practices in filling out the questionnaire in selected areas. The field work started in the first week of March 1994, immediately after the training of field staff and was completed by the mid of

March 1994.

Continuous monitoring and supervision was made by the researcher during the study life-span.

To facilitate FGDs topic guides was prepared by the researcher and given to the moderators. As members of the research crew the Y.alem FP project supervisor (moderator of the FGD) held series of discussions with the male clients, while the project counsellor conducted the FGDs with female clients under both settings and the researcher conducted the FGDs with the provider group. The FGD began with general topics and moved to specific topics. Each of the settings was to include five groups making a total of 15 groups and 45 participants.

Fig 1

Procedures for Locating Study Subjects

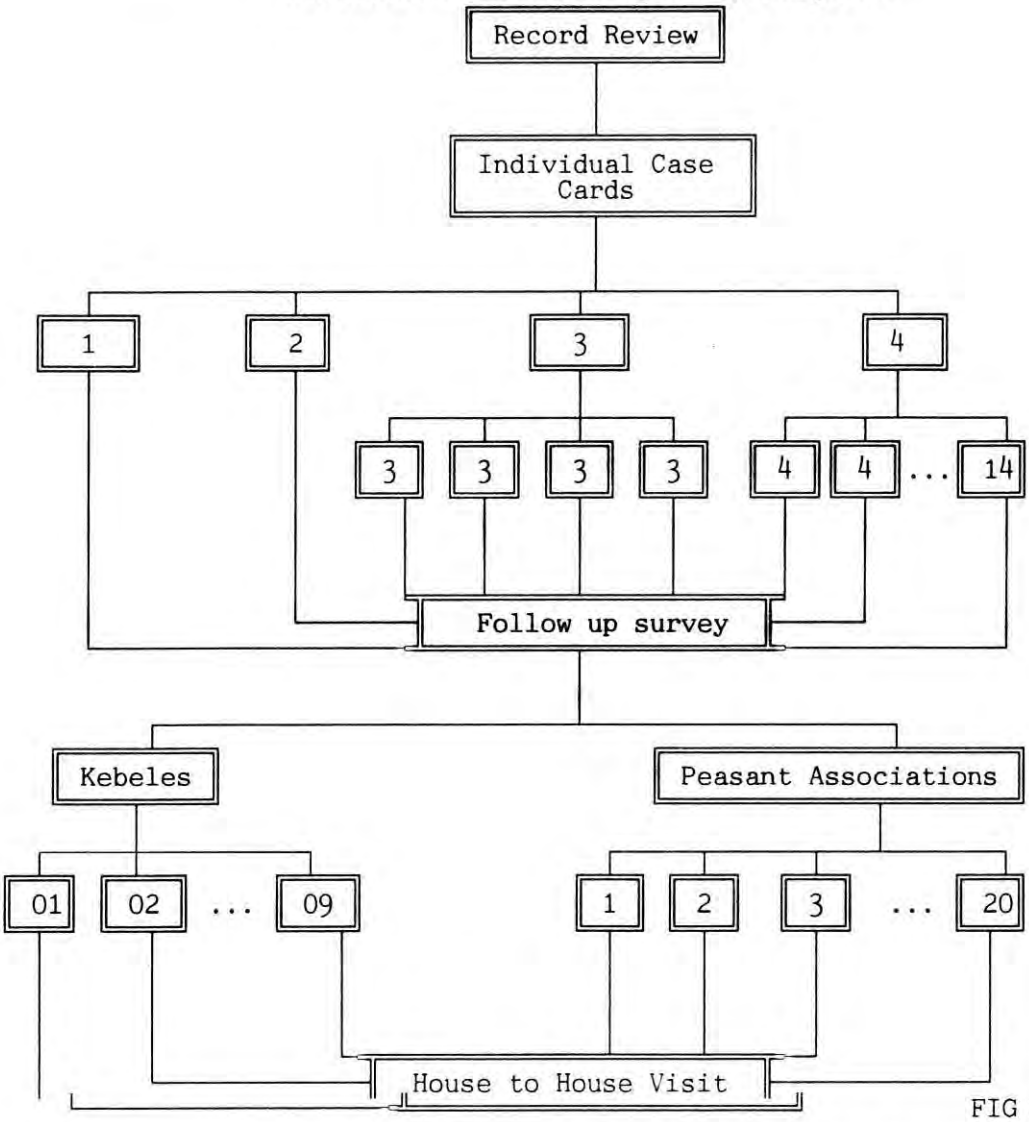


FIG 1

KEY 1 = Hospital, 2= H.C, 3= 4 H.C 4 = 14 P.S

A total of 9 kebeles and 20 peasant associations.

Data Management and Analysis

Data entry, and clearing was made by using EPI INFO version- 5 statistical package. Acceptance rate, percentage distributions of causes of terminations, regression analysis of certain variables with duration of use were also performed by using EPI-INFO statistical package. The life table computation were done using QUATTRO PRO computer program. The life table approach was for measuring the relative efficacy of different methods of contraception, controlling for the duration of use and regression analysis to corroborate whether different risks of contraceptive failures were associated with a woman's socio-demographic characteristics.

Outline of Analysis

The analysis is organized in four sections: The first section analyses the acceptance rate which measured under-or over-representation of acceptors in categories of a characteristics.

The second section focuses on the use effectiveness of a contraception in terms of post acceptance continuation and pregnancy rates. This include comparisons of duration of use of different contraceptive and of the risk of pregnancy during and after use stopped. For this analysis, a data set was created, in which the observation were segments of use or non use.

With regard to pregnancy rate, several pregnancy rates have been used to evaluate post acceptance performance; use - failure, extended use-failure and method failure but in this section rates based on the concept of use - effectiveness are presented: the first method failure rates and the over all post-acceptance pregnancy rates.

The third section deals with causes of terminations of first method and these have been classified into the following categories: side effects, health and medical reasons, unintended and intended pregnancies and personal

reasons (inconvenience, lack of need).

The last section focused on two rates - the combined all method continuation and over all post acceptance pregnancy rates. This is an attempt to find out how differences, in the demographic and other back ground characteristics of women using different methods affect women's general patterns of continuation and failures.

5. RESULT

1. Loss to Follow up and Acceptor Count Validity

During interviewing, the primary sample of 2404 cases were reduced by 184 cases: 15 acceptors had died, 78 respondents were found to be the same persons (acceptance duplication) and the rest 91 respondents claimed never to have accepted FP (see table 1). Of the remaining 2220, 2055 were successfully interviewed and 165 (7.4%) cases were lost to follow up .

The distribution of modern contraceptive methods by site of delivery is shown in table 2. Oral contraceptives were the most commonly used method constituting 1494 (69.7%). Injectable contraceptive accounted for one- third, VSC and IUD close to 2%. The two barrier methods , condoms and foams were used much less than any of the other methods(both less than 1%). Rural areas under the catchment area of the H.S and P.S had a some what higher acceptance level than urban areas under the H.C (62.8% compared with 36.1%).

Table 1. Distribution of Sample and of Cases Lost to Follow up by SSD and method. Dale Woreda 1994.

Items	Total	Hospital Vsc.	Health Center Pil	Inj.	IUD	Condom	Foam	Health Station Pill	Inj	Condom	Foam	Project sites Pill	Inj.	Condom	Foam
Primary sample[1]	2404	23*	606	232	24	11	8	489	182	3	0	600	245	2	5
▮ Acceptance duplication	78	-	10	18	-	-	-	5	7	-	-	30	9	-	-
▮ Never accepted	91	1*	60	5	-	10	-	2	-	-	-	13	-	-	-
▮ Deceased	15	-	6	1	-	-	-	3	-	-	-	5	-	-	-
Secondary sample[2]	2220	22*	529	206	24	1	8	479	175	3	0	552	236	2	5
▮ Completed interview	2055	9*	435	204	8	1	8	460	172	3	0	528	229	2	5
▮ Lost to follow up	165	13*	94	2	16	0	-	19	3	-	-	24	7	-	-
Percent lost to follow up	7.4	59*	17.7	0.9	66.6	-	-	3.9	1.7	-	-	4.3	2.9	-	-
Distribution of cases lost to follow up by reasons															
▮ Refused interview	32	-	6	-	-	-	-	14	3	-	-	3	6	-	-
▮ Un known at stated address or address unclear	47	-	34	-	6	-	-	-	-	-	-	7	-	-	-
▮ Moved from stated address or located far away from program area	56	-	38	2	8	-	-	4	-	-	-	4	-	-	-
▮ Not at home (temporary absence)	30	-	16	-	2	-	-	1	-	-	-	10	1	-	-

1)Primary sample = the number of acceptors identified by review of records

2)Secondary sample= the adjusted number of acceptors following follow-up survey

* VSc cases were not included in the computation.

The prevalence of contraception by selected socio - demographic characteristics, is presented in tables 3 and 4. A substantial percentage of acceptors 1140 (79%) belong to the age groups 20 - 34. Seventy two percent of all acceptors had living children of more than three at the time of accepting a method. Majority of acceptors (58.4%) never had formal education nor completed primary school. Religious back ground seem to play important role in the rate of acceptance. Nearly 85% of all acceptors were christians, with protestants making up the 65% Orthodox 14%, Catholic 6%, and Muslim 8%. The motivator, current users and the H.I were the chief sources of information in arousing contraceptive awareness, and thus acceptance was as high as 59.2%, 17.8% and 20.8% respectively. More than 82.6% acceptors never used contraceptive method before accepting in the program. Acceptors' husbands were generally favorable in 88.4% of cases, unfavorable 8.5% and indifferent in 3.1% of cases.

Table 3. Current Use of Contraception Among Married Women of Reproductive Age by Method and women's Characteristics.Dale 1994.

Characteristics	Pill n=1428 # (%)	Injectable. n=601 # (%)	Other n=26 # (%)	All method n=2055 # (%)
I. Age Group				
15 - 19	145 (10.1)	15 (2.5)	8 (30.8)	168 (8.2)
20 - 24	414 (28.9)	87 (14.5)	6 (23.1)	507 (24.7)
25 - 29	474 (33.2)	214 (35.6)	5 (19.2)	693 (33.7)
30 - 34	252 (17.6)	163 (27.1)	3 (11.5)	418 (20.3)
35 - 39	119 (8.3)	104 (17.3)	4 (15.4)	227 (11.0)
40 +	24 (1.7)	18 (3.0)	0 (0.0)	42 (2.0)
II. No of Living Children				
None	46 (3.2)	4 (0.7)	3 (11.5)	53 (2.6)
1 - 2	466 (32.6)	36 (6.0)	5 (19.2)	507 (24.7)
3 - 4	425 (29.8)	152 (25.3)	8 (30.8)	585 (28.50
5 - 6	301 (21.1)	184 (30.6)	5 (19.2)	490 (23.8)
7 - 8	143 (10.0)	151 (25.1)	4 (15.4)	298 (14.5)
9 - 15	47 (3.3)	74 (12.3)	1 (3.9)	122 (5.9)
III. Education				
No formal education	834 (58.4)	373 (62.1)	5 (19.2)	1212 (59.0)
Grades 1 - 6	365 (25.6)	148 (24.6)	6 (23.1)	519 (25.3)
" 7 - 8	152 (10.6)	53 (8.8)	7 (26.9)	212 (10.3)
" 9 - 12	69 (4.8)	24 (4.0)	8 (30.8)	101 (4.9)
" 12 +	8 (0.6)	3 (0.5)	0 (0.0)	11 (0.5)
IV. Religious Affiliation				
Protestant	942 (45.8)	385 (64.1)	11 (42.3)	1338 (65.1)
Orthodox	189 (13.2)	81 (13.5)	14 (53.8)	284 (13.8)
Catholic	81 (5.7)	36 (6.0)	1 (3.9)	118 (5.7)
Muslim	91 (6.4)	43 (7.2)	0 (0.0)	134 (6.5)
Other*	125 (8.8)	56 (9.3)	0 (0.0)	181 (8.8)
V. Source of Information				
Users	245 (17.8)	85 (14.1)	5 (19.2)	335 (16.3)
Motivations	845 (59.2)	367 (61.1)	14 (53.8)	1226 (59.7)
Husbands	27 (2.0)	12 (2.0)	1 (3.8)	40 (2.0)
Visit to H.I for other reasons	311 (20.8)	137 (22.8)	6 (23.1)	454 (22.1)

* Pagan, Heathen . H.I = Health Institution

Table 4. Percentage Distribution of Acceptors by Selected variables.Dale 1994.

Variables	Number	Percent
Husbands attitude		
Favorable	1817	88.4
Unfavorable	174	8.5
Indifferent	64	3.1
Working status		
Working	184	9.0
Not Working	1871	91.0
Previous contraceptive experience		
Yes	358	17.4
No	1697	82.6
Type of marriage		
Monogamous	1721	87.7
Polygamous	334	12.3
Reason for contraception		
No more child wanted	299	14.5
Wanted more but later	1715	83.5
Other*	41	2.0
Period contraception started		
Post - partum	1517	73.8
Post - abortal	68	3.3
Interval	470	22.9
By distance and time to travel kilo meter (km)		
0 - 2 km	1440	70.1
3 - 5 km	456	22.2
6 +	159	7.7
Time (hr)		
Less than 1 hr	1606	78.2
2 hours	337	16.4
3 hours	112	5.5

* Group of women with no living children but would like to postpone child bearing

USE EFFECTIVENESS OF A CONTRACEPTION.

1. First - Method Continuation Rates

The overall first - method continuation rates of the different types of contraception is presented in figure 3. It was higher among those who were on injectable than those on pills. First method continuation rate of the different contraceptives combined were 98.4 per 100 acceptors during one year period.

Pregnancy Rates

1. First - Method Failure Rate

It is shown in Figure 4 that the pregnancy rate 12 - month after acceptance was 1 percentage point more for the pill acceptors than for injectable acceptors and the all method use failure after 12 month was 1.6%.

2. Over All Post - Acceptance Pregnancy Rate (Extended use effectiveness rate)

The effect of the difference in continuation rates on the overall post acceptance pregnancy rates of the three methods is shown in Figure 5. During the first six month after acceptance, the overall post acceptance pregnancy rate among pill acceptors was about four times higher than that of injectable and much lower than other methods. By the end of first year the difference has narrowed so that the rate for the pill was about twice that for injectable. The all method combined continuation and pregnancy rates also followed same pattern (fig 6).

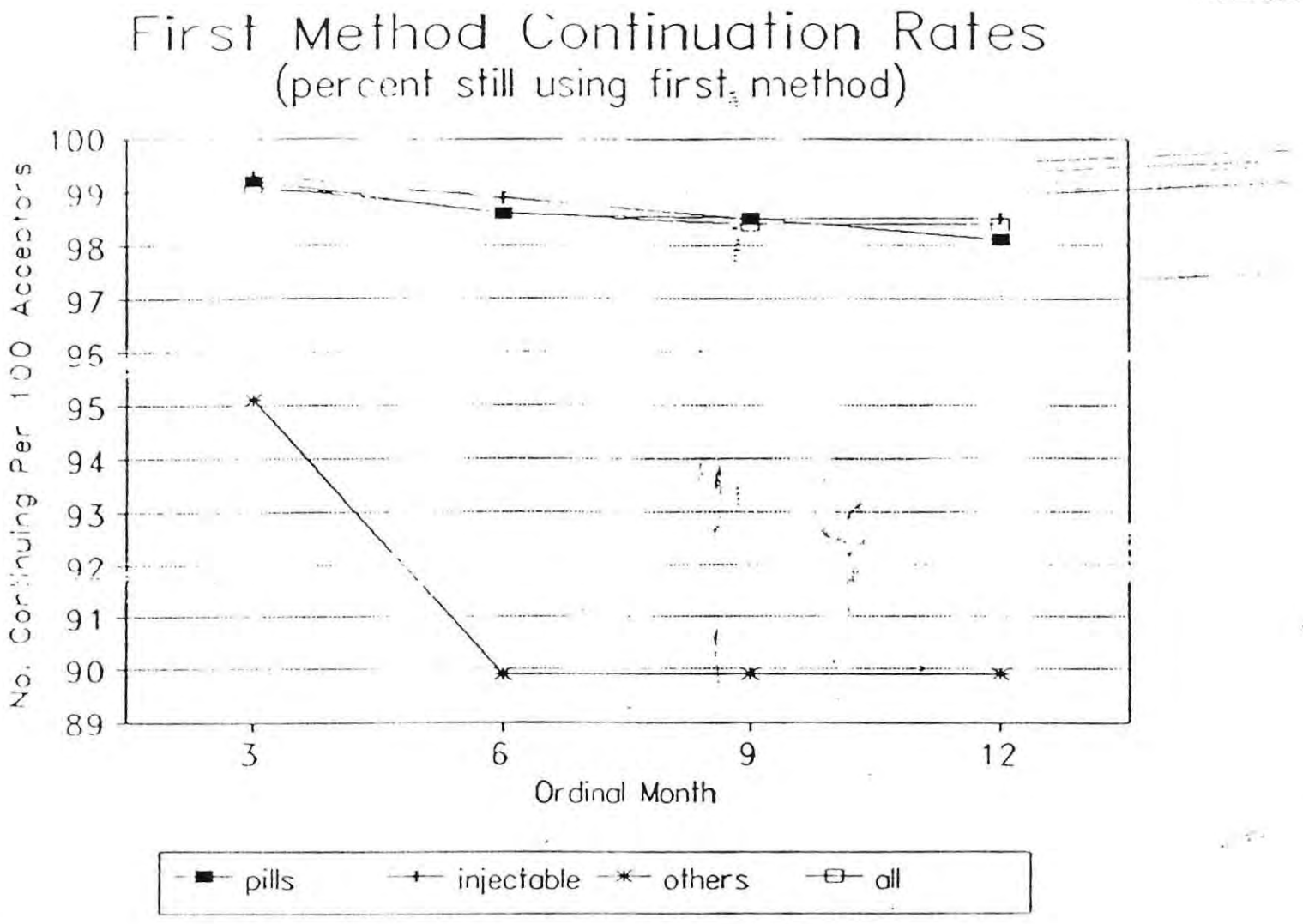
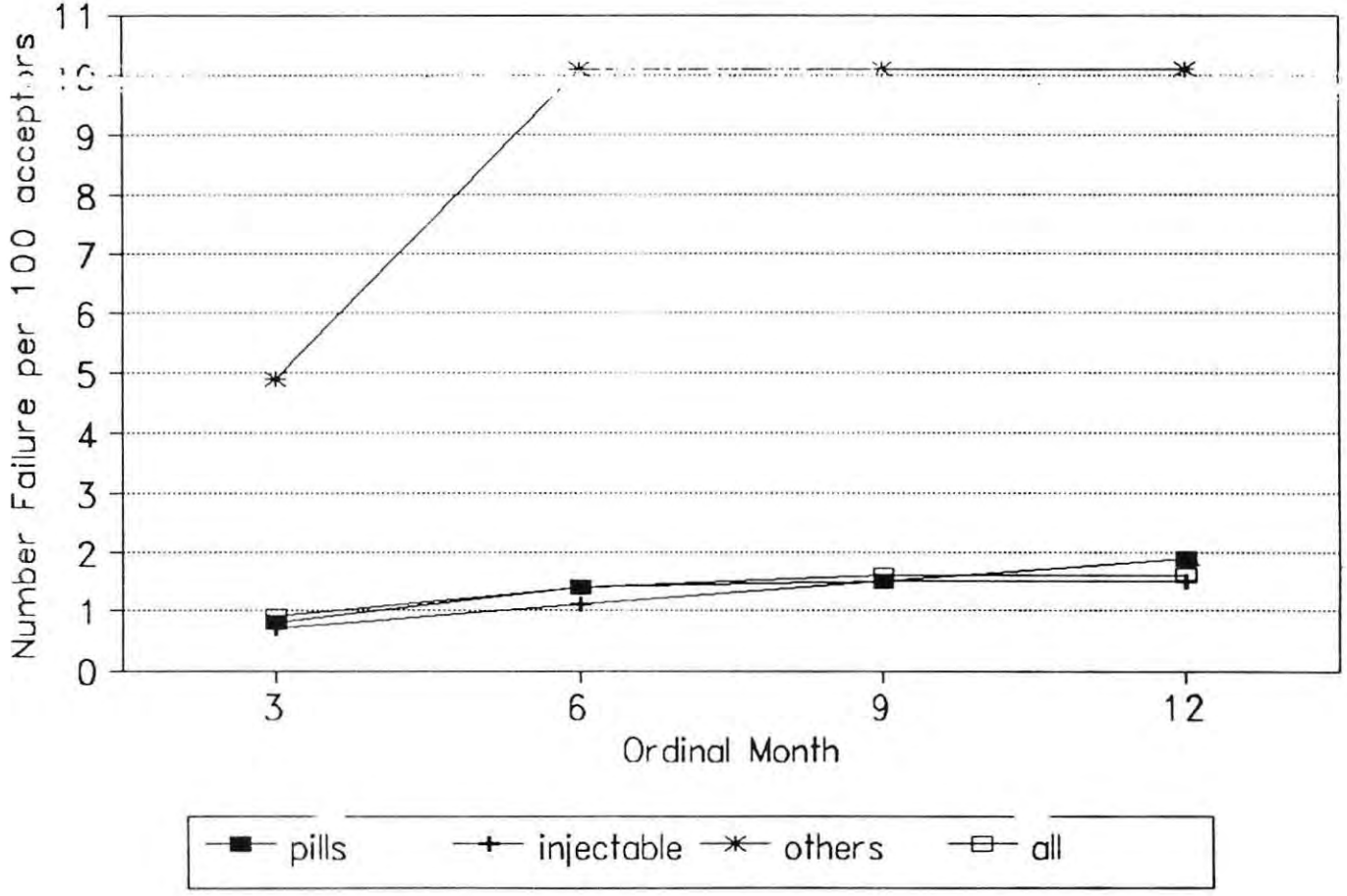
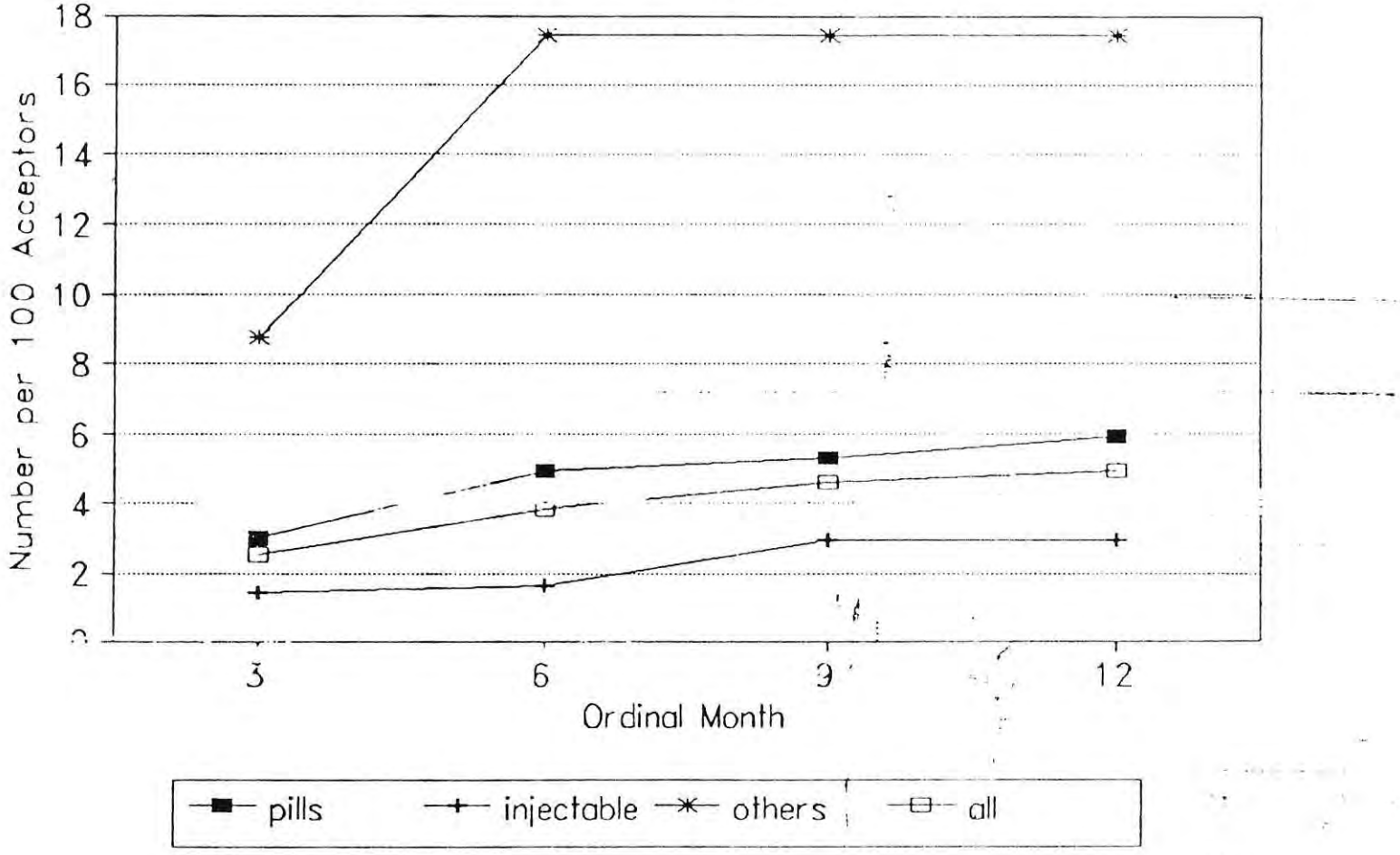

First Method Continuation Rates
(percent still using first method)
No. Continuing Per 100 Acceptors
100
99
98
97
96
95
94
93
92
91
90
89
3
6
9
12
Ordinal Month
pills
injectable
others
all

Fig 2

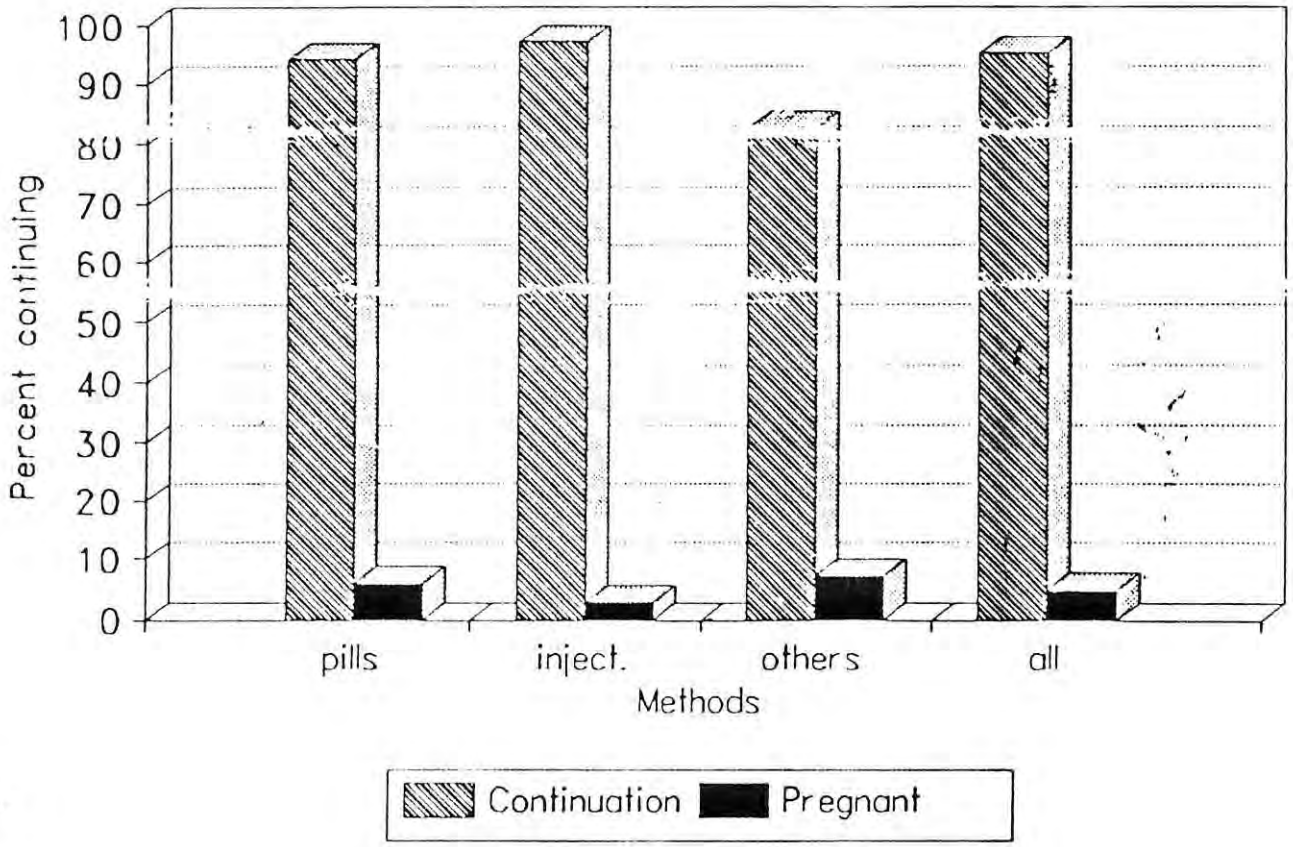
Cumulative First Method Use Failure
(percent becoming pregnant)



Cumulative Overall Pregnancy Rate
(percent becoming pregnant)



All Method Combined Extended Use Effect
(percent becoming pregnant)



Figs

Reasons for Discontinuing the First Method

As can be seen from Table 5, for pill and injectable contraceptives, the primary causes of termination were side effects and health reasons (accounting 38.7 and 32.9 percents of the total terminations respectively). The major reason for terminating of other method was lack of cooperation by husbands (38.4 percent). The most common side effects encountered for pill were dizziness and abdominal discomfort and for injectable heavy vaginal bleeding and scanty menses. The second most common reason for termination was pregnancy (planned) for the two methods (pill (28.6%) and other method (23.0%)) and lack of need (19.3%) and pregnancy (12.9%) by the injectable contraceptive (see Table 6).

Method changes and reasons of discontinuing all method

From the first method drop outs less than half had changed methods (table 6). About 95 percent of the pill acceptors who had changed method accepted injectable, while about one third of other method users changed to injectable while more than half of the other method users changed to pill (64.7).

The net effect of these shift in method was that the most recent method among shifters as a whole was likely to be injectable (75.9%), pill 19.1% and other method (4.9%).

Table 7 revealed the reasons for termination of the most recent method to be different with the first method. The major reasons of terminating the first method were side effects and pregnancy (32.7 and 26.6), where as the main reasons of terminating the most recent method were lack of need and pregnancy(51.2 % and 30.2) and (32.7 and 26.6%) respectively.

Table 5. Percentage Distribution of First - Method Dropouts, by Reason for Terminating by Method Accepted.Dale 1994.

Reason for termination	(n=398)	Pill (n=62)	Injectable (n=13)	Other (n=473)	Total
Side effects, medical reasons	32.9	38.7	0.0	32.8	
Pregnancy (accidental)	11.0	8.0	23.0	11.6	
Wanted another child	28.6	12.9	23.0	26.0	
Husband objected, uncooperative	14.8	14.4	38.4	16.0	
No need (widowed, separated)	11.8	19.3	15.3	9.9	
Others*	0.7	6.4	0.0	2.9	

Others* inconvenience and clinic related factors

Table 6. Percentage Distribution of Acceptors, Who Changed Methods by Most Recent Method, Controlling for Method First Accepted, Dale 1994.

	First Method			
Most recent Method	Pill (n=123)	Injectable (n=22)	Other (n=17)	Total (n=162)
Pill	0.0	90.9	64.7	19.1
Inj	95.1	0.0	35.2	75.9
Other	4.8	9.0	0.0	4.9

Table 7. Percentage Distribution of F/P Drop Outs, by Reasons for Terminating Most Recent Method and First Method.Dale 1994.

Reason for Termination	Most recent method (n=162)	First method (n=473)
Side effects, medical reasons	6.8	32.7
Pregnancy (Accidental)	30.2	11.6
Wanted another child	9.3	26.6
Husband objected	2.5	16.0
No need	51.2	9.9
Other*	0.0	2.9

Other*Inconvenience and clinic related factors

Differentials in Continuation and Pregnancy Rates

The following independent variables as computed by single decrement life table techniques showed the continuation rates to be high in the age group 25-29, in women of having more than 3-4 children, has an educational attainment of seventh grade and above. And it was also higher where the husbands' attitude were one of indifference and favorable and in working mothers in those who wanted no more children than who wanted more.

There was significant association between duration of use and educational status, husband's attitude and parity.Table 6.showed the significance level as indicated by the high partial statistic F value (see table 6).

Table 8. Regression analysis by education, parity and husbands attitude effect, Dale 1994.

EDUCATION EFFECT

Source	df	Sum of Squares	Mean Square	F-statistic
Regression	4	251.8475	62.9619	6.79
Residuals	2050	19011.0498	9.2737	
Total	2054	19262.8973		

B Coefficients

		B	95% confidence		Partial	
Variable	Mean	coefficient	Lower	Upper	Std Error	F-test
Grade 1-6	0.2526	0.3529779	0.039869	0.666087	0.159750	4.8822
Grade 7-8	0.1032	-0.0427486	-0.487091	0.401594	0.226705	0.0356
Grade 9-12	0.0491	1.5404290	0.922267	2.158591	0.315389	23.8556
Grade 12+	0.0054	0.3316082	-1.476181	2.139397	0.922341	0.1293
Y-Intercept		3.1229373				

PARITY EFFECT

Source	df	Sum of Squares	Mean Square	F-statistic
Regression	5	138.5255	27.7051	2.97
Residuals	2049	19124.3718	9.3335	
Total	2054	19262.8973		

B Coefficients

variable		B	95% confidence		Partial	
[children]	Mean	coefficient	Lower	Upper	Std Error	F-test
2-3	0.0258	0.6026222	-0.261729	1.466974	0.440996	1.8673
4-5	0.2847	0.3681439	0.005000	0.731288	0.185278	3.9481
6-7	0.2384	0.1503696	-0.228783	0.529522	0.193445	0.6042
7-8	0.1450	0.6955689	0.258645	1.132493	0.222921	9.7360
9-15	0.0589	0.7780471	0.172317	1.383778	0.309046	6.3382
Y-Intercept		2.9822835				

HUSBAND ATTITUDE EFFECT

Source	df	Sum of Squares	Mean Square	F-statistic
Regression	2	158.9036	79.4518	8.53
Residuals	2052	19103.9937	9.3099	
Total	2054	19262.8973		

B Coefficients

		B	95% confidence		Partial	
Variable	Mean	coefficient	Lower	Upper	Std Error	F-test
Favorable	0.0803	0.3900763	-0.095989	0.876141	0.247992	2.4741
Indifferent	0.0273	1.6115049	0.800233	2.422777	0.413914	15.1580
Y-Intercept		3.2099237				

RESULTS OF THE FOCUS GROUP DISCUSSIONS

According to the FGDs held with the VSC sampled client groups, both the women and husbands' reaction was generally favorable. By and large the women who have undergone VSC were very positive about their experience. Most reported no change or a change for the better in their health. On woman reported of having an irregular bleeding after she had the operation. A large majority responded positively to the question "do you recommend the method to others?"

The women group who failed short off getting the VSC had a favorable attitude towards VSC. A woman from this group told about her tragic experience; how her operation was canceled in two occasions after she had been put on nothing per OS (not to eat any thing). In the group women and men believe that VSC should be reserved in case of health problem or if the women have a problem in using any of the other methods available.

Many couple in both settings had similar views about VSC. It is the last in the series of contraceptive methods that they would use as they move from spacing their children to ending fertility. Until completion of family size (5-6 children) the other methods available were considered satisfactory.

Two women from the rural group, expressed their strong feelings towards VSC by saying, that they want " a completely birth stopping contraceptive " and if the service were to start right here, many women including themselves would accept. Other reasons for not using VSC was related to the fear of operation which they might end in death or in not been able to regain full health after the operation. They further held the idea that the operation may expose the " infertile surface " which might lead to many new illnesses.

The VSC provider group pointed out the main reason for lack of VSC service to be shortage of facilities and inadequate preparedness to carry out the program in the hospital. From the outset VSC was not accepted as part of the hospital routines. The hospital management gave no support to the conduct of VSC and as a result many operations were canceled and other requests were categorically rejected. The magnitude of the problem was exacerbated when the VSC doctor left the hospital with out being replaced by trained VSC Doctor. Other contributory factors to low performance were lack of separate VSC operating room, time, supporting staff and lack of incentives in various forms to the VSC team members by the responsible organizations.

The FGDs for identifications of barriers to the use of IUD as envisaged by the IUD provider were as follows:

The very high prevalence of sexually transmitted and pelvic inflammatory diseases (STD, PID) in the area have discouraged the provision of IUD to clients whose choices were IUD. Women were denied IUD if they had STD and PID. The prohibitive cost for laboratory examinations and a course of treatment that follow for STD and PID; coupled with the un willingness to allow pelvic examination and unfamiliar clinical procedures such as speculum examinations and swab taking which were offending to most of the clients have led to the rejection of the method. The availability of other alternative contraceptives which involved less embarrassing medical examination and without incurring any cost also had their own contributions.

From the client group, particularly the rural women stated that lack of access and unavailability of service near by, high cost of various expenses and the uncaring attitude of the health workers were the reasons for staying away from the service.

Most women using injectable reported if they had access to IUD as they have now for other, they would go for IUD. Some of the fears that prevented both urban and rural women from using the method were:

IUD can ascend up and enter the intestine and cause intestinal diseases, displacement of an IUD outside the uterus is common and dangerous, pregnancy occurring after IUD insertion was considered to be life threatening to the woman and to the fetus.

The suggestions that were made by the providers about ways of improving IUD and VSC deliveries were as follows.

- Reform the VSC team - by training at least two physicians who are interested and working in obstetrics and gynecology and brief refresher course to other members of the team.
- Renovation of space dedicated to VSC in the hospital or to make use of the OR when it is under engaged and in off peak hours and days.
- If the above isn't practicable, it is worth trying to renovate the health center's delivery room which had been the OR of the hospital before it moved to the present site. This delivery room is relatively spacious and can accommodate both services.
- More effective approach to check the spread of STD and associated problems should be addressed by public health programs. To improve the low acceptance rate of IUD, the FP program should be inclusive of STD treatment and control program.

DISCUSSION

The timeliness and urgency for an organized & integrated family planning programs cannot be doubted in the unfolding of the pathetic demographic realities in Ethiopia.

This study has made an attempt to look at the use effectiveness and extended use-effectiveness of various contraceptive practices in one of the largest family planning projects ever launched in the country. The study compared and contrasted the impact of certain socio-demographic and other relevant variables on the acceptance and continuation of contraceptive methods that were put in use in the woreda.

The study covered the history of all contraceptive users served by Health Centers, Health stations and Project sites in the region between 1991 and 1993. Prime interest of the analysis has fallen on the use-effectiveness of the available contraceptive methods after acceptance.

According to the available data, the percentage of women lost-to-follow up was higher in the hospital and health center acceptors than in the health station and project site acceptors, due to the fact that the health station and project site acceptors were being followed soon after acceptance (6 months) than the former groups of acceptors (18 months).

The data collected from record review showed, there was no discernible differences in the type of method accepted, the use history and other socio demographic characteristics of the interviewed with the non interviewed women (data not shown).

Over all, more than 95 percent of the acceptors were using effective contraceptive methods. Pill was used more than any other method. This finding is similar to most Sub- Saharan countries so far surveyed(20).In Zimbabwe and Morocco pills accounted for 86% and 79% of all methods used respectively (21). The contraceptive prevalence across certain socio-demographic characteristics indicated CP was lowest among the young women in the age group 15-19, reached a peak among 25-29 and declined after age 30. This pattern reflects the desire for child bearing among young woman, then growing interest in spacing births and eventually ending child birth.

About one third of the total acceptors of pills had no children more than two, which may suggest contraceptives were used more for spacing purposes than limiting of family size . It is interesting to note that among acceptors with living children as many as six, pill was chosen by as much as 61% of them indicating again though, not conclusively, the idea of spacing.

It was only for those with more than seven children that pill usage fared a sharp down turn in favour of injectable.

The fact that 3% of all acceptors have no children might indicate that their acceptance of the methods came from the misconception they had, ie."continuous use of contraceptive method induces fertility and prohibits unwanted birth ". Families with a relatively large number of living children (more than 5) opted for injectable naturally urged by the motivation of "terminating" child birth (which is a common belief among the acceptors).

The level of education did not seem to affect the acceptability of any of the methods.In fact the majority of the acceptors never had formal education nor completed primary school. This finding is consistent with recent findings among DHS surveyed countries, where little difference in CP by woman's level of education existed in the following countries Mauritius,Sri Lanka,or Thailand, but in stark contrast to the general belief that the level of education varies positively with adoption of family planning programs. We may cite the experience of Botswana as a case in point where in 1988 more than 71% of total acceptors were women with educational level of primary school and above (20). However, our experience is encouraging when one considers the poor educational level attained particularly in rural parts of this

country. The majority of users who accepted a method after being persuaded by motivator and health institutions were overwhelming.
This fact bears weight in the contemplation of future FP program else where in the country .

In summary the socio-demographic -contraceptive practice matrix substantiates the glaring facts that contraceptives were mainly practiced to space the next births. Acceptance rate had little to do with "modernism" as reflected in educational background of the study population.

The rate of continuation was over all considerably high, therefore, the effect of certain well-known characteristics was limited with in a very narrow range. The first - method failure rate indicate some thing about the intrinsic effectiveness of a particular method and evaluates FP program from the acceptors perspective to plan fertility. But it does not provide sufficient information about the long term effects of accepting a method. On the other hand the over all post acceptance pregnancy rate evaluates a program from the perspective of a national goal to reduce fertility. Our findings of the use and extended use failures fell in the lower range of what have been reported from developing countries. For instance, a study of the contraceptive effectiveness among acceptors in the philippines program during 1971,

the use failure and extended use failure were 3.7 and 22.3 for pill and 3.2 and 9.5 for IUD respectively (49). Considering our result, in terms of long range demographic effectiveness, it appears that provision of Injectable were much more effective than a pill acceptance and nearly 5 to 6 times as effective as an acceptance of other method. It was found out that the level of education bore a certain influence on the continuation rate. The least educated had the lowest continuation rate, specially with respect to pills. Users who had husbands with unfavorable attitude to contraceptives fared badly in continuation and had higher rate of unintended pregnancies. One interesting feature here was the case of indifference by husbands. For this class of users, continuation was the highest perhaps signifying the resoluteness of the wife in independently pursuing the practice.

The data collected to study the contraceptive experience of the acceptors helped to understand the behavior not only of women who continue use of a method but also of those who discontinued use, those who switched methods and those who abandoned all methods When one looks at the reasons for termination of a given method, the influence of side effects and other medical reasons stood prominent, followed by a desire to have a child (voluntary termination).

For users of all contraceptives considered together, nearly half of all women who had begun use abandon for reasons related to side effects, and medical reasons, to get pregnant, accidental pregnancy was the third important factor, lack of cooperation from husbands and inconveniences of the method respectively. The other reason that stood out first for other method users and third as cause of terminating for the other two methods was the objection of husbands.All these have got a major implication to program improvement. Program managers should consider that termination for side effects can be reduced substantially if women are counselled as they start a method about what to expect or can ease concerns over possible long term side effects.

In early clinical trials of long acting hormonal contraceptives, for example, the discontinuation rate for menstrual disturbances among a group of users who were not carefully told about side effects was 10.5 per 100 women at one year. Among another group, who were reassured that bleeding problems would sub side and that the irregular patterns had no harmful effects, the discontinuation rate was 5.2 (50). Among the first method drop outs who changed methods, the new method adopted certainly was injectable. Women initially on pill were most likely to change to the more effective method injectable than the users of other method.

One difference that was apparent was, women shifting from pill were likely to select more effective substitute method in terms of use effectiveness than were women shifting from less effective method.

From those abandoned the use of first methods nearly half had changed to other methods .More than two thirds of the first method drop outs of pill users changed to injectable and about the same percent of injectable drop out changed to pill.

There is a sparse literature about method changes in general and their programmatic implications in particular (45).

High rate of switching among contraceptive users may indicate that women are exposed to an array of contraceptive options and are taking advantage of the opportunity to use methods as their needs and preference changes. Thus, it may reflect successful FP programs. On the other hand, high rates of method switching could reflect erratic availability or difficulties in obtaining and continuing use of preferred methods (45).

The reasons for the changes from one method to another method were the following:

The introduction of a formerly in accessible method such as injectable to the H.C and later to P.S and H.S., a large number of the clients changed to injectable.

The other reason that would be worth mentioning was

shortage of supply and difficulties in obtaining new supplies of the method they were currently using. This was more so for injectable clients of the project. Those who were unable to come on the program day, either pill or barrier methods was supplied in person by motivator. This part of the arrangement needs careful assessment and new approach so as to reach these clients by the method they were using could be sought.

Frequent abandonment of method use-whether temporary or permanent- may indicate that women have difficulty of maintaining continual use, so that they often leave themselves exposed to the risk of unintended pregnancy,even though, women may stop use when they wish to do so.

The percentage distribution of reasons for terminations of the first and most recent methods were different. The major cause of terminating of first methods were side effects and pregnancy where as the main reasons of termination of the most recent method were lack of need and pregnancy. The former may suggest temporary abandonment and a desire to change methods but the latter tend to signal a more permanent terminations (no need of protection) due to pregnancy or sexual abstinence.

Results have shown that acceptance of a given contraceptive method is significantly influenced by age of acceptors, the number of living children before acceptance and the source of information regarding contraceptive use.

On the basis of the differentials observed in the findings, it is possible to discern some categories of women who are especially likely to drop out and become pregnant again soon after acceptance. These include low parity women in their twenties, those who have never used contraception before, and those whose source of information about the current method use was other than the users motivator and H.I.

Continuation and pregnancy rates of contraceptives was slightly different among users of varying socio-demographic characteristics in the study area. Generally, for all characteristics pill appeared to have lower continuation and higher pregnancy rates than other methods. Some insight were gained regarding the motive for contraceptives and the spread of awareness in influencing use - effectiveness rates. Finally the results of this study have further strengthened earlier reports that contraceptives use is determined by several socio demographic factors(20).

Some of the socio demographic factors considered by this study were closely linked. Attempts to strengthen the above findings through regression analysis showed, for instance, that the relationship between education, number of living children and attitude of husband and duration of use were significant enough as indicated by the high F value. Accordingly, there is a strong relationship between the three independent variables and duration of use. For instance, if we take education, duration of use might have increased by 154 % if most users had attained educational level of grade 9-12. Furthermore, had most users been in the group having living children more than 7, duration of use might have increased by 69-70 %. It was also remarkable to see that had husbands' attitude remained in different to contraceptive use, duration of use might have been increased by 161%. In general, as has been the case in many similar studies, regression analysis corroborates, instead of contradicting, the results of the life table.

In its two years of existence the program in the project sites, appears to be operating successfully. This success may be attributed to using of local people to teach about FP and distribute contraceptive methods to a large number of women in the child bearing age in a depressed socio economic environment where trained health workers were scarce.

Since acceptors who were aroused and recruited to practice contraceptives by motivator (field workers) appear to be especially motivated to continue use of contraception and were able to avoid pregnancy following acceptance, it might be worth while to make especial efforts to induce the motivator in both urban and rural to intensify their home to home visits of couples and refer more of their clients to the service delivery sites of distribution.

This should also be most urgent case to southern branch of FGAE to crown the community based aspect of its program to more successes.

The significant effect of the husband's opposition on continuation and pregnancy rates suggests the need for a program of information, education and communication expressly designed to reduce such opposition.

The result of the focus group discussion showed very poor, and in some cases non existent service as a barriers preventing many clients from using IUD and VSC. This result again is consistent with the fact that where VSC is not used the major reason is lack of service or restrictive regulations (22).

If policy makers and program planners can improve the availability of services with regard to VSC, the use and acceptance will improve and follow the patterns of other countries where services are more available and program well established.

Survey data from Kenya showing that sterilization prevalence has increased significantly in just a few years suggest this scenario is possible.

To improve performance and facilitate use of IUD several approaches should be tried. Increasing attention has to be given on the need for training of paramedical personnel so that they can assume major responsibility for IUD insertion and follow up.

Studies from both developed and developing countries showed that para medical personnel and even rural trained traditional mid wives, can perform routine IUD insertions. In counseling women, reassuring them about side effects, and by providing sympathetic follow up care, indigenous health workers can often do an excellent job. In controlled studies continuation rates are generally higher when IUD insertion and follow up care are provided by village mid wives (51, 52).

In general the FGDs findings signals the need for health and FP program administrators to begin planning for the expansion of services, especially in to rural areas where the demand is greatest.

The major limitations of this study could be the retrospective nature of the study. Inquiry to prior contraceptive practice which could depend on individuals ability to recall past sequence of events. The lower pregnancy rates could be due to the brief lapse of time between the cut off period and the conduct of the survey. If the survey had waited at least three months after the cut off period, the chance of the first trimester pregnancies to be recorded would have been increased.

Surveys which assess pattern of use and termination should be conducted regularly in order to provide data on use sequences.

CONCLUSION

Injectable acceptors in all service delivery sites are highly persistent and successful. In terms of long range demographic effectiveness, injectable appeared to be much more effective than other methods.

The majority of the women accepted a method after being persuaded by motivator. The over all socio demographic contraceptive profile showed contraceptives were mainly practiced for spacing.

The level of education didn't seem to affect the acceptability of any of the methods. Side effects and health reasons stood prominent in termination of the method accepted.

The community based aspect of the FP program may have contributed to the increased acceptance and continuation rate in the rural areas. However, lack of access and non existence of services were identified as a main barrier preventing clients from using IUD and VSC.

RECOMMENDATION

1. Every effort should be made to maximize reliance on the most acceptable and effective method especially injectable.
2. Accurate information about side effects should be provided to all clients attending FP services in all health institutions and project sites.
3. Out reach delivery system should be extended to expand the delivery of the service to the inaccessible majority.
4. A community based operational research is recommended to provide strong evidence and substantial conclusion.

" RAPID POPULATION GROWTH BURNS NATURES CANDELE AT BOTH ENDS...GENERATING MORE CONSUMERS WHILE REDUCING NATURAL PRODUCTIVITY. " CYNTHIA GREEN.

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APPENDIX A

Dale Woreda Yirgalem F/P Program
Record Review Form

DATE ___/___/___ Code No _____

1. Site of service delivery

   1.1 [ ] Health Center
   1.2. [ ] Health Station
   1.3 [ ] Village

2. Name ofclient_____

3. Card Number _____

4. Present address of client: Kebele _____

   P.A. _____

   House No _____

5. Date of first visit ____/____/____

6. Age at first visit _____

7. Number of live births altogether: boys: _____ girls

8. Method accepted at first visit

   (1) Pill: [ ] Eugenol (3) IUD.....

   [ ] Microgin (4) VSC.....

   (2)injectable: [ ] Depo Provera (5) CONDOM.....

   [ ] Norestrate (6) FOAM.....

9. Date of last contact ____/____/____

Use-history of client:

[ ] Using first method

[ ] Changed method --> **Q11**

[ ] Accidental pregnancy

[ ] Discontinued - planned to have a baby

[ ] Discontinued - no need of contraception

[ ] Contraception abandoned --> **Q12**

[ ] Lost to follow up --> **Q12**

[ ] Other (specify)

UNLESS OTHERWISE INDICATED, END HERE

11. If the client changed methods, what is the new method?

Pill: [ ] Eugenol IUD .....
[ ] Microgin VSC.....

Injectable:
[ ] Depo Provera CONDOM.....

[ ] Norestrate FOAM.....

12. Date of change: ____/____/____

13. Use-history of new method:

[ ] Continuing use

[ ] Accidental pregnancy
[ ] Discontinued - planned to have a baby

[ ] Discontinued - no need of contraception

[ ] Contraception abandoned --> **Q14**

[ ] Lost to follow up --> **Q14**

[ ] Other (specify)

---

14. For cases of contraception abandoned or lost to follow up, how many visits before abandoning or lost?

[ ] 1 visits [ ] 2 visits [ ] 3 or more

ADDIS KIDANE WOREDA YIRGALEM FAMILY PLANNING PROGRAM

FOLLOW UP AND SURVEY FORM

Date..... Code No.....

NB

The study on family planning conducted through this questionnaire is an integral part of national concern on the issue, and therefore, the researcher calls up on all involved in filling this questionnaire to show utmost care and sincerity.

1. Background information

1.1.Consent of respondent Yes [ ] No [ ]

1.2. Name of head of household _____

1.3. Respondents Name _____

1.4. Present address Kebele (peasant A.)_____

House No _____

1.5 Sites _____

1.6 Education/ literacy status

1. No Schooling 2. 1-6 3. 7-8

4. 9-12 5. 12+

1.7. Occupation of clients

1. Working 2. Not working

1.8. Occupation of spouse

1. Farmer 2.Daily labourer

3. Govt employee 4. Other (specify)_____

1.9. Religion

1. Protestant 2. Orthodox 3. Catholic

4. Moslem 5. No religion

1.10 If protestant

1. M/ Eyesus 2. Kale Hiwot 3. Mulu Wongel

5. Philadelphia 6. H/ Birhane 7. Adventist

8. other specify _____

1.11 Marital status

1. Currently married 2. Never married

3. widowed 4. Divorced

5. Other specify _____

1.12 If married, at what order is your present marriage

1. 1st 2. 2nd 3. 3rd or above.

1.13 How many years have you been married (if not the first then in this union). 1. form 0-2. 2. for 5-9 3. above 10

1.14 Does your husband have other wives.

1. Yes 2. No

1.15 How many children did you have when you started with this program?

1. Male ____ 2. Female _____ 3. Total _____

II ATTITUDE AND PRACTICE

2.1. What method are you currently using (method currently using)

1. Pill 2. Injection 3. IUD 4. VSC 5. Condom 6. Foam

2.2. If not currently using any contraceptive, specify the reasons for termination

1. Side effect (specify) 2. Un wanted pregnancy
3. Planned to have a baby 4. Husband objected
5. Health reason(specify) 6. Inconvient time
7. Waiting time too long
8. Bad attitude of health worker
9. Became ill from other causes.
10. No need of contraception (specify)
11. Other (specify)

2.3 Is there a difference in what are you using now and your first choice.

1. Yes 2. No

2.4 If yes, what was your first choice ?

1. Pill 2. Injectable 3. IUD 4. Sterilization
5. Condom 6. Foam 7. Other specify _____

2.5 What was/is your reason for practising contraception?

1. Don't want any more children
2. Want children but not now
3. other (specify)

2.6 When have you started contraception ?

1. After 45 days post partum

2. After an abortion

3. In an interval where not related to pregnancy.

2.7 When was your last child born ?

Months _____ Years _____

2.8 From what source did you come to know about the current method you are using ?

1. From user 2. Home visits by Health Workers

3. From my husband

4. During a visit to clinic for other purposes.

5. From meeting (kebele /PA)

6. From church or other in formal meetings

7. Others (specify) _____

2.9 How far is it to the service delivery site

1. 0-2 km 2. 3-5 km 3. 6+

2.10 How long it take you to reach ?

1. < 1 hrs 2. 2 hrs 3. 3 hrs

2.11 What is the attitude of your husband to wards contraception ?

1. Favorable 2. Unfavorable 3. Indifferent

III CONTRACEPTIVE PRACTICE

3.1 Have you used other method before starting in this program

1. Yes 2. No → skip to 3.5

3.2 Which was the last method you used before starting the program?

1. Pill 2. Injection 3. IUD 4. Sterilization

5. Condom 6. Foam 7. Other specify _____

3.3 Were you using this method

1. Regularly as prescribed 2. Occasionally

3. Only once 4. Other (specify)

3.4 Where did you obtain this method

1. Health institution 2. friends 3. Drug shop

4. Other (specify) _____

3.5 Since you started the program have you ever changed method of contraception?

[] Yes, If yes [] once [] twice

3.6 What made you terminate the first method ?

1. Side effect (specify) _____

2. Pregnancy (specify) _____

3. Health reasons (specify) _____

4. Fear about method (specify) _____

4. Other (specify) _____

3.7 If you have changed method more than once, what is the reason terminating the second method ?

1. Side effect (specify) _____

2. pregnancy (specify) _____

3. Health reasons (specify) _____

4. Husband objected _____

5. Other (specify) _____

3.8 After you started receiving contraception from the clinic or the project have you become pregnant ?

1. Yes 2. No

3.9 If yes, enter in the table and probe

Method	USE		conception		PREGNANCY OUTCOME
	Reg	Occ	During use	After	

Key: Pregnancy outcome

1. Still pregnant
2. Induced abortion
3. Spontaneous abortion
4. Live birth
5. Still birth

Conception:

Check appropriate box depending on whether contraceptive was being used, or after terminated.

USE:

Regular or occasional.

Time taken to complete _____

No of visits _____

Appendix C Life Tables Computations

In using the life table as a measure of continuation, we may distinguish between a single decrement life table that are used respectively to compute "net" and "gross" rates.

The rates of continuation are probabilistic measured and calculated using the formula stated below Let:

$N_{xj} \equiv$ Number of women adopting method j at start of the monthly interval (x, x+1) - i.e., the $(x+1)^{th}$ ordinal month.

$D^i_{xj} \equiv$ Corresponding number of termination of method j because of factor i during month (x, x+1).

$T_{xj} \equiv \Sigma D^i_{xj} \equiv$ Total observed terminations during month (x, x+1) for method j.

$C_{xj} \equiv$ Number of continuing users last observed during month (x, x+1), for method j.

$F_{xj} \equiv$ Number of women lost to follow up during month (x, x+1) for method j.

$W_{xj} \equiv$ total women withdrawing from observation during month (x, x+1) First computed are monthly rates of discontinuing of a method j for the i^{th} specific causes during the ordinal month (x, x+1). It is given by:

$$Q^i_{xj} \equiv \underline{D}^i_{xj} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad [1]$$

N^{*}_{xj}

where, $N^{*}_{xj} = N_{xj} - W_{xj}/2$

The rationale underlying N^{*}_{xj} is that had number of W_{xj} method acceptors not been lost to observation during month (x, x+1), there would have been $W_{xj}/2$ additional month of exposure. Thus, for example monthly risk of specific case (i = pregnancy say,) one wants Q_{xi} to be solution of i.

$$Q_{x\,i} = \frac{D^{i}_{xj} + (W_{xj}/2)Q_{x\,i}}{N_{xj}}$$

Which is satisfied by:

$Q_{xi} = \underline{D}^{i}_{xj-} \;/\; N^{*}_{xj}$

That the 'i' specific monthly risks of termination add-up to the conditional monthly rate of terminating a method j for i number of reasons combined is seen from:

$$Q_{x1} + \ldots . Q_{xn} = \frac{D^{1}_{xj} + \ldots + D^{n}_{xj}}{N^{*}_{xj}}$$

$$= \frac{T_{xj}}{N_{xj}}$$

$$= q_{xj}$$

Finally, the conditional likelihood of surviving

month (x, x+1) as a continuing user is $p^{i}_{xj} = 1 - q_{xj}$

The proportion of acceptors expected to terminate their method until the end of (x, x+1) is :

$$D^{i}_{0(x+1)j} = \prod_{h=0}^{x} D^{i}_{hj}$$

.....[5]

The proportions of terminating a method during month (x, x+1) because of specific reason i is given by.

$d_{xi} = D^{i}_{xj} Q_{xi}$ ..... [6]

Summing these proportions for a particular risk i yields the cumulative rate of terminating a method because of a particular risk i.

$$\sum_{h=0}^{x} d_{hi} = \sum_{h=o}^{x} D_{hj} Q_{hj}$$

The expressions given above to compute specific rates included multiple risks. This rate is termed as "net", rate which allow for the presence of competing risks.

Nevertheless, if interest is on the magnitude of the rate of specific risk "i" standing by itself we need to make modifications as follows

$$q_{xj}^{c} = \frac{D_{xj}^{i}}{N^{**}}$$

where

$$N^{**} = N_{xj} - T_{xj}/2 \quad \ldots\ldots\ldots\ldots\ldots [9]$$

following [8] the monthly probabilities of escaping the gross risk of "i" may be chained to yield the likelihoods of avoiding, or succumbing to. The gross risk of i by the end of month (x, x+1).

$$D_{o(x+1)j}^{i} = \prod_{h=0}^{x} p_{hj}^{i}$$

As is seen gross rates are not additive that is the monthly rate of termination for all reasons is less than the sum of monthly rates for specific risk i

Multiple and single decrement - There are two major ways of calculating failure; multiple decrement and the

associated single decrement (often referred to elsewhere as net and gross rates, respectively).

Whereas the multiple decrement recognizes that failures occurs with in the same interval as do other types of contraceptive terminations (such as discontinuing the method for other reasons), the single decrement measure is a hypothetical calculations that examine failure in the absence of any other "competing risks". Multiple decrement life table rates allow a subject to discontinue for a variety of reasons. The rates sum to the total discontinuation rate and can be compared with in the strata. Single-decrement rates allow a subject to discontinue for only one reason. All other reasons for discontinuation are treated as withdrawals. Single-decrement rates are used to compare discontinuation between separate groups or strata. The latter rates are higher than multiple decrement rates, and single-decrement rates cannot be summed with in a group to equal the discontinuation rates.

1. To assess continuation, one needs to know the proportions of acceptors that are still successfully using contraceptive at specified intervals after adoption.
2. One also needs to measure the relative intensities of the several causes for interrupting practice of

the method, of which accidental pregnancy is only one.

3. In the usual follow up study, there is a fixed cut off date with variable dates of acceptance, resulting in records of unequal length and many respondents classified as continuing users at the end of the study.

4. As time elapses from acceptance, the monthly rates of termination, as exhibited by a cohort of acceptors, typically decreases at a decelerating rate. That is, the probability of continuing use for another month is not constant which considerably complicates any attempt to extrapolate continuation beyond the period of observation. In terms of use - effectiveness of all contraception (i.e, without regard to method), the period of exposure begins with the initiation of use and terminates with any one of the following six statuses (54).

1 Not pregnant but exposed to risk at end of observation depending whether or not she is using contraception.

2. Change of method, switching to other method in a multi-method mix programs that offer wider choices.

3. Accidental pregnancy while using contraception.

4. Discontinuation of contraception without desire for protection (planning pregnancy).

5. Discontinuation of contraception with out need for protection (for example, separation from husband).

6. Discontinuation - other (discontinuation with continued exposure to the risk of unintended pregnancy).

The rates of continuation and pregnancy are probablistic measured and calculated using multiple and or single decrement life table methods (see Appendix C).

Appendix D Duration of use of methods

Months of exposure	Interval	Pill	Inj.	Other	All
- 1 months	1	589	180	10	779
1 - 2 "	2	190	68	3	261
2 - 3 "	3	180	132	1	313
3 - 4 "	4	170	77	3	250
4 - 5 "	5	105	46	3	154
5 - 6 "	6	73	44	1	118
6 - 7 "	7	13	8	0	21
7 - 8 "	8	18	2	0	20
8 - 9 "	9	17	12	0	29
9 - 10 "	10	12	1	0	13
10 - 11 "	11	13	3	1	17
11 - 12 "	12	12	5	0	17
12 - 13 "	13	3	6	1	10
13 - 14 "	14	7	3	1	11
14 - 15 "	15	9	8	2	19
15 - 16 "	17	6	1	0	7
17 - 18 "	18	0	0	0	0
Total	-	1428	601	26	2055

LIFE TABLE MODEL

Ordinal Month (X+I)	Women exposed at start of month Nx	With-drawals Wx	Adjusted number of women N' Nx'=Nx-½Wx	Pregnancy Px	Monthly probability ofhaving a Pregnancy Px/Nx*	Cumulative Monthly probability of not having a pregnancy	chance of not having a pregnancy by end of monthx
1	1428	124	1366.0	20	0.01464	0.98536	1.00000
2	1284	31	1268.5	7	0.00552	0.99448	0.99448
3	1246	23	1234.5	3	0.00243	0.99757	0.99206
4	1220	10	1215.0	5	0.00412	0.99588	0.98798
5	2120	15	1197.5	2	0.00167	0.99833	0.98633
6	1188	7	1184.5	0	0.00000	1.00000	0.98633
7	1181	3	1179.0	0	0.00000	1.00000	0.98633
8	1178	4	1176.0	0	0.00085	0.99915	0.98633
9	1174	3	1172.5	1	0.00171	0.99829	0.98549
10	1170	5	1167.5	2	0.00086	0.99914	0.98380
11	1163	2	1162.0	1	0.00172	0.99828	0.98296
12	1160	1	1159.5	2	0.00000	1.0000	0.98126
13	1157	0	1157.0	0	0.00000	1.00000	0.98216
14	1157	4	1155.0	0	0.00000	1.00000	0.98216
15	1153	1	1152.5	1	0.00087	0.99913	0.98041
16	1151	2	1150.5	0	0.00000	1.00000	0.98041
17	1149	0	1149.0	0	0.00000	1.00000	0.98041
18	1149	0	1149.0	0	0.00000	1.00000	0.98041

10	1170	5	1167.2	2	0.000000	0.000111	0.000280
12	1160	21	1159.5	2	0.000000	1.0000	0.005126

DECLARATION

I, the undersigned declare this thesis is my orginal work and was not been presented for a degree in this or any other University and that all sources of materials used for this thesis have been dully acknowledged.

Name TIZAZU ABEBE

Signiture

Place ADDIS ABABA

Date of submission 21/07/94

This thesis has been submitted with our approval as university advisors

Dr. Tadesse Alemu

Advisor