DETERMINANTS OF CONTRACEPTIVE METHOD CHOICE: A COMPARATIVE STUDY OF PERMANENT, SEMIPERMANENT AND TEMPORARY METHODS

KESARIN ROONGRUANGMANIRAT

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS
(POPULATION AND FAMILY PLANNING RESEARCH)

IN
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY
1994

Thesis

entitled

DETERMINANTS OF CONTRACEPTIVE METHOD CHOICE:
A COMPARATIVE STUDY OF PERMANENT, SEMIPERMANENT AND
TEMPORARY METHODS

Kesarin Roongruangmanirat
Candidate

Kusol Soonthorndhada, Ph.D.
Major Advisor

Varachai Thongthai, Ph.D.
Co-Advisor

Monthree Chulasamaya, M.D., Ph.D.
Dean
Faculty of Graduate Studies

Bencha Yoddumnern-Attig, Ph.D.
Chairman
Master of Arts Program
in Population and Family
Planning Research
Institute for Population
and Social Research

Thesis
entitled

DETERMINANTS OF CONTRACEPTIVE METHOD CHOICE:
A COMPARATIVE STUDY OF PERMANENT, SEMIPERMANENT AND
TEMPORARY METHODS

was submitted to the Faculty of Graduate Studies,
Mahidol University for the Degree of Master of Arts
(Population and Family Planning Research)
on
1 July 1994

Kesarin Roongruangmanirat
Candidate

Kusol Soonthorndhada, Ph.D.
Chairman

Varachai Thongthai, Ph.D.
Member

Nibhon Debavalya, Ph.D.
Member

Supavan Phlainoi, Ed.D.
Member

Monthree Chulasamaya, M.D., Ph.D.
Dean
Faculty of Graduate Studies

Aphichat Chamratrithirong, Ph.D.
Director
Institute for Population and
Social Research

BIOGRAPHY

NAME	Kesarin Roongruangmanirat
DATE OF BIRTH	5 December 1949
PLACE OF BIRTH	Ubonratchathani, Thailand
EDUCATIONAL BACKGROUND	Bachelor Degree of Science in Statistics (Honors) Chulalongkorn University, Bangkok April 1972
PRESENT EMPLOYMENT	Statistical Assistant Population Division United Nations, Economic and Social Commission for Asia and the Pacific, Bangkok

ACKNOWLEDGEMENT

I wish to thank Dr. Nibhon Debavalya, the chief, and other officers of the Population Division of the United Nations Economic and Social Commission for Asia and the Pacific for their continuous support to me of both my study and my career responsibilities at the Division.

I would also like to express my gratitude to all the lecturers and staff members of the Institute for Population and Social Research, Mahidol University, for their guidance and assistance during my study, including the provision of data from the Study on Determinants and Consequences of Contraceptive Use Patterns in Thailand (1987) which were used in this study.

My special thanks go to Dr. Kusol Soonthorndhada, my supervisor, who has advised and guided me during the course of working on this thesis.

Kesarin Roongruangmanirat

Thesis Title Determinants of Contraceptive Method Choice: A Comparative Study of Permanent, Semipermanent and Temporary Methods

Name Kesarin Roongruangmanirat

Degree Master of Arts
(Population and Family Planning Research)

Thesis Supervisory Committee
Kusol Soonthorndhada, Ph.D.
Varachai Thongthai, Ph.D.

Date of Graduation 1 July B.E. 2537 (1994)

ABSTRACT

This thesis is to analyze determinants of the choice of contraceptive method in Thailand. It is also a comparative study of three types of methods: permanent, semipermanent and temporary methods. The data used are taken from the Contraceptive Use Patterns Survey (CUPS) in Thailand in 1987.

The major determinants on method choice found are whether the users want to have more children later or not, the number of living children and the age of the users. If women do not want more children later, they are likely to use a permanent method. Women with many living children are more likely to use a permanent method; those with few or no children are more likely to use a temporary method. Older women tend to use a permanent method; while the younger ones use a temporary one. However, there are remarkable proportions of women aged over 40 years and having enough number of living children are still using a temporary method, while they or their husbands are somehow ready to be sterilized. Therefore, these couples need to be convinced to undergo a sterilization.

Most women consider a semipermanent method as a temporary but a prolonged one. Campaigns to support IUD using should be aimed at those women who want no more children but do not want to be sterilized. Although condom is not so popular, comparing with other temporary methods, condom should be supported as it gives a dual protection, from pregnancy and from sexually transmitting diseases.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

CHAPTER I. BACKGROUND OF THE STUDY

1.1 Problem situation

Numerous studies have investigated contraceptive use among the Thai population, but only few have focused on factors affecting contraceptive method choice. Why do couples choose particular contraceptive methods? Why some effective contraceptive methods are not so popular? Why couples who do not want any more children are not using a permanent method? Are there any differences of characteristics of the contraceptive users, within and among groups of methods classified as permanent, semipermanent, and temporary? How can family planning managers promote Thai couples using some particular methods of contraception, such as vasectomy and IUD?

Until recently, little research addressed these questions, partly because influencing couples to use any method at all was the dominant concern of policymakers in the last decade. But rapid increases in contraceptive prevalence and accumulated experience with each method have heightened awareness that the study of contraceptive method choice in Thailand is an important research and policy question.

1.2 Justification of the study

Making policy recommendations cannot be assertive if not enough information is known about the factors that influence the choice of contraceptive method or about the most appropriate methods to use for particular couples. Therefore, the understanding of the factors affecting contraceptive method choice is necessary to the success of family planning policy making.

The results of this study, which is aimed to answer all the questions posted above, may be used by family planning policymakers and managers, public health specialists, and population researchers in Thailand and outside the country, as guide to promote some specific methods/plans in monitoring family planning programs. New findings may be discovered, and broader implications from this study for population policy and demographic thought/understanding may be reviewed.

1.3 Objectives

1. To observe levels of contraceptive use by method;

2. To compare characteristics of the users within and among groups of methods of contraception: permanent, semipermanent and temporary methods;

3 To identify possible determinants of the contraceptive method choice; and

4. To predict the choice by type (group) of contraceptive methods based on the users' characteristics.

CHAPTER II: LITERATURE REVIEW

2.1 Fertility level in Thailand

Thailand has a long history of family planning, which started since 1969-1970 when the contraceptive prevalence rate was less than 15 percent. The coincidence between the timing of the implementation of a nationally organized family planning program, in 1971, and the occurrence of both increased contraceptive prevalence and sustained fertility decline is consistent with the interpretation that the program played an important role in precipitating and facilitating reproductive change in Thailand (Knodel, Chamratrithirong and Debavalya, 1987).

As a result of increasing demand and the government's family planning policies, the contraceptive prevalence rate in Thailand had increased substantially in the last two decades. The rate increased from merely 53 percent to 59 percent, to 65 percent, and to 70 percent for currently married women aged 15-44 in 1978, 1981, 1984 and 1987 respectively (Leoprapai and Thongthai, 1989). The rate is not likely to decrease, and probably will not increase very much inasmuch as replacement fertility has almost been reached. However, as revealed by several surveys, the pattern of contraceptive use among married women has changed over time. Female sterilization has now become the most popular method, partly because those users, women undergone sterilization, are continued users and the number of users is a cumulative figure.

2.2 Determinants of contraceptive method choice in Thailand

Findings from an earlier study on determinants of contraceptive method choice by Chamratrithirong and Stephen

(1989) indicate that various factors have influenced contraceptive method choice in Thailand include socio-economic and demographic determinants such as **age, rural-urban residence, education, labor force status, region, religion, language, and parity.** The study results suggest policy issues likely to affect the need for contraceptives and recruitment of new acceptors into the national family planning program. One finding in particular is that Muslims and Southern Thais were continuing to use traditional and less effective methods or no method rather than modern methods. This was the case regardless of other socio-economic factors. Another group who appeared to be resisting modern methods were women with no formal education. As program acceptance within Thailand approaches its likely maximum, the national program may want to target these two groups for information on modern contraceptives.

Guest and Chamratrithirong (1993) have studied closely on how social setting and family planning program activity effect the acceptance of female sterilization among Thai women. Several sources of data were used in the analysis. Individual level data came from a national sample of the Contraceptive Use Pattern Survey (CUPS). Characteristics of sterilized women were found as follows:

Women who were sterilized since the start of 1985 differ from other women on a number of characteristics. While 7.7 percent of Buddhist women were sterilized, less than one percent of women of other religious denominations, who were overwhelmingly Muslim, underwent sterilization during the same period. This is also reflected in the rates of prevalence by **region**, with over 7 percent of women in all regions except the South having been sterilized.

Muslims, especially in the South, are much less likely to use permanent methods of contraception and much more likely than other women to cite **religious reasons** for not using contraception.

There is little difference among different **occupational groups**, those women working in agriculture, those working in non-agriculture and those not in the labor force having similar rates of sterilization. The differentials in recent sterilization rates among **educational categories** may be partly due to demographic factors. For example, there is an inverse U shape relationship between **age** and recent sterilization, with the mean age of sterilization of 30.3 being only slightly higher than that for women not sterilized. The small proportion of women with no education is, on average much older than other women in the sample, while those with secondary education are on average younger than other women.

One of the strongest correlates of sterilization is **parity**. Women who have undergone a recent sterilization had an average of 2.9 living children compared to the average of 2.0 living children of non-sterilized women in the sample.

2.3 Framework used in an earlier study

Chamratrithirong and Stephen (1989) have studied various factors that had influenced contraceptive method choice in Thailand, by using data from CPS3. They included socio-economic and demographic determinants such as age, rural-urban residence, education, labor force status, region, religion, language, and parity as independent variables. The dependent variable was contraceptive

choice. Polytomous logit regression was used as the statistical technique to avoid problems of heteroskedasticity and to allow for joint outcomes of separate events. The dependent variable was classified into three categories: (1) pill, IUD, and injectable (the most effective and noncoital contraceptives); (2) other methods (less effective or coitus-related contraceptives); and (3) nonuse. Sterilization was not considered as one method in the study (1989). The age was measured continuously; the other variables were categorical and represented by sets of dummy variables.

CHAPTER III. STUDY METHODOLOGY

3.1 Coverage of the study and source of data

This study is a national level study, for Thailand. The information about women aged 15-49 years who were currently married and using contraception to be used here is from one of the most recent surveys on the subject, the Survey of Determinants and Consequences of Contraceptive Use Patterns in Thailand in 1987 (Leoprapai and Thongthai, 1989). The survey was conducted between April to August 1987 by the Institute for Population and Social Research, Mahidol University.

The sample was designed to represent data at a national level, by assigning a weighting factor to each case in the sample. The sample size of CUPS 1987 was 6,835 cases of ever married women aged 15-49 years covering 25 provinces. The probability proportional to size technique was applied to the selection of census blocks. Afterward, the simple random sampling technique was used in the selection of households of which one eligible woman was interviewed.[1]

Only currently married women who were using contraception, 4,402 unweighted cases, are included in the analysis of this study. In order to have the sample representing true proportions of urban and rural areas, weighting factors set by CUPS 1987 for this purpose are applied so that there are 4,473 weighted cases to be analyzed.

---

[1] For further details, see Leoprapai and Thongthai (1989).

3.2 Conceptual framework

In the conceptual framework used in this study, socio-economic and fertility characteristics of women in the sample will be included and analyzed as independent variables. The dependent variable is women's current contraceptive methods. Those variables to be used are defined and grouped as follows:

3.2.1 Illustrative framework identifying variables

Independent variables
(Determinants of the choice:)

Socio-economic characteristics:
- Religion
- Education
- Occupation
- Urban/rural residence
- Family income

Fertility variables:
- Number of living children
- Want more children or not

Experience:
- Age started using
- Duration of use

Accessibility and availability of contraceptives:
- Convenience
- Expensiveness

Dependent variables
(Contraceptive methods:)

Permanent methods:
- Female sterilization
- Male sterilization

Semipermanent methods:
- IUD
- Norplant[2]

Temporary methods:
- Pills
- Condom
- Injectable
- Safe periods
- Withdrawal
- Others

3.2.2 Dependent variable

a. Contraceptive methods

Contraceptive methods in this study refer to women's current methods only. Ten main methods of contraception in

---

[2] "Norplant" is the registered trademark of the Population Council for subdermal levonorgestrel implants.

Thailand are pills, condom, injectable, IUD, norplant, female sterilization, male sterilization, safe period, withdrawal, and other temporary methods.

In order to study these contraceptive methods by type and period of protection, the methods will be grouped into three types: permanent methods, semipermanent methods, and temporary methods.

b. Groups of contraceptive methods

1. Permanent methods: This group of methods includes female and male sterilizations of any processes, which are normally considered nonreversible.

2. Semipermanent methods: The group of methods includes IUD and norplant, which protect women from pregnancy for 3-5 years after insertion.

3. Temporary methods: This group includes pill, condom, safe periods, withdrawal and others, whose effectiveness is based on day-to-day practice. Though injectable is a method that will be effective for about 3-5 months after the injection, it is also considered temporary and included in this group. Normally, once couples stopped using a method in this group, they would loose the protection immediately or very soon.

3.2.3 Independent variables

Independent variables in this study are factors determining what contraceptive method women should use. These determinants are mainly the women's characteristics, which are classified into three groups: socio-economic characteristics, fertility characteristics, contraceptive use experience, and accessibility.

1. Socio-economic characteristics: religion, education, occupation, urban/rural residence and family income will be used as proxies of socio-economic determinants of married women on contraceptive method choice. Definitions and classifications of these variables are described below:

Religion

The vast majority of Thai people is Buddhist. However, the majority of those Thai people in four southern provinces - Yala, Pattani, Satul and Narathivas - is Muslim. Those Muslims are distinguished from Buddhists and Christians in contraceptive decision making by their high value of marriage and pronatalist orientation. Therefore, the classified groups of religion are, Muslims and Buddhists/Christians.

Education

Women's levels of education are classified in this study as: no schooling, primary, secondary, and higher education.

Occupation

For more meaningful analysis, women's occupations are classified into: agricultural sector, non-agricultural sector, and not in the labor force.

Urban/rural residence

The same definition of urban/rural residence as in CUPS is employed here too. In CUPS, an "urban" area refers to a "municipal" area. Consequently, a "rural" area refers to any "non-municipal" area.

Family income

It refers to an annual family income. It acts as an indicator of power in pursuing contraceptive service or supply of the woman in the family, as well as her economic background which may be psychologically influencing the choice.

2. Fertility variables: Fertility variables are important factors in determining whether women should use a particular contraceptive method. Basic variables used in this framework are number of living children and whether women wanted more children later or not.

Number of living children

Number of living children refers to number of both male and female living children combined. It should be equal to the number of children ever born subtracted by the number of children died. The number may be zero, but never be negative.

Whether more children wanted or not

Besides determining whether women should use contraception or not, this variable may also be one of the main reasons of the method choice, permanent or non-permanent methods.

3. Current experience: This group of variables includes age when women started using the current contraception (when they made the choice of contraceptive method) and duration of the current use.

Age when started using the contraceptive method

Age in complete years when women started/decided to use the current contraceptive method. This age is

considered a better proxy of influence of age on the choice than the current age. Though the current age is not included in this framework, characteristics of women by current age are also presented in Table 1 to provide basic information for later studies.

Duration of use

It refers to the duration of current use in years. In the case of using a non-permanent method, a long term use indicates that the users felt satisfactory in using the contraceptive method and had a tendency to continue using the method.

4. Accessibility of contraceptive methods: Basic variables used here are convenience of getting to the contraceptive suppliers, and whether using the method is expensive or not.

Convenience

It refers to women's perception of whether it is convenient for them to obtain the contraceptive service or supply or not.

Expensiveness

It refers to women's perception of whether it is expensive for them to obtain the contraceptive service or supply or not.

In summary, there are three dependent variables in this study: whether using a permanent method, a semipermanent method, and a temporary method or not. Eleven independent variables, as illustrated in Section 3.2.1, will be analyzed to discover whether each of them is a rational determinant of the method choice or not.

3.3 A structure to identify and to compare the determinants

The first stage of this study is to observe the pattern of contraceptive use by method and group of methods: permanent, semipermanent, and temporary methods, in Thailand in 1987.

The second stage is to compare the users' characteristics which may affect the contraceptive method choice. The first part is to observe similarity and/or differences of characteristics within the same group of methods. Then, the second part is to investigate similarity and/or differences of characteristics among different groups.

The third stage is to identify determinants of the contraceptive method choice from the independent variables by using logistic regression analysis.

The last stage is to predict the choice by type (group) of contraceptive methods: permanent, semipermanent or temporary methods, based on the women's characteristics.

3.4 Hypotheses

1. There are many socio-economic and fertility characteristics that may influence the contraceptive method choice. Three of these characteristics may be strongly identifying method to be chosen: age, number of living children, and whether wanting more children or not. When all the characteristics are analyzed, we may find that:

   i) Couples wanting more children will use a temporary method of contraception, while those

not wanting more children will use a permanent method.

ii) Women with younger ages will use a temporary contraceptive method, while older will use a permanent method.

iii) Couples with enough number of living children will use a permanent contraceptive method.

iv) Old couples, those with enough number of living children or those not wanting more children, who do not want to undergo a sterilization or have not decided definitely what to do will use a semipermanent method of contraception.

2. Another hypothesis has been derived from the concept that couples with the same characteristics, such as in the same group of age, or have about the same number of living children, should have a tendency to choose the same group (type) of contraceptive methods: permanent, semipermanent or temporary. Therefore, there should be some similarity in the characteristics of the users of contraceptive methods within the same group, while there should be some difference in the characteristics of the users of different groups of methods.

3.5 Analysis method

3.5.1 Descriptive analysis

The data used in this study are at the individual level, using each currently married woman who was

interviewed in CUPS as the unit of analysis. For the descriptive analysis, frequency distributions are used to analyze women's characteristics and their actual contraceptive method choice; while crosstabulations and graphs of cumulative percentage are used to analyze women's characteristics and their predicted methods. Relationships between determining factors and contraceptive methods likely to be chosen will be discussed for each factor and each group of methods.

3.5.2 Mean analysis

To assure the appropriateness of the method grouping used in this study, observed similarity and difference of the users' characteristics will be analyzed for both methods within the same groups and among different groups of contraceptive methods.

3.5.3 Logistic regression analysis

Multiple regression analysis, one of the most versatile data analysis procedures, can be used to summarize data as well as to study relations among variables. Based on the regression equation, it is possible to predict dependent variable by developing a mathematical model that relates the dependent variable and independent variables or factors.

Similar to multiple regression analysis, logistic regression analysis can also be used to study the relationship among variables and to predict a dependent variable from a set of independent variables. However, the former technique poses difficulties when the dependent variable can have only two values - an event occurring or not occurring. Logistic regression was also the method used in a study on the same subject - choosing a

contraceptive method choice in Thailand by Chamratrithirong and Stephen (1989) as the statistical technique, but they used a different set of variables.

When the dependent variable can have only two values, the assumptions necessary for hypothesis testing in multiple regression analysis are necessarily violated. For example, it is unreasonable to assume that the distribution of errors is normal. Another difficulty with multiple regression analysis is that predicted values cannot be interpreted as probabilities. They are not constrained to fall in the interval between 0 and 1. In this study, a more appropriate multivariate technique for estimating the probability that an event occurs: the logistic regression analysis is used.

Predicting whether an event will or will not occur, as well as identifying the variables useful in making the prediction, is important in most academic disciplines as well as the "real" world. For example, in answering such questions as "why do some people want to undergo a sterilization?", or "why do some other people use a temporary contraceptive method instead?".

3.5.4 The logistic models

In this study, three logistic regression models, of using permanent, semipermanent and temporary methods of contraception, will be developed. In each model, the dependent variable is the choice of type of methods - whether women would adopt that type of methods or not; and the independent variables or factors, which will be the same in all the models, are eleven women's socio-economic, fertility and other characteristics.

The following multinomial logistic models are used to assess the effects of independent variables on a dichotomy dependent variable. Each model is a generalization of the binary logistic regression model. Since each of three dependent variables takes one of the mutually exclusive and exhaustive categories, permanent (Y_1), semipermanent (Y_2), and temporary (Y_3); thus $\Sigma Y_i = 1$. See Table 7 for the nomination and descriptions of all variables.

Model I: permanent contraceptive methods
(reference is using semipermanent or temporary methods)

$$\log [\text{prob}(Y_1)/\text{prob}(Y_2, Y_3)] = B_{10} + B_{11}X_1 + B_{12}X_2 + .. + B_{111}X_{11}$$

Model II: semipermanent contraceptive methods
(reference is using permanent or temporary methods)

$$\log [\text{prob}(Y_2)/\text{prob}(Y_1, Y_3)] = B_{20} + B_{21}X_1 + B_{22}X_2 + .. + B_{211}X_{11}$$

Model III: temporary contraceptive methods
(reference is using permanent or semipermanent methods)

$$\log [\text{prob}(Y_3)/\text{prob}(Y_1, Y_2)] = B_{30} + B_{31}X_1 + B_{32}X_2 + .. + B_{311}X_{11}$$

The logistic coefficient (B_{ij}) can be interpreted as the change in the log odds[3] associated with a one-unit change in the independent variable, X_j.

Since it is easier to think of odds rater than log odds, the logistic equation can be written in terms of odds as:

---

[3] The odds of an event occurring are defined as the ratio of the probability that it will occur to the probability that it will not. For example, in Model I, the odds of using a permanent method of a woman are the ratio of the probability that the woman will use a permanent method, to the probability she will use a non-permanent method. This technical meaning of odds used here should not be confused with its informal usage to mean simply the probability.

$$\text{Prob(event)/prob(no event)} = e^{Bi0+Bi1X1+ \ldots\ldots +Bi11X11}$$
$$= e^{\Sigma BijXj}$$

The e raised to the power B_{ij} is the factor by which the odds change when the independent variable (X_j) increase by one unit. If B_{ij} is positive, the factor of e^{bij}, or exponential of B_{ij}, will be greater than 1, which means that the odds are increased; if the B_{ij} is negative, the factor will be less than 1, which means that the odds are decreased. When B_{ij} is 0, the factor equals 1, which leaves the odds unchanged.

CHAPTER IV. DATA ANALYSIS

4.1 General characteristics of the sample

To present general ideas about the sample used in this analysis, some socio-economic characteristics of the sample are discussed here. The sample includes 4,473 currently married women aged 15-49 years who were using contraception. The proportion of currently married among ever-married women was 94 percent, while the contraceptive prevalence rate for currently married women aged 15-49 years was 69 percent[4]. In using the sample to represent the whole country, weighting factors set by CUPS 1987 for this purpose are applied to the sample throughout the analysis of this study.

Table 1 in Appendix I presents percentage distributions of the sample by some characteristics. The majority of the sample was in the ages of 25-34 years. The average age was 32 years. About 95 percent of these women were Buddhists, and 4 percent were Muslims. The general level of education of these women was not high. About 5 percent of them never had schooling. Almost three quarters of the sample had education only up to the primary level, while only 18 percent at the secondary level, 4 percent at higher education level. They spent 4.8 years in school, on average. About 54 percent of these women were working in the agricultural sector, 29 percent in the non-agricultural sector, and 17 percent were not working.

The majority of the sample, 83 percent, was living in rural areas. Only 17 percent were living in urban areas,

---

[4] The contraceptive prevalence rate here refers to weighted number of currently married women aged 15-49 years who were using contraception (4,473) as percentage of weighted number of total currently married women aged 15-49 (6,452).

including Bangkok. The general level of family income of these women was very low, as about 46 percent of them had an annual family income of less than 20,000 Baht. The average annual income was only 37,000 Baht.

The average number of living children of the women using contraception was 2.6 children, a number slightly higher than replacement level. About 54 percent of these women had one or two children, and 43 percent had three or more children.

4.2 Grouping contraceptive methods

Grouping all the contraceptive methods prevailing in Thailand into three groups (types) by their nature and length of protection from pregnancy is the first step before proceeding further to a comparative study of the three groups which is the theme of this study. The first group is permanent methods of contraception, comprising female and male sterilizations. The methods in this group are considered not reversible. The second group is semipermanent methods, comprising IUD and norplant. The methods in this group protects women from getting pregnancy for about 5 years after receiving the medical/family planning service, if the device is not removed. The third group is temporary methods, comprising pills, condom, injectable, and others. Methods in this group protect only up to three months at most (injectable). These methods are easy to use, i.e. using does not require any medical treatment, but the total effectiveness of the methods depends very much on the users effectiveness. It is stated earlier in one of the hypotheses to be proved in this study that, based on some factors, couples choose contraceptive methods of the same group (type) in the same direction, and of different groups differently.

Tables 3-6 present analyses of means of selected characteristics, which are also the independent variables in the logistic regression models. Table 3 indicates that ten out of eleven users' characteristic means have significant mean difference among the three different groups of contraceptive methods. That means users with different characteristics used different types of methods. Table 4 shows that ten out of eleven characteristic means of permanent method users do not have significant difference of means of female and male sterilization users. The exception is only convenience, which is however not relevant to sterilization. In other words, users of female and male sterilization had similar characteristics. Table 5 shows that ten out of eleven characteristic means of semipermanent method users have no significant difference of means of IUD and norplant users. The exception is occupation group, which is probably due to free or low-cost IUD service provided to farmers. This means that users of IUD and norplant had similar characteristics. Table 6 shows the mean analysis among users of pills and injectable, the two main contraceptive methods in the group of temporary methods comprising 88 percent of users of all temporary methods. Only two most popular temporary methods are selected to be analyzed here to avoid over due difference from fluctuation caused by comparing too many means. Table 6 indicates that nine out of eleven characteristic means of temporary method users have no significant difference of means of pill and injectable users. The exceptions are family income and duration of using the method. Here again, it can be concluded that users of the two temporary methods had similar characteristics. In summary, the mean analysis of both within and among groups of the contraceptive methods are assuring that the contraceptive method grouping is rational.

4.3 General pattern of contraceptive method mix

Three most popular contraceptive methods among Thai couples were female sterilization - 37 percent, pills - 28 percent, and injectable - 15 percent. Most of the current users, 97 percent, were using effective methods, while the rest, 3 percent, was reported using less effective methods, e.g. safe period, and withdrawal.

In general, the most popular type of methods in Thailand was temporary, which was used by 49 percent of users. Permanent methods was the second popular type which drew 43 percent of users, not much less than the temporary type. Semipermanent methods gained only 9 percent of users. (See Table 2).

4.4 Building logistic regression models

4.4.1 Selecting predictor variables (determinants)

Backward stepwise elimination for automated model building from eleven possible predictors been applied in building the three models mentioned earlier in Section 3.5.4. The results were disappointing in the sense that no consistent sets of best predictors found from that practice. Summarized description of the eleven predictors or independent variables included in all the models are as shown in Table 7, nominated by X_1, ... , X_{11}.

In conclusion, significant determinants of each type of methods, in each model, are those predictors (independent variables) that their coefficients are marked with * in Table 8.

4.4.2 Assessing the goodness of fit of the models

There are various ways to assess whether the model

fits the data or not. One way to see how well the model fits is to compare predictions to the observed outcomes. In Model I, 75.5 percent of all the women were correctly predicted by the independent variables; in Model II, 91 percent of all the women were correctly predicted; and in Model III, 75.2 percent of all the women were correctly predicted. This means that Model I and Model III moderately fit the data; while Model II strongly fits them.

4.4.3 Interpretation of logistic coefficients

Logistic regression coefficients are presented in Table 8. The values B coefficient of the logistic analysis here depend on units of measurement, thus simply comparing the magnitudes of B coefficients without considering the units of measurement is not appropriate.

A coefficient or B can be interpreted as the change in the log odds associated with a one-unit change in the independent variable. For example, from Table 8, the coefficient for religion in Model I is **-1.54** means when the religion changes from 0 (non-Muslim) to 1 (Muslim) and the values of other independent variables remain the same, the log odds of using a permanent method **will be decreased by 1.54.**

The exp(B) is the factor by which the odds will be changed when the independent variable increases by one unit. If B coefficient is positive, this factor, exp(B), will be greater than 1, which means that the odds will be increased; if B is negative, the factor will be less than 1, which means that the odds will be decreased. When B is 0, the factor equals 1, which leaves the odds unchanged. For example, in Model III, when religion changes from 0 to 1, the odds (of using a temporary method of contraception)

are increased by a factor of 3.34, as shown in the last column of Table 8.

4.5 Analysis of the logistic regression models and predicted use

4.5.1 By each determinant

Religion

Table 8, which presents all coefficients and their exponential values for all independent variables in the three models, will be used in analyzing each determinant throughout this section. In all the logistic models, the reference group for religion is non-Muslims. In Model I - using a permanent method of contraception, the coefficient of religion (whether Muslim or not) is negative, the log odds of using a permanent method will be decreased (by 1.54) when women are Muslims. The exp(B) for religion in Model I is less than 1 means that the odds will be decreased when women are Muslims. Considering the Model III coefficient, it can be implied that the odds of using a temporary method will substantially be increased when women are Muslims. Similarly, from the Model II coefficient, the odds of using a semipermanent method will slightly be increased when women are Muslims. Whether women are Muslims or not can determine the women's choice on a temporary method (Model III) or on a permanent method (Model I) significantly. Religion can hardly determine their choice on a semipermanent method (Model II), of which the variable is not a statistically significant determinant.

Predicting whether women with particular characteristics will or will not choose the type of contraceptive methods, as the probability of choosing, from each model is another feature obtained from the logistic

regression analysis. All the probabilities predicted have been transformed into percentage for easier interpretation as shown in Table 9 and in all the figures.

Muslim women have more probability to use temporary method than non-Muslim women, as shown in Table 9 and Figure 1. Sterilization is somehow not a method well acceptable among Muslim women.

Education

The reference group for education in the models is no schooling. There is little difference between influence of women's spending n years and n+1 years in school on the choice of type of contraceptive methods. The coefficient for education in Model I is positive means spending more years in school makes women prefer using a permanent method over a non-permanent method. The coefficient in Model III is negative means spending more years in school makes women less prefer a temporary method. Number of years they spent in school can determine their choice on a semipermanent method better than determining their choice on other types of methods. Moreover, in Table 8, it is indicated that number of years spent in school is not a significant determinant of their choice on a permanent method.

Predicted proportions of women using different types of methods by education levels, as presented in Table 9 and Figure 2, indicate that the effect of education on choosing permanent or non-permanent methods is not linear. The unclear directions of education effect on the choice may also be due to the balanced effect of other factors, such as the age, where older women have spent fewer years in school than the younger.

Occupation

The reference category is women not working. The coefficients for both occupational groups in Model I are negative. This means that, comparing with not working women, those working in both sectors are associated with a decrease in log odds of using a permanent method of contraception. Whether women are working in the agricultural sector or not is a significant determinant of their choice on a semipermanent and a permanent method; while whether they are working in the non-agricultural sector or not cannot determine their choice on any type of methods significantly.

However, predicted proportions of women using the three types of methods presented in Table 9 contradict with the interpretation of coefficients above, when the proportions of using a permanent method of both groups of working women are higher than that of non-working women. These predicted proportions and the coefficients may present a contradictory picture of the relationship when there are other involving factors, which may be stronger factors, such as income and place of residence. The predicted proportion of women working in the agricultural sector using a semipermanent method is remarkably high. See also Figure 3.

Place of residence

The reference category of this variable is living in a rural area. The coefficient of urban/rural place of residence in Model I is positive means living in urban area is associated with an increase in log odds of using a permanent contraceptive method; while in Models II and III it is associated with a decrease in log odds of using a semipermanent and a temporary method. Whether women are

living in an urban area or not can determine their choice on a semipermanent method much better than determining their choice on other types of methods. However, place of residence is not a significant determinant of any types of methods.

Women in urban areas are predicted to use a permanent method more than a temporary method; while those in rural areas are predicted to use a temporary method more than a permanent method. See also Figure 4.

Family income

The reference category is women of the families in the lowest income group. The coefficients of family income from the three models indicate that when the families get higher income the women are more likely to use a permanent method of contraception and less likely to use a temporary method. Family income can determine women's choice on a permanent method and on a temporary method better than determining their choice on a semipermanent method, of which the variable is not a significant determinant.

Predicted proportion of using a permanent method of women from the highest-income families is as high as 60 percent; while that of women from the lowest-income families is only 38.6 percent. In an opposite direction women from the lowest-income families are more likely to use a temporary or a semipermanent method than those from the higher-income families. See also Figure 5.

Number of living children

The reference category is women who have no children. As expected, the coefficients in Table 8 indicate that when women have more number of living children they are more

likely to use a permanent method of contraception as some of them have reached their ideal family size. In other words, increasing in numbers of living children will increase the probability of undergoing a sterilization. Women's number of living children can determine their choice on a permanent method and on a temporary method better than determining their choice on a semipermanent method, of which the variable is not a significant determinant.

Women's number of living children is a strong fertility factor affecting on their desire to have more children later or not and consequently on their choosing the type contraceptive methods. As couples reach their ideal family size, their use of contraception is to terminate their child bearing. About 80 percent of women with 1 child or no children are predicted to use a temporary method; while about 10 percent of them are predicted to use a semipermanent method. More than half of women with three or more children is predicted to use a permanent method. See also Figure 6.

Whether women want more children or not

The reference category is women not wanting more children. As shown in Table 8, the coefficient for using a temporary contraceptive method of women wanting more children is 1.9. Its high exp(B) of 6.4 illustrates that women wanting more children later have more than 6 times higher odds of choosing a temporary method over other methods than women not wanting more children later. The coefficient of using a permanent method for women wanting more children later is negative, which means the odds will be decreased and therefore women who still want more children will tend not to use a permanent method. Whether

women want more children later or not can determine their choice on a permanent method the best, followed by determining their choice on a temporary method. It can weakly determine their choice on a semipermanent method, of which the variable is not a significant determinant.

Whether women want more children or not is another strong determinant of choosing a permanent method and of choosing a temporary method, type of contraceptive methods, as expected. This may be due to the fact that Thai women have a variety of methods available, and thus they react their demand for fertility regulation in the right direction. Women who want more children later tend to use a temporary method or, less likely, a semipermanent method, while other women who do not want more children will prefer using a permanent method in order to terminate their childbearing. It is illustrated in Table 9 that an estimate of 57 percent of those women not wanting more children later, are predicted to use a permanent method. As high as 85 percent of women wanting more children later are predicted to use a temporary method. Figure 7 clearly illustrates the proportions.

Age when women start using the contraceptive method

The reference category is the youngest in age. The coefficient of age when started using the contraceptive method in Model I is negative means women's age advancement is associated with a decrease in log odds of using a permanent method; while in Model III it is associated with an increase in log odds of using a temporary method. Since the relationship of age and the choice is not linear, it is difficult to interpret the odds change when the women are turning forties. Age at the time women decided to use a method can determine their choice on a permanent method and

on a temporary method better than determining their choice on a semipermanent method, of which the variable is not a significant determinant.

About half of women aged 25-29 years when they chose a method is predicted to use a permanent method. The proportion is even higher when women are 30-39 years of age. However, the proportion is dropping when the women are in their forties of age. That is because some of them think that they may be infertile already, beside their fear of undergoing a sterilization. The majority of women in the youngest age groups is predicted to use a temporary method. However the proportion of women using a temporary method does not drop so low when they get older. A temporary method is predicted to be a popular method among women at all ages.

A predicted highly relationship between the age when choosing a method and using a permanent method has an inverted-U shape, peaking at age 30-34 (see Figure 8).

Predicted proportions of women using different types of methods by current age are also presented, in Table 9 and Figure 9, in order to provide more information for further analysis. Proportion of women using a permanent method is predicted to be increasing all the way when women get older (by the current age). They are also predicted less likely to use a temporary or a semipermanent method when they get older.

Duration of use

The reference category of this variable is those who had been using the method for less than 1 year. The coefficients for duration of use in the three models

convince that the longer the couples want to use contraception, the more likely they will use a permanent method of contraception, and the less likely they will use a temporary method. Their duration of use can determine their choice on all the three types of methods significantly. Moreover, it can determine their choice on a permanent method and on a temporary method better than determining their choice on a semipermanent method.

Table 9 and Figure 10 give a pattern of type of method mix by duration of use confirming that the choice of contraceptive method also depend on whether women want to practice contraception for a short term or a long term. If they want to space their childbearing for one up to three years, they are more likely to use a temporary method, which will suit their choice; while a semipermanent method will suit them in prolonging their next childbearing for three to five years. Finally, a permanent method, will certainly suit them when they decide not to have any more children.

Convenience

The reference category of this variable is those who thought obtaining contraceptive service was not convenient. The coefficients in Table 8 for convenience indicate that if women think it is convenient to get the contraceptive supply they tend to use a temporary method of contraception, rather than a permanent or a semipermanent method. Convenience to commute to a family planning center can determine their choice on a permanent method and on a temporary method better than on a semipermanent method. Moreover, the variable is not a significant determinant of any types of methods.

If it is not convenient for women to go to a family planning center to get service/supply they are predicted to use a permanent method; while if is convenient they will tend to use a temporary method. See also Figure 11.

Expensiveness

The reference category of this variable is those who thought that the method used was not an expensive method. The coefficients for expensiveness in the three models indicate that when women think the contraceptive method is not too expensive they are more likely to use a permanent or a semipermanent method. In the opposite direction if they think using the method is too expensive they are likely to use a temporary method. Whether they think the method they are using is expensive or not can determine their choice on any type of methods significantly. Moreover, it can determine their choice on a permanent method and on a temporary method slightly better than determining their choice on a semipermanent method.

Among those women who think using the contraceptive method is not expensive, about 46 percent of them are predicted to use a permanent method, while 45 percent of them are predicted to use a temporary method. About 74 percent of those women who think the method is expensive are predicted to use a temporary method. See also Figure 12.

4.5.2 By each type of contraceptive methods

Permanent contraceptive methods

Table 8 shows that whether women will choose a permanent method or not can be determined significantly by their religion, whether they are working in the agricultural sector or not, family income, number of living children, whether they want more children or not, age when they choose a method, duration of current use, and whether they think the method is expensive or not.

Table 9 also indicates that permanent methods of contraception are predicted to be used among older women, Buddhists and Christians, women in higher income group, women with lower education, and those with many living children. Moreover, the type of methods is strongly predicted to be used among women not wanting more children, and those intending to use contraception for many years.

Temporary contraceptive methods

Whether women will choose a temporary contraceptive method or not can be determined significantly by their religion, education background, family income, number of living children, whether they want more children or not, age when they choose a method, duration of current use, and whether they think the method is expensive or not.

In an opposite direction to permanent methods, temporary methods are predicted to be used among younger women, women with few children or none, those intending to use contraception for only few years. Furthermore, the type of methods is predicted to be widely used among Muslims, women wanting more children, and those who think the method is not expensive.

Semipermanent contraceptive methods

Whether women will choose a semipermanent contraceptive method or not can be determined significantly by their education background, whether they are working in the agricultural sector or not, duration of current use, and whether they think the method is expensive or not.

Semipermanent methods are predicted to be popular mostly in the same directions with temporary methods. This may be implied that Thai women consider semipermanent methods, IUD and norplant, as those temporary, but prolonged ones.

CHAPTER V. SUMMARY AND RECOMMENDATIONS

5.1 Summary

After analyzing possible determinants of the choice of contraceptive method: permanent, semipermanent or temporary method, it is shown that more or less the same socio-economic and demographic determinants as found from the CPS3 data in the study of Chamratrithirong and Stephen (1989), as mentioned earlier in Section 2.2, are also found significant in this study. Summary of the findings is as follows:

It should be noted here that Muslims tend to use a temporary method of contraception rather than a permanent method. That may be because of their religious perception. However, according to Al-Ghazali, a Muslim scholar from the eleventh century whose works have been of great influence on Muslim thinking, any form of contraception is reprehensible, but not forbidden. (The Netherlands, 1994) The relationship between education and contraceptive method choice is complex. That is because education has both direct and indirect effects on the choice. Women working in the agricultural sector are more likely to use a semipermanent method, mostly IUD, than the other methods. Permanent methods are more popular among women in urban areas than those in rural areas. Women from high-income families are more likely to use a permanent method; while those from low-income families to use a temporary method.

Women with many children normally want to stop their childbearing, thus they are likely to undergo a sterilization. On the contrary, women with few children and do not want to stop their childbearing yet, but rather

to space it, tend to use a temporary or a semipermanent method. Women who want more children later tend to use a temporary method or, less likely, a semipermanent method, while those who do not want more children will prefer using a permanent method.

When women are still young their intention of using contraception is to space their child births thus they tend to use a temporary method; while older women, normally with enough number of children, tend to terminate their childbearing thus they will use a permanent method. The longer the couples want to use contraception, the more likely they will use a permanent method, and the less likely they will use a temporary method.

If it is not convenient for women to go to a family planning center to get service/supply they are predicted to use a permanent method; while if it is convenient they will tend to use a temporary method. Many women think that using a permanent method is less expensive, partly because of the free sterilization service, than using a temporary method, when they have to pay for the contraceptive supply.

5.2 Recommendations

There is an increasing trend in using female sterilization, through support of physicians, after the women's giving the second birth in a hospital, for example. However, there are remarkable proportions of women aged over 40 years and having enough number of living children are still using temporary methods, while they or their husbands are somehow ready to be sterilized. Actually, these couples need to be convinced to undergo a sterilization.

Though male sterilization, which is an easier method than female sterilization, is included in the plan of the national family planning program to be strongly promoted, the method is still not so popular as expected. To increase number of new vasectomy acceptors, it needs a strong coordination between the national family planning program and non-governmental organizations, and further support, by providing free vasectomy or incentives approaches, for examples.

Muslims can be encouraged to undergo sterilization through clear interpretation of religious concepts, which, according to some religious leaders, do not forbid any methods, except abortion.

Condom is not so popular in Thailand; comparing with pills and injectable which are much more popular temporary methods. However, in order to protect HIV or AIDS transmission, condoms should be strongly supported, such as providing free or low-price condoms, again by related agencies in Thailand.

IUD may work to suit many women's intention to protect pregnancy for a long time well, but the problem is it seems to be popular only for those women who want to prolong their pregnancy. Campaigns to support IUD using as a semipermanent method, instead of using a temporary method, should be aimed at those women who want no more children but do not want to undergo sterilization.

Proportion of norplant users is very low, which may be due to the fact that the method is still under an experimental period at the time of the survey, the

scarcity, the side effects and the high cost of this method. However, in order to increase the total number of contraceptive acceptors, norplant may be further promoted as an alternative method for women who do not want to use IUD, the other semipermanent method, because of its side effects.

It is noteworthy here that low-income families tend to use temporary methods, which are actually expensive and not convenient methods. From a study of the Institute for Population and Social Research on cost of services (1991), it was indicated that the two cheapest methods per birth averted were male and female sterilization, which are permanent methods. While the two most expensive methods were condom and injectable, which are temporary methods. Thus, those couples with low income or those concerned about cost-effectiveness should be urged to use the permanent methods.

Though it is not clear from the findings that education, occupation or place of residence has strong influence on the choice of method, it is obvious that information, education and communication can play an important role in disseminating knowledge about the existence and the relative effectiveness of each method to prospective users.

REFERENCES

Chamratrithirong, Aphichat and Elizabeth Hervey Stephen
1989 "Determinants of Contraceptive Method Choice in Thailand", **Choosing a Contraceptive Method Choice in Asia and the United States**, edited by Rodolfo A. Bulatao, James A. Palmore and Sandra E. Ward, the East-West Center, Honolulu.

Chayovan, Napaporn, Peerasit Kamnuansilpa and John Knodel
1988 **Thailand Demographic and Health Survey 1987**, Institute of Population Studies, Chulalongkorn University, Bangkok, and Institute for Resource Development/Westinghouse, Columbia.

Guest, Philip and Aphichat Chamratrithirong
1993 "Rural Thai Social Setting and Family Planning Activity: Effects on Female Sterilization", paper prepared by Institute for Population and Social Research, for presentation at Meeting of Investigators of Rockefellor Funded Family Planning Evaluation Studies, Chiang Mai, October 1993.

Institute for Population and Social Research, Mahidol University and Human Resources and Social Development Program, Thailand Development Research Institute
1991 **Cost of Public Family Planning Services and Scope of Private Sector Provisions**, IPSR Publication No. 149.

Institute of Population Studies, Chulalongkorn University
1989 **Health and Population Studies Based on the 1987 Thailand Demographic and Health Survey**, Demographic and Health Surveys Further Analysis Series, No. 1.

Knodel, John, Aphichat Chamratrithirong and Nibhon Debavalya

1987 **Thailand's Reproductive Revolution: Rapid Fertility Decline in a Third-World Setting**, The University of Wisconsin Press.

Leoprapai, Boonlert and Varachai Thongthai

1989 **Contraceptive Practice of Thai Women 1987**, Results of the Study on determinants and consequences of Contraceptive Use Patterns in Thailand, by the Institute for Population and Social Research, Nakhonpathom.

Palmore, James A. and Rodolfo A. Bulatao

1989 "The Contraceptive Method Mix: An Overview". **Choosing a Contraceptive Method Choice in Asia and the United States**, edited by Rodolfo A. Bulatao, James A. Palmore and Sandra E. Ward, the East-West Center, Honolulu.

Thai Population Information Center

1992 **TPIC Presskit for the Fourth Asian and Pacific Population Conference (4th APPC)**, 19-27 August 1992, Bali.

The Netherlands, Ministry of Foreign Affairs, Development Cooperation Information Department

1994 **Women and Islam in Muslim Societies, Analysis & Policy**, The Hague.

APPENDIX I. TABLES

Table 1. General characteristics of the sample

	Percentage distribution	No. of cases (weighted)
Current age (years)		
15-19	3.1	140
20-24	15.0	671
25-29	22.8	1020
30-34	23.7	1060
35-39	19.1	853
40-44	10.9	487
45-49	5.4	242
Total	100.0	4473
Religion		
Buddhist	95.4	4267
Muslim	3.9	175
Christian	0.7	31
Total	100.0	4473
Education		
No schooling	4.6	206
Primary school	73.6	3291
Secondary school	17.8	796
Higher education	4.0	180
Total	100.0	4473
Occupation		
Agricultural	54.3	2427
Non-agricultural	28.5	1273
Housewife	17.3	773
Total	100.0	4473
Place of residence		
Urban	16.9	755
Rural	83.1	3718
Total	100.0	4473
Family annual income (Baht)		
Less than 10,000	22.1	959
10,000-19,999	23.7	1030
20,000-39,999	27.0	1172
40,000-99,999	21.2	921
100,000 and over	6.0	261
Total	100.0	4343
No. of living children		
No children	2.4	109
1-2	54.2	2426
3 and more	43.3	1938
Total	100.0	4473

Table 1. (Continued)

	Percentage distribution	No. of cases (weighted)
Want more children or not		
Do not want	74.8	3245
Want more children	25.2	1091
Total	100.0	4336
Age started using		
13-19 years	7.0	313
20-24 years	26.2	1169
25-29 years	33.8	1510
30-34 years	21.5	959
35-39 years	9.0	401
40-44 years	2.2	100
45-49 years	0.4	16
Total	100.0	4468
Duration of use		
Less than 1 year	25.5	1138
1-3 years	33.3	1489
4-10 years	31.3	1399
11+ years	9.9	442
Total	100.0	4468
Convenience		
Inconvenient	1.3	58
Convenient	98.7	4358
Total	100.0	4416
Expensiveness		
Not expensive	91.7	4042
Expensive	8.3	366
Total	100.0	4408

Table 2. Distribution of current users by methods and groups of methods

	Percent	Cases (weighted)
Pills	27.8	1244
Condom	2.5	113
Injectable	15.1	674
IUD	8.6	385
Norplant	0.2	10
Female sterilization	36.8	1647
Male sterilization	5.7	256
Safe period	1.2	54
Withdrawal	1.6	73
Breastfeeding	0.2	11
Others	0.1	6
Total	100.0	4473
Permanent methods	42.6	1904
Semipermanent method	8.8	395
Temporary methods	48.6	2174
Total	100.0	4473

Table 3. Mean analysis among groups of method

	Total sample means	Permanent method	Semi-permanent method	Temporary method	Significance among groups of methods
Muslim or not	0.04	0.01	0.03	0.06	0.00 *
Years in school	4.80	4.53	4.96	5.01	0.00 *
Occupation group (1-3)	1.63	1.63	1.43	1.66	0.00 *
Urban residence or not	0.17	0.19	0.09	0.17	0.00 *
Family income (10000 B)	3.70	4.32	3.10	3.27	0.00 *
Number of living children	2.57	3.18	2.48	2.04	0.00 *
Want more children or not	0.25	0.02	0.30	0.46	0.00 *
Age started current method	27.39	28.51	26.95	26.49	0.00 *
Duration using the method	4.04	6.11	3.08	2.39	0.00 *
Convenient to get service	0.99	0.99	0.98	0.99	0.76
Expensive to get service	0.08	0.04	0.03	0.13	0.00 *

Total cases = 4473 (weighted).
* Significant mean difference among groups, at the level of 0.05.

Table 4. Mean analysis among methods of the permanent group

	Total group means	Female Steril-ization	Male Steril-ization	Significance among methods
Muslim or not	0.01	0.01	0.03	0.03
Years in school	4.53	4.57	4.29	0.10 +
Occupation group	1.63	1.63	1.64	0.83 +
Urban residence or not	0.19	0.19	0.21	0.40 +
Family income (10000 B)	4.32	4.29	4.52	0.67 +
Number of living children	3.18	3.19	3.13	0.53 +
Want more children or not	0.02	0.02	0.04	0.03
Age started current method	28.51	28.44	29.03	0.08 +
Duration using the method	6.11	5.99	6.92	0.00
Convenient to get service	0.99	0.99	0.99	0.49 +
Expensive to get service	0.04	0.04	0.04	0.79 +

Total cases = 1904 (weighted).
+ Significant similarity between the two methods of the group, at the level of 0.05.

Table 5. Mean analysis among methods of the semipermanent group

	Total group means	IUD	Norplant	Significance among methods
Muslim or not	0.03	0.03	0.08	0.42 +
Years in school	4.96	5.99	4.93	0.23 +
Occupation group	1.43	1.41	2.00	0.01
Urban residence or not	0.09	0.10	0.00	0.31 +
Family income (10000 B)	3.10	3.08	3.76	0.70 +
Number of living children	2.48	2.48	2.25	0.59 +
Want more children or not	0.30	0.30	0.27	0.85 +
Age started current method	26.95	26.92	28.07	0.51 +
Duration using the method	3.08	3.14	0.99	0.09 +
Convenient to get service	0.98	0.98	1.00	0.69 +
Expensive to get service	0.03	0.03	0.00	0.53 +

Total cases = 395 (weighted).
+ Significant similarity between the two methods of the group, at the level of 0.05.

Table 6. Mean analysis among methods of the temporary group

	Total group means	Pills	Inject-able	Significance among methods
Muslim or not	0.06	0.05	0.07	0.21 +
Years in school	4.77	4.73	4.83	0.40 +
Occupation group	1.63	1.61	1.66	0.11 +
Urban residence or not	0.15	0.16	0.13	0.06 +
Family income (10000 B)	2.99	2.78	3.38	0.00
Number of living children	2.03	2.00	2.08	0.26 +
Want more children or not	0.47	0.46	0.47	0.72 +
Age started current method	26.27	26.18	26.45	0.35 +
Duration using the method	2.38	2.68	1.81	0.00
Convenient to get service	0.99	0.99	0.99	0.88 +
Expensive to get service	0.13	0.13	0.14	0.28 +

Total cases = 2174 (weighted).
+ Significant similarity between the two methods of the group, at the level of 0.05.

Table 7. Means and standard deviations of determinants of method choice

		Mean	Standard deviation	No. of cases (weighted)
	Method group (1=perm, 2=semi, 3=temp)	2.06	0.95	4473
Y1	Permanent method (1=yes, 0=no)	0.43	0.49	4473
Y2	Semipermanent method (1=yes, 0=no)	0.09	0.28	4473
Y3	Temporary method (1=yes, 0=no)	0.49	0.50	4473
X1	Muslim or not (1=yes, 0=no)	0.04	0.19	4473
X2	Years in school (0-17 years)	4.80	2.74	4473
X3	Occupation group (1=agr, 2=non-agr, 3=housewife)	1.63	0.76	4473
X4	Urban residence or not (1=yes, 0=no)	0.17	0.37	4473
X5	Family income (10000 B) (0-99.97)	3.70	6.38	4345
X6	Number of living children (0-15)	2.57	1.48	4473
X7	Want more children or not (1=yes, 0=no)	0.25	0.43	4336
X8	Age started current method (13-48 years)	27.39	5.71	4468
X9	Duration using the method (0-37 years)	4.04	4.44	4468
X10	Convenient to get service (1=yes, 0=no)	0.99	0.11	4416
X11	Expensive to get service (1=yes, 0=no)	0.08	0.28	4408

Table 8. Multinomial logistic regression coefficients for three groups of method choice

Variables	Permanent methods		Semipermanent methods		Temporary methods	
	B	Exp(B)	B	Exp(B)	B	Exp(B)
Muslim or not	-1.536 *	0.215	0.017	1.017	1.207 *	3.343
Number of years in school	0.001	1.001	0.083 *	1.087	-0.040 *	0.960
Occupation group						
Agricultural sector	-0.267 *	0.766	0.702 *	2.018	-0.078	0.925
Non-agricultural sector	-0.125	0.883	-0.035	0.966	0.108	1.114
Urban residence or not	0.133	1.142	-0.298	0.743	-0.057	0.944
Family income (10000 B)	0.029 *	1.030	-0.004	0.996	-0.025 *	0.975
Number of living children	0.299 *	1.348	0.074	1.076	-0.335 *	0.715
Want more children or not	-2.991 *	0.050	0.125	1.133	1.851 *	6.367
Age started current method	-0.031 *	0.970	-0.014	0.986	0.037 *	1.038
Duration using the method	0.151 *	1.163	-0.062 *	0.940	-0.136 *	0.873
Convenient to get service	-0.503	0.605	-0.229	0.795	0.518	1.679
Expensive to get service	-1.505 *	0.222	-1.139 *	0.320	1.713 *	5.546
Constant	0.318		-2.426 *		-0.525	
Overall correctly classified	75.47%		90.99%		75.19%	

* Significant coefficient, at the level of 0.05.

Note: As the sample size is large, the test that a coefficient is 0 can be based on the Wald statistic, which has a chi-square distribution. The significance level for the Wald statistic of each coefficient is computed. Only the coefficients marked with * are proved to be significantly different from 0, using a significance level of 0.05.

Table 9. Predicted percentage distribution of users by method group

	Permanent method	Semi-permanent method	Temporary method	Total
Current age (years)				
15-19	10.01	11.89	78.10	100.00
20-24	16.46	11.23	72.31	100.00
25-29	32.26	10.27	57.47	100.00
30-34	47.95	8.87	43.18	100.00
35-39	58.36	7.75	33.89	100.00
40-44	67.38	6.74	25.88	100.00
45-49	71.75	5.63	22.62	100.00
Religion				
Buddhist/Christian	45.11	9.04	45.85	100.00
Muslim	14.99	8.13	76.88	100.00
Education				
No schooling	50.48	6.18	43.34	100.00
Primary	46.82	8.77	44.42	100.00
Secondary	30.99	10.18	58.83	100.00
Higher education	38.40	12.05	49.55	100.00
Occupation				
Agricultural sector	43.38	11.30	45.32	100.00
Non-agricultural sector	45.80	5.88	48.32	100.00
Housewife	42.90	6.37	50.73	100.00
Place of residence				
Rural	43.03	9.68	47.29	100.00
Urban	49.22	5.17	45.62	100.00
Family annual income (Baht)				
Less than 10,000	38.58	10.51	50.91	100.00
10,000-19,999	43.01	9.72	47.27	100.00
20,000-39,999	43.20	8.60	48.20	100.00
40,000-99,999	47.53	7.60	44.88	100.00
100,000 and over	59.91	7.12	32.97	100.00
Number of living children				
No children	6.37	10.63	83.01	100.00
1	11.91	10.30	77.79	100.00
2	43.15	9.08	47.77	100.00
3	54.66	8.16	37.18	100.00
4	63.90	8.25	27.85	100.00
5+	69.86	8.60	21.54	100.00
Whether want more children				
Not want more children	57.09	8.37	34.54	100.00
Want more children	3.84	10.92	85.23	100.00

Table 9. (Continued)

	Permanent method	Semi-permanent method	Temporary method	Total
Age started current method (years)				
13-19	19.55	10.79	69.66	100.00
20-24	34.12	9.83	56.05	100.00
25-29	48.63	8.71	42.66	100.00
30-34	53.17	8.18	38.65	100.00
35-39	52.05	8.31	39.64	100.00
40-44	44.46	8.72	46.81	100.00
45-49	44.63	9.61	45.76	100.00
Duration using current method (years)				
Less than 1	21.54	10.99	67.47	100.00
1-3	34.05	10.09	55.86	100.00
4-10	60.24	7.65	32.10	100.00
11+	80.52	4.80	14.68	100.00
Convenience to get service				
Inconvenient	48.08	10.92	41.00	100.00
Convenient	43.91	8.98	47.12	100.00
Expensiveness to get service				
Not expensive	45.82	9.52	44.66	100.00
Expensive	23.06	3.18	73.76	100.00
Total mean	43.96	9.00	47.04	100.00
Total standard deviation	28.83	4.25	27.44	
Number of cases	1816	372	1942	

APPENDIX II. FIGURES

Figure 1. Predicted use by type of methods and religion

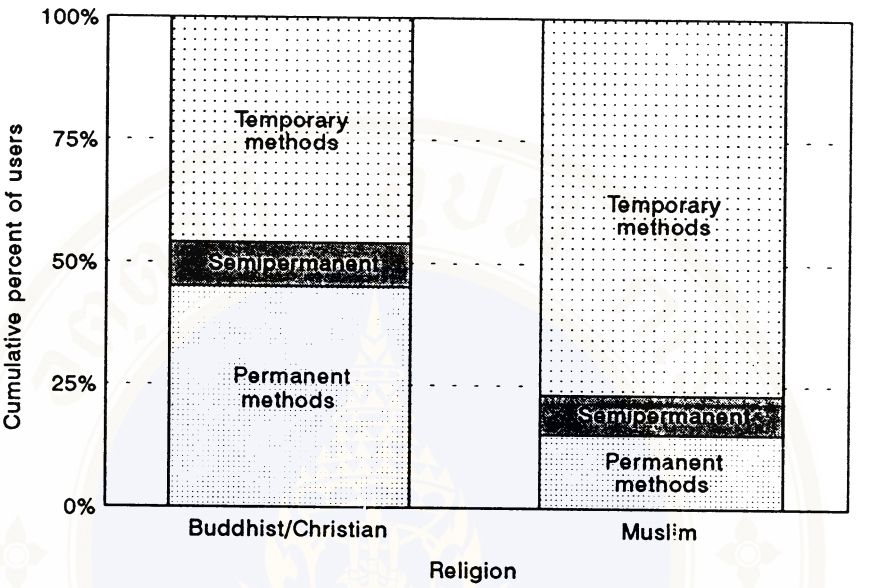

Figure 2. Predicted use by type of methods and number of years in school

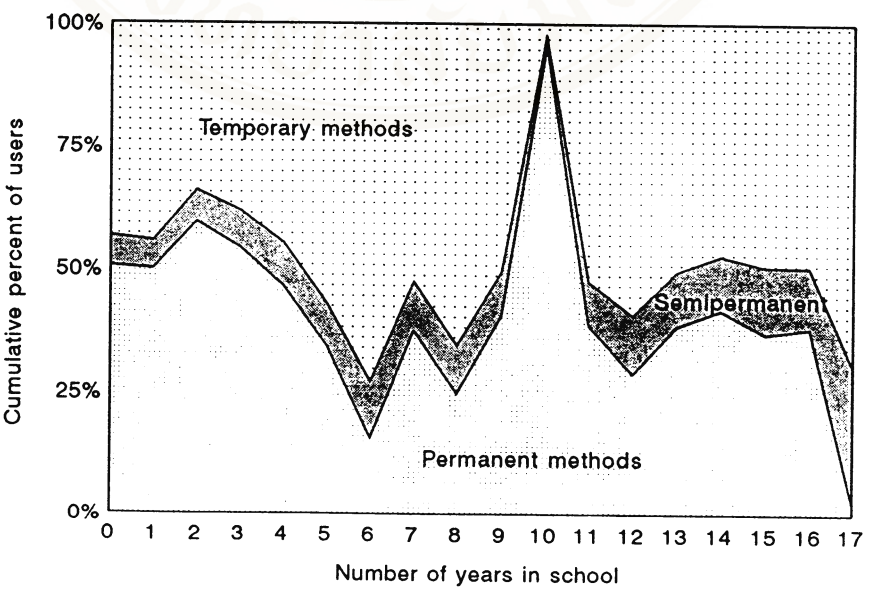

Figure 3. Predicted use by type of methods and occupation group

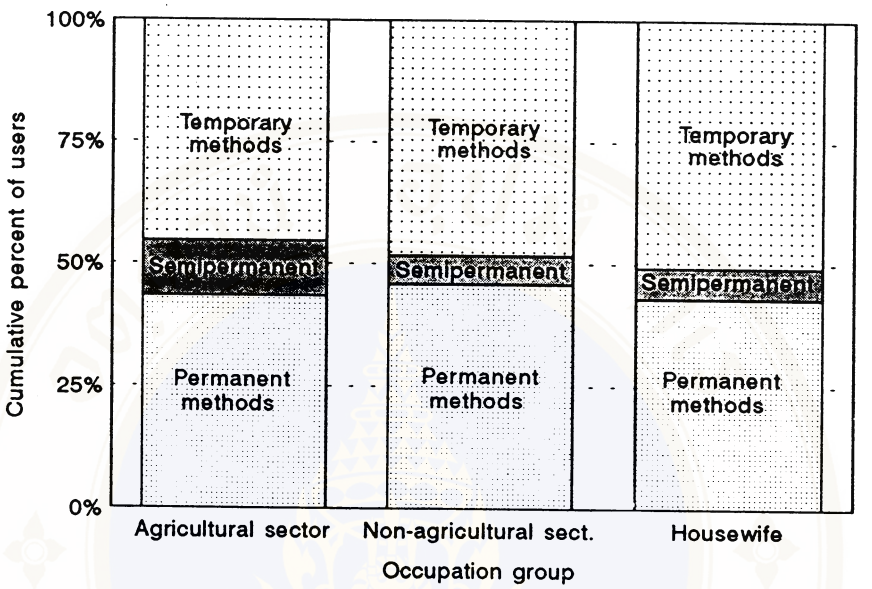

Figure 4. Predicted use by type of methods and place of residence

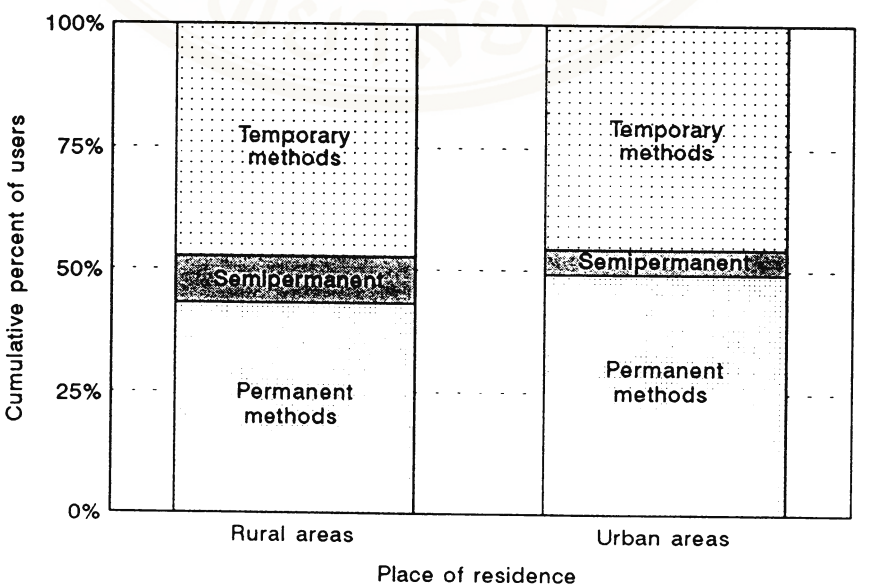

Figure 5. Predicted use by type of methods and family income group

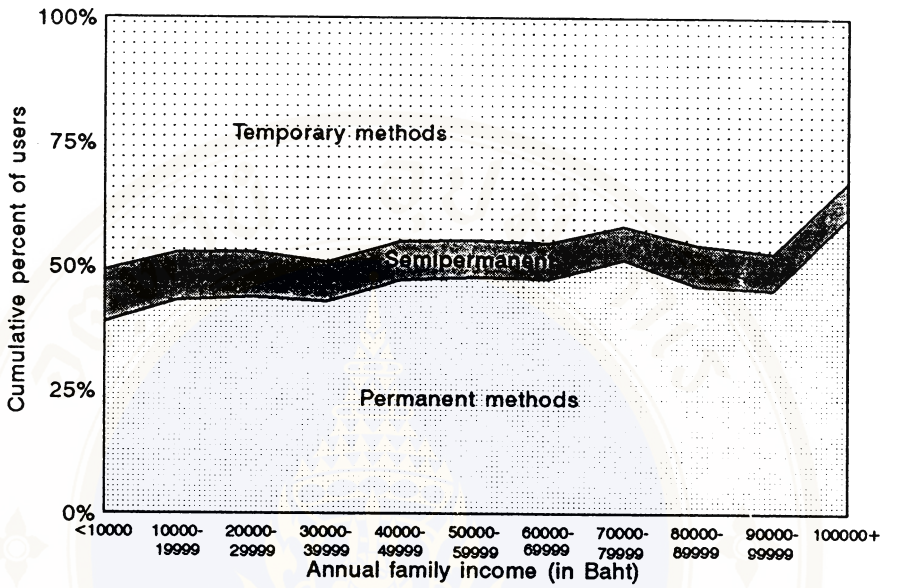

Figure 6. Predicted use by type of methods and number of living children

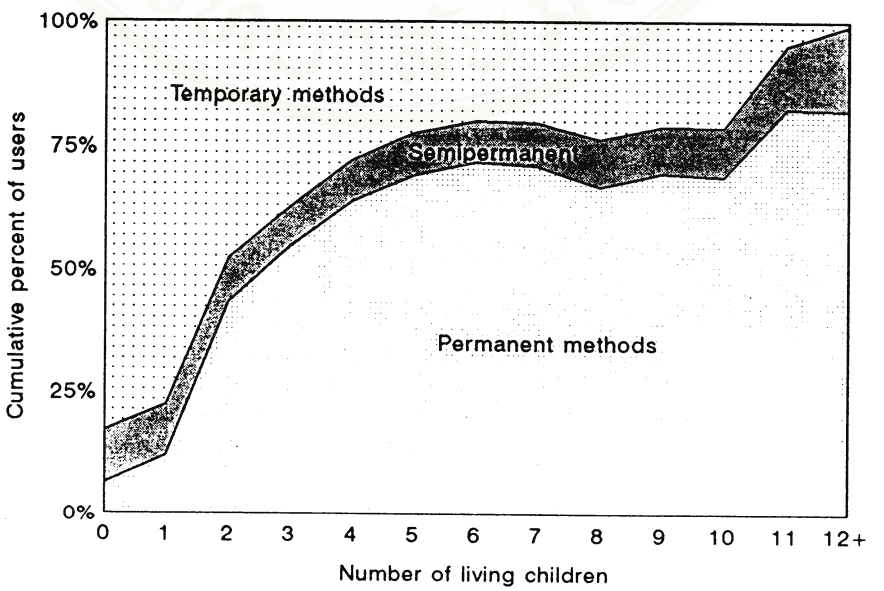

Figure 7. Predicted use by type of methods and whether want more children later or not

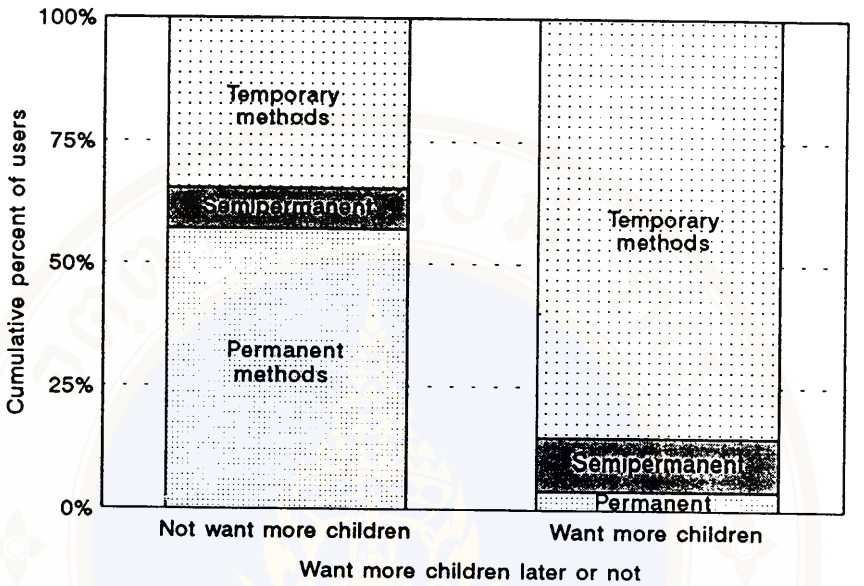

Figure 8. Predicted use by type of methods and age when start using the method

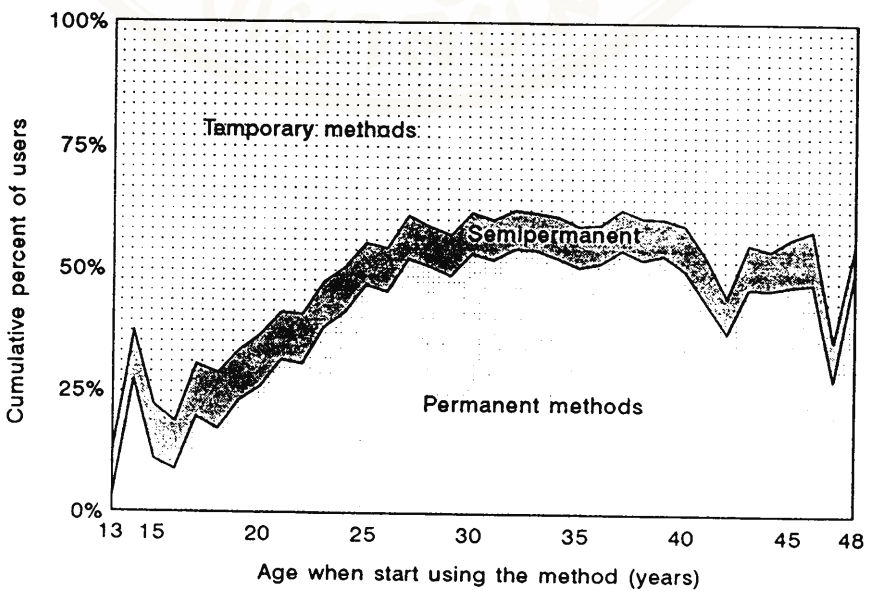

Figure 9. Predicted use by type of methods and current age

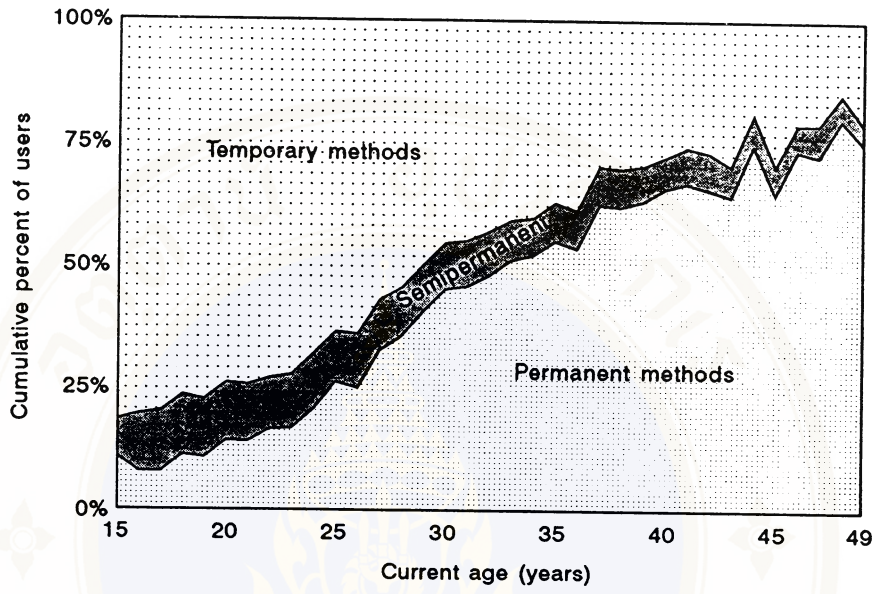

Figure 10. Predicted use by type of methods and duration of current use

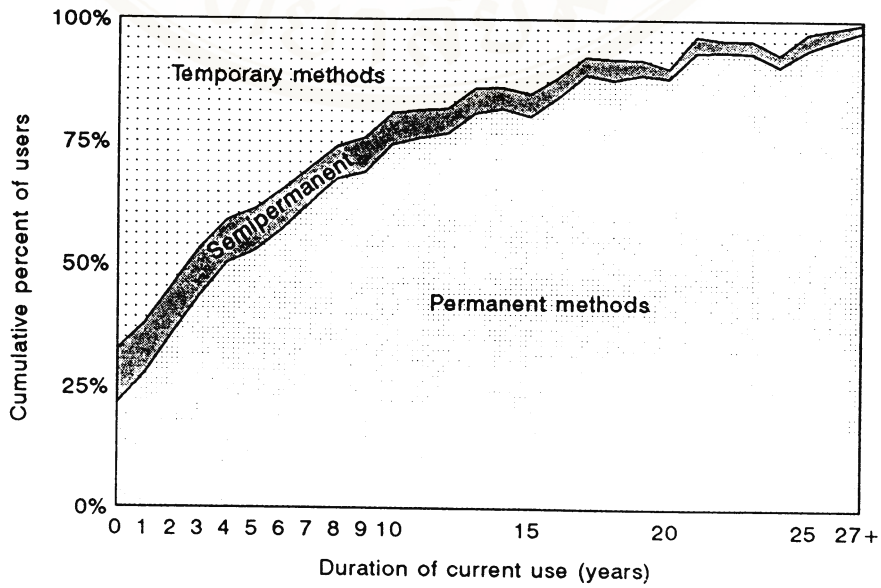

Figure 11. Predicted use by type of methods and whether convenient to get service or not

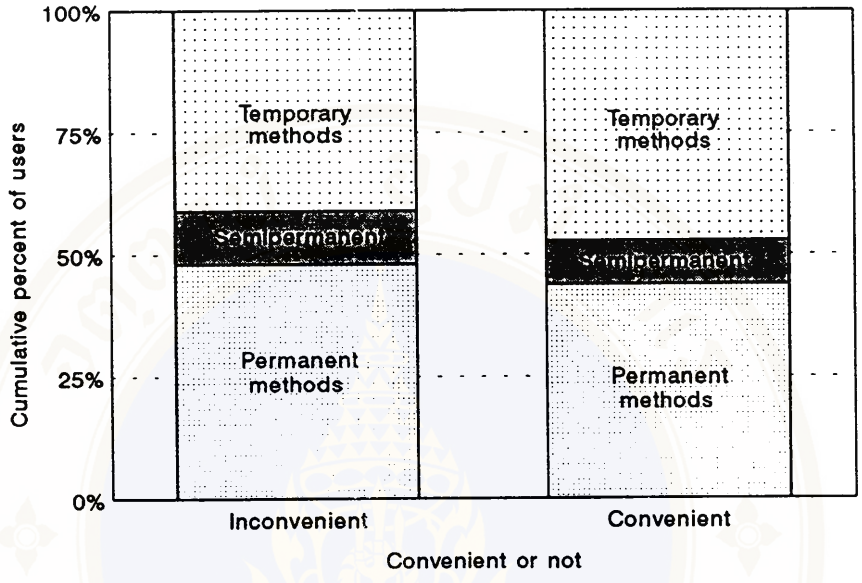

Figure 12. Predicted use by type of methods and whether expensive to get service or not