Utilization of Family Planning Services en Péru

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PHR advances knowledge and methodologies to develop, implement, and monitor health reforms and their impact, and promotes the exchange of information on critical health reform issues.

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Abstract

There is no doubt that women and children form part of those groups of greater vulnerability in all developing countries, and even in those countries with relatively high economic growth. Women have awakened particular interest in recent years, in all settings in which they might confront some type of discrimination and/or where they may be more vulnerable than their male counterparts, due to their innate characteristics.

This situation is no different in Peru, and women have been the object of a series of social programs in various areas. However, the results of these programs have not been adequately evaluated, nor have the programs been according to how well they have achieved the original objectives for which they were designed.

It is for this reason that we have concentrated our efforts on analyzing problems related to reproductive health in Peru, one of the most debated areas in what are referred to as women's issues. It should be noted that despite the efforts realized in recent years in family planning, the mother-child population has continued to increase in absolute terms, producing considerable congestion in the use of services, as coverage and quality in supply have not increased at the same rate.

It is for this reason that this study has attempted to investigate the determinants of reproductive health service utilization in the country, used as a mechanism to identify possible problems in the design and coverage of principle activities that have been carried out by each government so far in these areas.

Our research is focused on the study of four types of interventions: family planning, birth control, birth services, and the pap smear. Despite obvious differences in analysis due to the very characteristics of these interventions, it has been possible for us to reach general conclusions. Specifically, we have found that the variables with the most influence over reproductive and family health decisions are those related to the level of education and socio-economic status of the family, rather than those variables related to income and cost of services. In addition, coverage and quality of services have shown a relative importance in determining regular usage.

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Acronyms

EDIS	Estudio sobre Disponibilidad de Servicios de Planificación Familiar
	Study of the Availability of Family Planning Services
ENDES	Encuesta Demográfica y de Salud Familiar
	Demographic and Family Health Survey
ENDESA	Encuesta de Salud
	Health Survey, Universidad del Pacífico 1995
INANDEP	Instituto Andino de Estudios en Población y Desarrollo
	Andean Insitute of Development and Population Studies
INEI	Instituto Nacional de Estadística e Informática
	National Institute of Information and Statistics
MINSA	Ministerio de Salud
	Ministry of Health
WHO	World Health Organization
PAHO	Pan-American Health Organization
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development

Foreword

Part of the mission of the Partnerships for Health Reform Project (PHR) is to advance "knowledge and methodologies to develop, implement, and monitor health reforms and their impact." This goal is addressed not only through PHR's technical assistance work but also through its Applied Research program, designed to complement and support technical assistance activities. The main objective of the Applied Research program is to prepare and implement an agenda of research that will advance the knowledge about health sector reform at the global and individual country levels.

An important component of PHR's applied research is the Small Applied Research (SAR) program. SAR grants are awarded, on a competitive basis, to developing-country research institutions, individuals, and non-profit organizations to study policy-relevant issues in the realm of health sector reform. The SAR program has twin objectives: to provide data and analyses relevant to policy concerns in the researcher's own country, and to help strengthen the health policy research capacity of developing country organizations. While PHR provides technical advice and support to the SAR grantees, the content and conclusions in the final research reports are the responsibility of the grantees. They do not necessarily reflect the views of USAID or PHR.

A total of 16 small research grants have been awarded to researchers throughout the developing world. Topics studied include health financing strategies, the role of the private sector in health care delivery, and the efficiency of public health facilities.

SAR grant recipients are encouraged to disseminate the findings of their work locally. In addition, final reports of the SAR research studies are available from the PHR Resource Center and via the PHR website. A summary of the findings of each study are also disseminated through the PHR "in brief" series.

Small Applied Research Grants

Dr. Joseph K. Konde-Lule (Institute of Public Health, Makerere University). "User Fees in Government Health Units in Uganda: Implementation, Impact and Scope".

Dr. R. Neil Soderlund (University of Witswatersrand). "The Design of a Low Cost Insurance

Pedro Francke (Independent). "Targeting Public Health Expenditures in Peru: Evaluation of Ministry of Health Services and Procedures and Proposal of a Targeting System".

Alfred Obuobi (School of Public Health, University of Ghana). "Assessing the Contribution of Private Health Care Providers to Public Health Care Delivery in the Greater Accra Region".

V.R. Muraleedharan (Indian Institute of Technology, Department of Humanities and Social Sciences). "Competition, Incentives and the Structure of Private Hospital Markets in Urban India: A

Dr. George Gotsadze (Curatio International Foundation). "Developing Recommendations for Policy and Regulatory Decisions for Hospital Care Financing in Georgia".

Dr. Aldrie Henry-Lee (The University of West Indies, Institute of Social and Economic Research). "Protecting the Poor, High Risk and Medically Indingent under Health Insurance: A Case

Dr. Maria C.G. Bautista (The Institute for Development Policy and Management Research Foundation, Inc.). "Local Governments' Health Financing Initiatives: Evaluation, Synthesis and Prospects for the National Health Insurance Program in the Philippines".

Oliver Mudyarabikwa (University of Zimbabwe). "Regulation and Incentive Setting for Participation of Private-for-Profit Health Care Providers in Zimbabwe".

Easha Ramachandran (Institute of Policy Studies, Health Policy Programme). "Operating Efficiency in Public Sector Health Facilities in Sri Lanka: Measurement and Institutional Determinants of Performance".

Dr. M. Mahmud Khan (Public Health Sciences Division, Center for Health and Population Research). "Costing the Integrated Management of Childhood Illnesses (IMCI) Module: A Case

Dr. Arlette Beltran Barco (Universidad Del Pacifico). "Determinants of Women's Health Services Usage and Its Importance in Policy Design: The Peruvian Case".

Frederick Mwesigye (Makerere University, Makerere Institute of Social Research). "Priority Service Provision Under Decentralization: A Case Study of Maternal and Child Health Care in Uganda".

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Mathias L. Kamugisha (National Institute for Medical Research- Amani Research Center). "Health Financing Reform in Tanzania: Appropriate Payment Mechanism for the Poor and Vulnerable Groups in Korogwe District, Northeastern Tanzania".

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Executive Summary

There is no doubt that women and children form part of those groups of greater vulnerability in all developing countries, and even in those countries with relatively high economic growth. It is for this reason that many social programs and the help of international organizations are oriented towards the necessities of these population groups. Specifically, women have awakened particular interest in recent years, in all settings in which they might confront some type of discrimination or vulnerability.

In Peru, women have been the object of a series of social programs in various areas. However, the results of these programs have not been adequately evaluated, nor have the programs been assessed according to how well they have achieved the original objectives for which they were designed. As such, the research that has been undertaken to date on "women's issues" has been limited and incomplete, leaving a series of gaps that restrict their utility for improving efforts of assistance and the revision of political measures directed towards this target population.

With this evidence considered, this paper studies the determinants of reproductive health service utilization in the country, as a mechanism for the identification of possible problems in the design and coverage of the principal activities carried out so far by each government in such areas, in order to suggest improvements in their design. Note that the previously mentioned problems are explained by a series of limitations that originate from the supply of services, but that are also explained by restrictions in demand. Here we have focused on the analysis of the latter, though quite a bit of evidence was presented around problems of supply.

An exhaustive bibliographical review has permitted us to initiate the study presenting the state of reproductive health in Latin America and Peru. Through this exercise, a decrease in demographic growth in Latin America during the last forty years was confirmed, which has generated a relative decline in the mother-child population. However, in absolute terms, the whole population has grown, leaving a deficit in health services that has developed proportionally. As such, the region is confronting serious problems like high abortion rates, maternal and perinatal death, poor quality of health services and restrictions in their supply, among others. In Peru, the situation is equally fragile, with high maternal mortality (303 deaths per 100 thousand live births), principally due to direct obstetric reasons (hemorrhages, hypertension, and other complications of pregnancy and delivery) and abortion.

Coverage and/or use of the main reproductive health services in Peru is not , which explains why important sectors of the population are not well served. For example, the insatisfaction of demand for family planning reached 18 percent at the national level, and 34 percent in the rural areas. Also, it has been estimated that 23.1 percent of Peruvian women do not have any prenatal care. Finally, with respect to the pap smear, coverage is 20.8 percent at the national level. These statistics can be explained by problems of demand as much as by problems of supply.

Many restrictions in demand for reproductive health services can be mentioned: lack of information about various interventions and their implications on the health of the woman, beliefs and fears, rooted machismo (male chauvinism), and the cost of services which, in many cases, decreases demand. With respect to restrictions in supply, we have low availability of health services near potential patients' homes; restrictions in the provision of medical supplies, equipment and health professionals in the institutions providing services; poor quality of care, which makes good

communication with patients difficult and reduces the probability of continued treatment; and problems in the conception and design of existing programs in the area of reproductive health.

This research has focused on four types of interventions: family planning, birth control, delivery care and the pap smear. This study has tried to identify the socio-demographic variables linked to families as well as the variables of the quality and coverage of health services that have the most influence on utilization, and has tried to determine the sensitivity of utilization to these variables. In addition, the study has simulated policy changes that modify the most influential variables that can be controlled by health authorities, leading to changes in demand for and utilization of reproductive health services. From the results obtained, we have proposed some modifications in the current design of programs geared towards reproductive health care in the nation.

With this task in mind, we have conducted a statistical and econometric analysis of the *Encuesta Demográfica y de Salud Familiar* (ENDES 1996), complemented with the Census on Health Infrastructure and Health Sector Resources (1996). Specifically, we have utilized methods of cross-sectional estimation to study qualitative and discrete decision variables. Each type of decision analyzed was estimated with an ad-hoc methodology. The decision to utilize family planning and undergo the pap smear was run with a binomial probit, that of pregnancy with a sequential probit, and that of delivery with an ordered model.

The selection of which variables to include was determined through a review of the correlation matrix and of the bibliographic review on reproductive health issues. Socio-economic characteristics of the woman and her family were incorporated, such as the level of income, education, age, and number of children, in addition to variables such as the availability of specific health services, information about those services, quality and coverage of those services, and other characteristics.

Then, we proceeded to estimate a group of equations and test the combined and individual significance of the variables. Similarly we verified the goodness of fit of the model as a whole. It is worth mentioning that some of the estimations made, especially those of family planning, have suffered from a low global fit; we believe that this is due to the lack of key variables like family income and the small proportion of women who claimed they did not utilize any contraceptive method.

From the analysis realized in this work, we have reached a series of conclusions on reproductive health in the country.

Variables such as the education of the couple, information about the effects of reproductive health interventions, and the economic situation of the family have been shown to have more influence on the behavior of Peruvian families in decisions of utilizing reproductive health services than the level of income and the cost of services. The relative importance of variables associated with coverage and quality of health services has also been demonstrated.

Specifically, in family planning, the most important variables explaining the behavior of the woman with respect to the use of contraceptives are those linked to the partner: a stable relationship and the partner's level of approval and their communication on the issue. Similarly, the education of the couple and their understanding of information on reproductive health demonstrate a high level of influence on the decision of whether to utilize contraceptive methods. It is in this way that we conclude that all of these factors are much more important than the variables of income, cost of services, and coverage in these types of decisions.

The use of birth control and the number of check-ups a woman undergoes are strongly influenced by the education of the couple, especially by that of the woman, as well as by other socio-demographic variables, such as her marital status, the number of children, and her age. That is to say, an adequate family environment and the existence of a relatively solid relationship increases the probability that the child will be well cared for from the beginning. One must not leave out the importance of the variables of coverage (geographic area) and quality of service (availability of basic services of health institutions), as well as some indicators of family well-being, nor the availability of health insurance, which allows us to conclude that in the case of the second decision, the elements of price and income have a relatively greater importance.

A very similar pattern can be appreciated in the case of delivery care, though the coverage of the service, collected through variables of geographical area, has a relatively greater importance for delivery care than it does for pregnancy.

Finally, with respect to the pap smear, the variables linked to information about the exam and acceptance on the part of women of the necessity to undergo it have a fundamental importance in the decision to do it. In this way, the fact that the woman has a stable partner and is sexually active substantially increases the probability that she demand the service, even though all women over 18 should have the exam done. Other variables related to the socioeconomic level of the family and the quality of services are also of essential importance.

Based on these results, we propose some policy recommendations.

Given the variables identified as determinants of reproductive health service utilization, it is of particular importance to improve the level of education of the couple as well as the amount of information they manage with respect to these issues. This way, it will be possible to clearly identify their necessities and eliminate misconceptions, so that it will be easier to develop successful reproductive health programs.

Another element of importance is the coverage and quality of health services that are offered. The greater utilization that is verified in urban zones exhibits not only an income effect (the greater income of urban zones favors an elevated level of demand), but also provides evidence of the positive effects of greater coverage, access, and quality of services.

Specifically, an adequate family planning program should concentrate efforts on three activities: integrate the couple into the program, improve the amount of information available with respect to alternative birth control methods that can be accessed, and increase the coverage of the program.

With respect to prenatal care and delivery services, the best way to improve utilization is through an increase in coverage and quality of services. Moreover, it would be imperative to improve access to health insurance to reduce the costs associated with consultations and medications, which can guarantee greater demand of services, especially for those women who have a limited budget.

Lastly, with respect to the pap smear, in addition to the general measures already mentioned, the most important effort should be the dissemination of sufficient information among women who should have the exam done. This information must include the risks of not doing it as well as clarify who should have the exam done regularly.

Finally, it is necessary to mention the evident relationship between these four interventions. An adequate family planning program guarantees fewer children. As a consequence, the quality of care given to each member of the family is improved, including the mother, which would naturally increase prenatal care and improve delivery services, as well as other preventive exams. For these reasons, we suggest that the strategy for improving reproductive health be definitively integral.

1.   Introduction

There is no doubt that women and children form part of those groups of greater vulnerability in all developing countries, and even in those countries with relatively high economic growth. Women have awakened particular interest in recent years, in all settings in which they might confront some type of discrimination and/or where they may be more vulnerable than their male counterparts, due to their innate characteristics.

In Peru, women have also been the object of a series of social programs in various areas, programs that in many cases have not been adequately designed and/or monitored. Our interest in this study is to analyze the issues of the woman and her family in the area of family planning, given the fact that in Peru, coverage and utilization of the principal reproductive health services have not been extensive. Specifically, the excess demand not satisfied by birth control services in Peru is 12 percent, reaching a figure of 20 percent in the rural areas.

It is for this reason that this study seeks to identify and analyze the determinants of family planning service utilization in Peru, as a mechanism for determining possible problems in the design and coverage of principal health interventions carried out by each government in this area so far, those that have provoked deficiencies in these services.

In this way, and through a statistical and econometric analysis of the *Encuesta Demográfica y de Salud Familiar*, ENDES 1996 (INEI, 1996), and the Census of Health Infrastructure and Health Sector Resources 1996 (MINSA, 1997), it has been confirmed that the variables with the most influence over decisions of family planning are those linked to the couple, such as level of education and economic well-being of the family, rather than those variables associated with income flow and the costs of services, since, in general, these can be subsidized. Similarly, coverage and quality have demonstrated a relative importance in the decision of regular use.

The main limitations of this work relate to the availability of adequate and pertinent information, as the sources utilized have a series of weaknesses that prevent the realization of a more complete analysis. Among these faults, the absence of a direct measure of family income should be mentioned, for which reason it has been necessary to work only with those resources generated or produced by the woman, given her potentials.

This report is divided into six sections, including the present introduction. The second section describes the principle objectives of the study and the methodology utilized in the work. In the third section, an analysis of the situation of family planning in Latin America, and particularly in Peru, is presented, in an attempt to compare it to the rest of the countries of the region. In addition, the principal restrictions of supply and demand that the utilization of these services confronts in our country is analyzed, in order to end the discussion with a presentation of the main efforts made in this area by the public and private sectors. In the fourth section, the estimation of the model of utilization of family planning services is demonstrated, including a statistical description of the principal relationships that the two sources of information utilized reveal among various socioeconomic variables of the family, quality, and coverage of reproductive health services, and the use of the main

contraceptive methods. Then, the model of utilization is estimated and we explain the main results discovered in detail. In the fifth section, we conduct a series of simulations using the estimated model, with the aim of establishing the impact that various policy measures would have on the utilization of services and family planning. Finally, in the last section, we present the main conclusions and recommendations derived from this study.

2. Objective and Methodology

The main objective of this study is to identify and analyze the determinants of family planning service utilization in Peru, with the aim of suggesting improvements in the design of the programs developed in this area.

To reach this objective, the two following preliminary steps were taken in the process of estimation itself:

> Bibliographic review, searching the main libraries of the country and those of a series of websites on the internet, as well as through interviews with Ministry of Health officials and visits to institutions of interest.

> Selected data from two databases were utilized throughout this study: *the Encuesta Demográfica y de Salud Familiar*, ENDES 1996 (INEI, 1996)[1], and the Census of Health Infrastructure and Health Sector Resources, 1996 (MINSA, 1997)[2].

With respect to the process of estimation, the decision of family planning was estimated using the probit methodology (see Annex A) since the dependent variable had a binomial definition (use or non-use of contraceptive methods).

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[1] *ENDES 1996* is a survey conducted over a population large enough to allow us to have samples of over 10,000 observations. Also, they have a great amount of qualitative information linked to perceptions and opinions on the use of family planning services and their importance for the couple and the family. However, one of the main weaknesses that we confront is that it does not collect information on family income nor expenses that are incurred for these services. To resolve this difficulty, we have constructed two proxy variables: one for price and another for income.

The first proxy was not of utility in the estimations conducted, and was hence thrown out; instead we used the right to medical insurance as an approximation of the payment that is required for the use of and access to services. In the case of income, only that generated by the woman was available; obviously this information is completely partial as it leaves out the income of the husband, who is generally the principal income earner of the household.

On the other hand, as it is pointed out in the Main Report of the 1996 ENDES, there are two possible sources of error in the survey: (i) those which are produced during the act of collection and processing information (non sample errors) and (ii) those which come from having interviewed only a sample and not the entire population (sample error). According to this report, for the elaboration of ENDES 1996, a series of procedures were followed (like careful design and numerous tests of the questionnaire, intense training of the survey administrators, etc.) with the aim of reducing to a minimum the first type of error, which was contained within reasonable margins.

The second type of error is measured through the standard error that points to the rate of precision with which the statistics calculated from the sample approximate the result that would have been obtained working with the entire population. The Main Report of ENDES 1996 offers a series of tables where the measures of error of the sample for each variable of the questionnaire are presented. This report holds that in general, the sample can be classified as quite precise, given that the standard errors are very small.

[2] District information of this census was connected to ENDES 1996, with the aim of including some variables which more directly measure the availability, coverage, and quality of the health services of each area. Even though this information was not found for each individual (researching the characteristics of the institution or the health provider), it was considered an important contribution to include variables of such nature at least for the district areas.

The selection of relevant explaining variables was carried out through a process of trial and error. First, a long list of variables originating from the bibliographic review on the subject of reproductive health, and from the analysis of models constructed previously by various authors for other countries, especially for developing countries, was compiled. Among these variables are socioeconomic characteristics of the woman and her family, availability of specific health services, information on these services, quality and coverage of these services, and others.

Then an inspection of the correlation matrix of the dependent variable and of the principal explaining variables collected was conducted. This inspection had a dual objective: i) to determine which of the explaining variables have a greater influence over the use of contraceptive methods and the direction of the relationships, and ii) to establish to what extent some of the suggested explaining variables could be correlated to one another[3]. Thanks to the results of this matrix, it was possible to eliminate some explaining variables and to test the adjustment of the model, alternatively, with those which presented high correlation between one another.

After that, the first working hypotheses with respect to the expected signs were obtained for the relationships between the dependent variable and the explaining variables selected from the prior analysis, through an analysis of cross tables.

Finally, we proceeded to estimate a set of equations and to test the combined and individual significance of the variables. Thus, the goodness of fit was verified as a whole[4]. Then, we conducted an analysis of the relative importance of the different explaining variables, such as simulations from the estimated models with the aim of predicting utilization of reproductive health services and the changes in utilization faced with modifications in the variables that can be managed by the respective officials.

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[3] This would be the case of variables that show the availability of different basic services in the house, or the condition of the rural area in which the family lives and the coverage of some health services there, among other examples.

[4] It is worth mentioning that the estimation has suffered from a low global adjustment; we think that this is a product of the lack of key variables like family income and the limited proportion of women interviewed that use no contraceptive method, that makes the sample less representative of the number of women not controlling conception.

3. State of Family Planning in Latin America and Peru

3.1   General Notions of Reproductive Health

There currently exists a great concern world-wide to control the high rate of population growth that is observed in many countries of the Third World, mainly because they lack the necessary resources to maintain such a rate of population growth. In Peru, the size of some families belonging to lower social strata that do not have the economic means necessary to satisfy their basic needs is a cause of great concern.

Faced with this situation, the will of the society and the state have come forth to regulate population growth through campaigns that call for family planning and birth control. These campaigns are currently a cause of great debate, given that they deal with the freedom of the couple to decide the size of their families and that religious beliefs are involved.

In the report of the International Conference on Development and Population in El Cairo, reproductive health was defined as "a state of general physical, mental, and social well-being, and not a mere absence of illness and ailments, in all aspects related to the reproductive system and its functions and processes" (United Nations, 1994). In the same document, it is pointed out that this implies the enjoyment of a satisfactory sexual life, where the couple decides whether or not to procreate without any risk. On the other hand, a series of benefits, such as a decrease in maternal mortality[5] and an increase in the health of newly-borns[6], have been attributed to family planning (Saavedra, 1988).

In general, there are two methods of family planning: traditional forms that are based on detecting and monitoring the fertility periods of the woman, and artificial forms that use chemical substances and/or devices to prevent pregnancy. In general, the latter have a greater probability of success than the former, especially when the woman has an irregular cycle.

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[5] Family planning contributes to the reduction of the number of undesired pregnancies that can end in illegal abortion.

[6] The probability that a child be delivered and develop in a healthy way decreases as the pregnancies of the mother are less spaced out.

3.2   Diagnosis of the State of Reproductive Health in Latin America and Peru

3.2.1   General Characteristics

Since the beginning of this century, Latin America has been the scene of a demographic transition process that implies passing through a stage of high fertility and mortality with low growth rates, and another of low mortality and low demographic growth. This process is reflected in the increase in life expectancy and the decrease in the infant mortality rates, the decrease in fertility rates and an accelerated process of urbanization. However, in the passing from one stage to the next, a difference between the rapidity of decrease of the mortality and fertility rates took place that brought about an explosion in population growth.

Thus, during the first years of 1950, 20 Latin American countries exhibited total fertility rates (TFR) of six or more children per woman, among them Peru (6.9), Ecuador (6.9), Bolivia (6.7) and Brazil (6.1) (PAHO/WHO, 1992). Towards 1993, in contrast, a general decrease in the fertility rate was observed among the countries of the region, as was the case in Peru (3.5), Ecuador (3.8), Bolivia (4.8), and Brazil (2.7). However, by that year, there were still countries with high fertility rates, principally Haiti (6.4), Guatemala (5.6) and Honduras (5.2) (PAHO, 1996).

It is worth mentioning that Peru is very close to the mean of fertility of the countries in the Latin American region, as observed in Figure 1.

Figure 1. Global Fertility Rate in America

Source: WHO, 1996b.
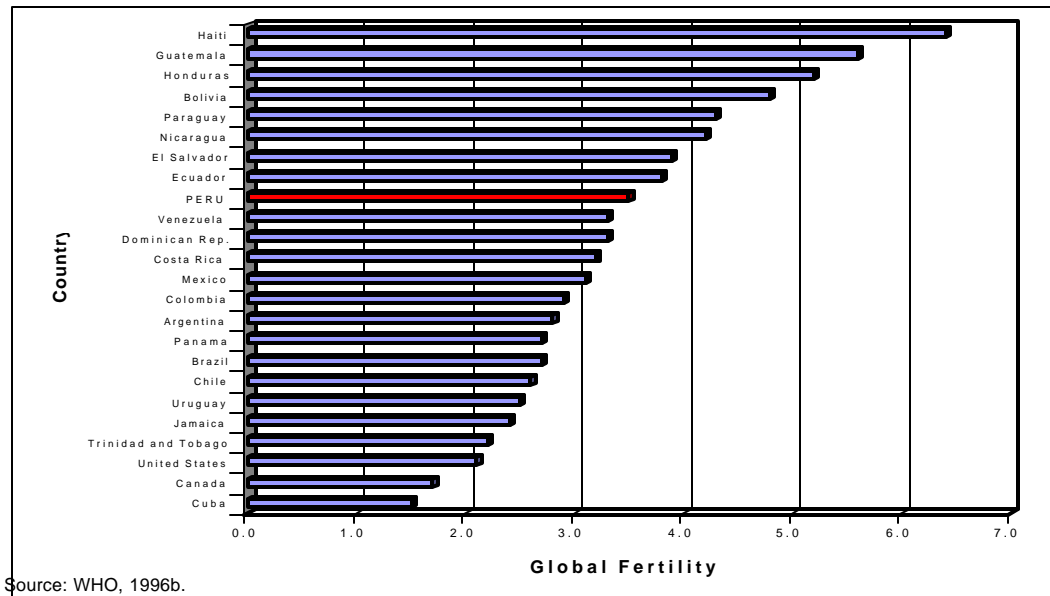
As to be expected, the correlation between the size of the fertility rates and the use of contraceptives is negative. A decrease in the fertility rate is generally preceded by an increase in the rate of contraceptive utilization in women between the ages of 15 and 49 years old, and by an increase in family planning services (PAHO 1996). However, the decrease in fertility does not constitute the ultimate objective of family planning.

There have been two main objectives of family planning in the Latin American region: to develop policies on population and to preserve mother-child health. With respect to this issue, PAHO points out that family planning "exercises a positive influence on health, development and the well-being of the family, in addition to a very important effect on the mother and the child (PAHO/WHO, 1992).

These objectives, however, have not been achieved in the entire region because in developing countries there exist many women who would like to delay their maternity or not have more children, but lack the true possibilities of choice, as pointed out by the World Fertility Study (Omideyi, 1990, p.17). In this vein, there are a series of factors that explain the reproductive health of the woman. Among them we find education, age, the number of children, the socio-economic level, the level of income, marital status, the area of residence and occupation, and others (PAHO/WHO, 1992).

In order to satisfy the demand for reproductive health services, private organizations as well as governmental organizations can complement the work of the state. The private sector plays an important role in the production and administering of reproductive health services, as much in providing education and appropriate information about population and development programs. On the other hand, the nongovernmental sector (including nonprofit groups and organizations at the local, national, or international levels) have been able to help formulate, carry out, supervise, and evaluate different activities in the area of development and population. These organizations present relative benefits with respect to governmental organizations as they are more innovative and flexible in their vision and execution of these programs and frequently maintain links to and interact with groups which governmental sectors find less accessible.

In recent decades, in the majority of developing countries of the region there has been a strong and growing demand for family planning services. According to PAHO statistics, in 1965, only one country in the Latin American region offered family planning services within its health program. In 1974, the World Conference on Population in Bucharest took place, and one year later, 17 countries in the region provided family planning services through various governmental institutions. In 1983, there were only two countries in the region that did not recognize and support family planning; the rest had already integrated programs of mother-child health services, having a significant effect on fertility and a decrease in the mortality of that population group (PAHO/WHO, 1986).

Figure 2. Prevalence and Use of Contraceptives: Percent Married Women of Child-bearing Age who Use Contraceptives (1990-1991)
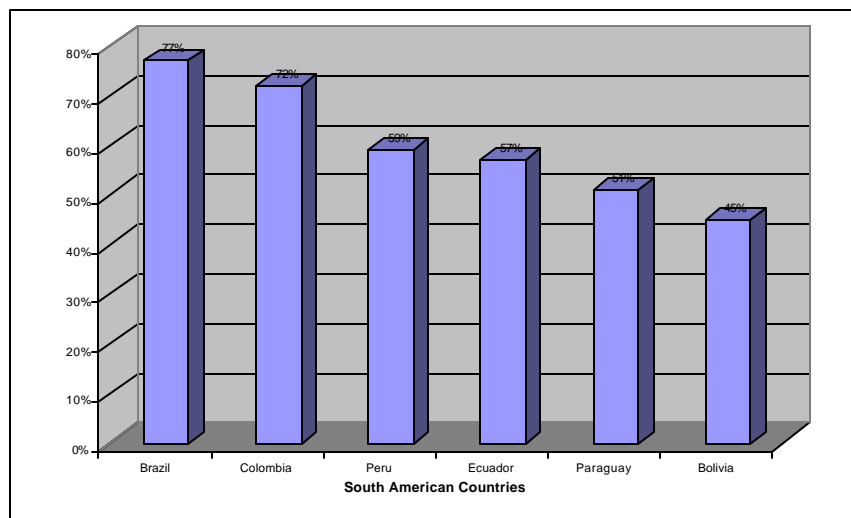
Source: Population Reference Bureau (PRB), 1998.

According to the Population Reference Bureau, in 1998, 67 percent of the married women in Latin America and the Caribbean used contraceptives. It is worth pointing out that Peru is one of the Bolivarian countries with the second highest rate of utilization, which reaches 59 percent. This proportion is explained by the expansion of reproductive health programs and the distribution of all modern contraceptive methods at no price to the user, even though these factors do not necessarily reflect an increase in the quality of service.

With respect to the insatisfaction of demand for family planning services in Peru, two levels can be observed:

> Women who do not want children but are not familiar with methods for preventing conception;

> Women who do not want more children, are familiar with contraceptive methods, but due to economic constraints, can not acquire them.

The Peruvian evidence demonstrates that 12.14 percent of women in a relationship have an unmet necessity for family planning, 3 percent for spacing out the birth of their children, and 9 percent to limit the number of children (INEI, 1996b). Similarly, there exists a great difference between the percent of unmet necessity in the urban versus rural areas (9 percent compared to 20 percent, respectively).

In Peru, it could be considered that 85 percent of the total demand for family planning is not satisfied[7] (INEI, 1996b). This situation has improved if we compare it to the year 1991, when the percentage of unsatisfied demand was 80 percent (five percentage points less than in 1996) and the unmet necessity was at 16 percent (four percentage points more than in 1996).

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[7] Unsatisfied demand is defined as:

$$\text{percentage satisfied demand} = \frac{[(\text{satisfie d need}) + (\text{failure of method})]}{\text{total demand}}$$

It might be mentioned that the reduced utilization of contraceptives and unsatisfied needs for family planning are in many cases a response to restrictions in demand and supply associated with reproductive health services, like those we will analyze in the coming sections.

3.2.2 Restrictions of Demand Associated with Reproductive Health Services

The restrictions on the demand side are those factors which explain why women do not make use of reproductive health services, even though they may be available. Among these factors we can cite fears on the part of the woman, unfamiliarity in the area of reproductive health, religious beliefs that restrict the correct use of certain family planning methods, and others.

3.2.2.1 Lack of Information

In Peru, according to a survey administered by INANDEP (Li, 1992), there exists a great gap between apparent knowledge and the real knowledge of the use of contraceptive methods. According to the survey, the real knowledge was half the number of women who claimed to be familiar with each method mentioned. For example, more than 27 percent of the women who use the rhythm method incorrectly identified the dates during which they could get pregnant, and 13 percent of those that used birth control pills did not know how to take them correctly. This lack of information would in part explain the percentage of error of contraceptive methods: according to the ENDES of 1992, 17 percent of the women that use some type of reversible method get pregnant within 12 months of having started using it (INEI, 1992a).

It is worth mentioning that the real knowledge of the methods is clearly associated with marital status, the migratory condition, and the level of formal education of the users. The complexity of the information provided constitutes a serious problem, especially for those who come to a family planning center for the first time, and who are frequently victims of an overload of information that prevents them from adequately understanding the essence of the message that health officials wish to convey.

Another difficult aspect related to the attainment of information is constituted by the nervousness of the patient due to a physical exam that was carried out or the bureaucratic routine. In addition, the sophisticated vocabulary used and the formats and drawings that transmit the information are not clear for less educated persons (Mayone, 1984).

3.2.2.2 Beliefs and Fears in the Area of Reproductive Health

The presence of a series of fears and beliefs among women prevents them from the correct use of contraceptive methods. Thus, there exists a percentage of women who have access to free contraceptive methods but who do not use them due to a series of fears, which are fed by rumors that emphasize and distort the health risks associated with the use of modern contraceptives.

A widely found rumor shared by many women consists of the idea that reversible family planning methods, such as oral contraceptives and the IUD, can make women permanently sterile. Similarly, it is thought that the pill produces cancer, despite recent studies showing that oral contraceptives actually protect women from ovarian and endometrium cancer.

All this is reaffirmed in a study done by Dina Li in five cities of Peru[8] (Li, 1992), where it is shown that among women who use no contraceptive method, more than half admitted to fears of modern contraceptive methods. These fears were greater among those who used traditional methods, such as the rhythm method and withdrawal.

3.2.2.3 Machismo Rooted in the Population

Machismo is a tendency which is quite deeply rooted among women and men in many developing countries such as Peru. This phenomenon has a negative effect on the use of contraceptive methods.

Where machismo is prominent, the man has the ability to negatively influence his partner with respect to the use of family planning methods, whether it be to "control the fidelity of his wife"[9] or in an attempt to use conception as a demonstration of masculine virility.

A display of the machismo rooted in Peruvian society can be found in the INANDEP study, where high percentages of men were found to be familiar with and approve of the use of artificial contraceptive methods, but did not agree with their own partners using them. This only confirms the need to include men in family planning programs (Li, 1992).

3.2.2.4 Religious Beliefs[10]

Eighty-five percent of the Peruvian population is Catholic. However, a large percentage lack a true religious education, and maintain a very simplified and narrow view of the position of the church in the area of family planning.

One must keep in mind that within the Catholic Church there exist two currents of thoughts regarding family planning; one is more flexible than the other and holds that the couple should have responsible and free paternity, and should therefore have the right to regulate birth – the number and spacing of their children – in such a way that they can care for them and educate them better. This forms part of the specific interpretation of the encyclical *"Humanae Vitae"* of Pope Pablo VI, who holds that the sexual act must be able to lead to the engendering of a new being, without imposing artificial obstacles, but leaving open the possibility of using natural methods to prevent undesired pregnancy.

Nevertheless, the Church understands that families can confront difficult situations, like if the couple has already had the children that they can reasonably raise and if it would be very difficult to apply natural methods, they can employ other methods, as long as they are not guided by self-interest, but precisely with the goal of generating more love, fidelity, union and peace in the family.

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[8] The cities analyzed by the author were Chiclayo, Piura, Trujillo, Arequipa and Cuzco.

[9] This is due to the fact that in less educated sectors of society, it is thought that in order to prevent infidelity, the woman must be pregnant. According to this way of thinking, a woman who uses contraceptives could more easily betray her partner without visual consequences.

[10] This section was extracted from various interviews with priests and other specialists in the area, who preferred to remain anonymous.

However, among those who are not familiar with the Church's position on this issue, religious beliefs can be an impediment to the use of family planning methods. Unfortunately, this is usually the case among less educated couples, who are precisely the ones with larger families.

3.2.2.5 Costs

The cost of accessing contraceptive methods seems to have a very small influence on the decision of women to regulate their fertility, given that campaigns sponsored by the Peruvian government have included the distribution of mass amounts of various contraceptives for free.

3.2.3 Restrictions in Supply Associated with Reproductive Services.

The Peruvian government, through its Ministry of Health, has developed many important efforts to improve the state of women's health in the country. The greatest efforts have focused on family planning. However, there still exist a series of problems related to the provision of services that must be solved.

3.2.3.1 Availability of Nearby Services

The distance between the patients' homes and the nearest health centers is at times a fundamental constraint on women's access to reproductive health services. Often, patients must spend a long time just to get to the nearest health center, and adding the waiting time, the opportunity cost is raised so much that on many occasions they prefer no to go.

3.2.3.2 Restrictions in the Provision of Services

The quality of health services is decisive in the acceptance of the use of reproductive services on the part of potential patients. This is also true with respect to reproductive health visits.

In Peru, many health centers find themselves running short of contraceptives, medical supplies and equipment, and/or lack reproductive health professionals, which prevents users from receiving adequate services.

The existing health services have received many criticisms, mostly due to the insensitivity and incompetence of the personnel in charge, as well as the poor quality and accessibility of services. In this way, Delicia Ferrando holds that patients' fear or dread of contraceptive methods and the exams themselves is intensified by the poor treatment of patients on the part of the personnel providing the services, insufficient communication, and deficient advice that does not take into account personal concerns nor the needs and desires of each particular woman (Ferrando, 1996).

Added to bad service are the poor condition of the waiting rooms of health centers[11], excessive waiting time[12], and inadequate conditions of the exam rooms[13].

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[11] According to the Study on the Availability of Family Planning Services (EDIS) 1992, 62 percent of the establishments did not have restrooms within the waiting area (INEI, 1992b).

[12] The *Encuesta Nacional de Hogares sobre Demanda de Servicios de Salud (ENDESA)* 1995 shows that 20 percent of the clients waited more than half an hour to be attended to (CIUP, AID, MINSA, 19995).

Similarly, it is possible to observe problems linked to the very design of reproductive health programs; for example, the low level of participation of the community, the focus of the family planning programs on women, and little dissemination of information about the programs.

3.3   National Programs and Activities in Reproductive Health

3.3.1   Participation of the Private Sector

In Peru, the private sector plays an important role in the supply of family planning services. Those who offer this type of service are general practitioners, who represent a third of the total, gyneco-obstetricians 26 percent, obstetricians 16 percent, and other health professionals, such as nurses, ancillary personnel, and technicians 26 percent (INEI, 1992b).

Clinics have an important role in the supply of service. For example, the Ricardo Palma clinic offers its clients free medical consultations in preventive care and health education, providing them with information on family planning, alcoholism, cholera, nutrition for pregnant woman, breast-feeding, cervical cancer, and other areas.

In addition, the universities of the country also have an important role in the process of family planning. The Cayetano Heredia University, for example, has started a family planning program in the Southern Cone of the city of Lima. They visit these areas monthly with the goal of attending to the necessities of the population. In this effort, they offer medical check-ups to pregnant women and provide information about contraceptive methods. A similar program is being developed by San Martin de Porras University, which also works with groups in the Southern Cone of Lima.

3.3.2   Participation of the Public Sector

The Peruvian government, through the Ministry of Health (MINSA), has been developing important efforts to improve the state of reproductive health of the men and women of the country. The programs carried out have the fundamental goal of contributing an "improvement in the current state of reproductive health as a fundamental action to promote the human development of the population that allows individuals to reach their maximum potential and the better use of their capabilities, improving the hope and quality of life of men and women equally" (MINSA, 1996b).

Specifically, one of the objectives of these kinds of global reproductive programs is to support the free choice of persons to plan their families, making access to contraceptive methods possible.

3.3.2.1 Reproductive Health and Family Planning Program 1996-2000

Currently, the MOH pays most attention to this program. Its strength, over the years, has allowed for an marked increase in the provision of almost all contraceptive methods offered through the network of MOH services, as well as an improvement in medical attention in health establishments.

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[13] According to EDIS 1992, only 28 percent of the observed visits had restrooms with running water, and 59 percent had a sink for handwashing (INEI, 1992b).

The general objective of this program consists of improving the state of reproductive health of men and women in all stages of life, through the provision of advocacy, prevention, treatment, and rehabilitation services, that are accessible to all Peruvians without restrictions.

It is worth mentioning that this program has three main goals to be reached by the year 2000:

> Decrease the maternal mortality rate to a level no greater than 100 per 100,000 live births;

> The prevalence of the use of necessary, safe and modern contraceptives to ensure a global fertility rate of 2.5 children per woman;

> Reduce the perinatal mortality rate of 1995 by 50 percent .

In order to cover the main areas of medical attention in reproductive health, the program includes four subprograms: the Perinatal Maternal Health Program, the Family Planning Program, the Integrated Health of Children and Adolescents Program and the Cervical Cancer Program.

The family planning program began in 1985 with centralized administration and selective activities. For five years, MOH officials have been initiating the development of local programs in the subregional levels of health, as a strategy to deconcentrate decision making power and to increase local autonomy.

4. Analysis Family Planning Services Utilization

In this section a statistical and econometric analysis is conducted with respect to the principal determinants of the utilization of contraceptive methods as an approximation of the use of family planning services. In order to do this, we survey the influence of various characteristics of the woman and her partner on the main decisions of utilization, as well as other variables that reflect quality and coverage of reproductive health services. The analysis is divided into three parts:

> The inspection of cross tables, with the aim of extracting some working hypotheses.

> Final estimation of the model, the discussion of adjustment, and the calculation of the elasticities and/or impact of the most important explaining variables.

> Statement of the principal conclusions of interest.

The dependent variable of the model is represented by USE, and is a discrete binomial variable of the form described in Annex B (Annex B is a description of variables).

Y_i = Do you currently use any contraceptive method?

1   Yes

0   No

Given the characteristics of the dependent variable, a binomial model (probit) was used to estimate the utilization of family planning services.

The sample used consists of 18,201 women of child-bearing age, taken from the ENDES survey of 1996, who have maintained sexual relations in the last five years from the year of the survey. Of this total, 66.27 percent said they used some type of method while the remaining 33.7 affirmed that they did not (INEI, 1996b).

4.1   Analysis of Cross Tables and Formulation of a Working Hypothesis

The objective of this analysis is to establish the existing statistical relationship between the variable that we wish to explain and the probable explaining variables. From this analysis, a working hypothesis was formulated with respect to the possible existence of this relationship, and its direction.

The variables that can explain the decision of the woman and her partner regarding the use of contraceptive methods have been ordered into five groups; some of them can be appreciated in Table 1[14].

Table 1. Summary of Cross Tables

Explaining Variables	Current use of some contraceptive method (USE)	
	No	Yes
Measures of current and permanent income		
Income (1996 sols) (INCOME)		
[0;1,000]	33.81	66.19
(1,000;3,000]	34.68	65.32
(3,000;10,000]	26.94	73.06
More than 10,000	27.29	72.71
Basic services (water, light and/or plumbing) (SERVICES)		
0 services	47.60	52.40
1 service	31.63	68.37
2 services	28.03	71.97
3 services	25.15	74.85
Characteristics of the woman		
Went to school (SCHOOL)		
Did not go	59.23	40.77
Did go	31.16	68.84
Characteristics of the relationship with her partner		
Frequency of communication in the couple about family planning issues (COMMUNICATION)		
Never	57.87	42.13
Sometimes	31.55	68.45
Frequently	20.58	79.42
Socioeconomic characteristics of the family		
Number of children (NUMCHILD)		
0 children	54.22	45.78
1 child	31.29	68.71
2 children	27.85	72.15
3 children	28.85	71.15
4 or more children	37.14	62.86
Access and provision of family planning services		
Area of residence of the woman (URBAN)		
Resides in rural area	45.51	54.49
Resides in urban area	26.62	73.38

Source: INEI 1996b
Own Elaboration

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[14] A more detailed description of the variables used can be found in Annex B. From this point on, the names of the variables used will be presented in parentheses and capital letters within the text.

4.1.1 Measures of Current and Permanent Income

As shown in Table 1, the correlation between the use of some contraceptive method and the annual income of the woman, in 1996 sols (INCOME), is positive. Thus, it is observed that as income increases, the percentage of women who do not use contraceptive methods decreases. This relationship is more notable if we divide the sample among those women who receive an income less than or equal to 3,000 S and those who receive higher incomes. Among the latter group, 73 percent use some type of contraceptive method, while among those who receive less than 3,000 S, approximately 65 percent use contraceptives.

The permanent income of the woman is approximated through two variables: the number of electronics in the home (ELECTRONICS) and the number of basic sanitation services in the home (SERVICES). Both variables demonstrate a clearly positive relationship with the utilization of contraceptive methods. Of the women who have no electric electronics in the home, 49.65 percent do not use contraceptive methods. In contrast, 76.72 percent of the women who have four or more electronics in the home do use them. Meanwhile, 47.60 percent of the women that do not have any basic services (water, light, plumbing) do not use any type of family planning. However, 74.85 percent of the women whose homes have those three basic services do use some type of contraceptive method (Table 1).

Observing these initial results, it is possible to put forth that the decision to use contraceptives seems to be influenced more by permanent income than current income. This allows us to initially conclude that the socioeconomic status of the family is more important in decisions to use contraceptives than the availability of temporary income. This result is reinforced when you take into account that many contraceptive methods are distributed for free in public health institutions.

4.1.2 Characteristics of the Woman

One characteristic of the woman that has a positive influence on whether or not she uses a contraceptive method is her education (EDUCATION). The sample indicates that of those women with a university degree, 80.4 percent use some type of method, while for those with no education the percentage falls to 45.4 percent.

It is worth mentioning that the most notable increase in the percentage of utilization occurs between having no education and attaining a primary education. As demonstrated in Table 1, the simple fact of having gone to primary school produces an increase of approximately 28 percentage points in the percent of women who use some method.

The age of the woman (AGE) is another characteristic of great importance in this decision. From the sample, it is found that among sexually active women between 15 and 18, 45.18 percent use some type of contraceptive method. This percentage increases to 64.53 among women between 19 and 24 years old, and finally reaches a level of 67.78 percent among those women older than 24.

4.1.3 Characteristics of the Relationship with the Partner

The presence of a stable partner (measured by the variable "marital status of the woman," MARSTAT), the education of the couple (PARTEDUC) and their level of communication

(COMMUNICATION), seem to influence the use of contraceptives[15]. These three variables attempt to measure the importance of the man in decisions of family planning.

In the first place, we can observe that 66 percent of the women who are married or have a stable partner used some type of method, while 59.24 percent of those with an occasional partner used some method. On the other hand, the education of the partner has a positive correlation with the use of contraceptives, as the most significant increase in use of contraceptives occurs between no education and primary education: 40 percent compared to 67 percent use, respectively.

Finally, the level of communication of the couple turns out to be an important factor in the decision to utilize these methods. As one can observe in Table 1, only 42 percent of those who did not discuss family planning with their husbands tend to use some method. However, the percentage is 79 percent when the couple frequently discusses the issue.

Complementing these factors, it is important to measure the influence of the approval of the husband with respect to the use of some contraceptive method, especially in a country like Peru, where tradition makes the man the head of the household and the person who controls the majority of the decisions concerning this issue. For this reason, women who do not have the approval of their husband and do not use any method represent 54.63 percent, while this percentage diminishes to 27.78 percent when the woman receives approval of her husband in this subject.

4.1.4   Socio-economic Characteristics of the Family

Some social and economic characteristics of the woman are of particular importance to the decisions regarding the use of some contraceptive method; among them we have the number of children who live with the mother (NUMCHILD) and whether she has insurance (INSURANCE).

The use of some family planning method seems to have a quadratic relationship with the number of children living with the woman in the home. As the number of children increases, there is a greater percentage of woman who use contraceptives up to around three children, and then the percentage starts to fall. As such, 68.71 percent of the woman with only one child use some method, while those with two have 72.15 percent usage. However, from the third child on, this percentage reduces to 53.54 percent in women with eight or more children (Table 1).

This result can be explained by noting that, if indeed it is true that the more children the woman has, the greater her interest in taking care of herself in family planning, then the fact that she has many children could be a consequence of not having taken care of herself in this way. This is to say, the expected relationship between the two variables is rather bi-directional.

The influence of having insurance on the decision of whether to use contraceptives is apparently not very strong. As such, 77 percent of the women with insurance use some method, while, of those who don't have insurance, the percentage only reduces to 64 percent. This could be the consequence of the complimentary distribution of contraceptives on the part of public and private institutions.

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[15] The inclusion of variables related to the partner limited the sample to those women who are married or have a partner, since this information was only gathered from them.

4.1.5   Access to and Provision of Family Planning Services

Some variables allow us to measure women's access to information about contraceptive methods and to family planning services. For example, the fact that women were able to hear about the issue in campaigns sponsored by the MOH and other institutions should increase the likelihood that she use contraceptive methods. As such, 71.62 percent of the women who frequently heard about issues of family planning on the radio (RADIO) use some type of contraceptive, while 43.59 percent of those who did not hear about them do not use them. In the same way it is expected that other forms of information dissemination improve the probability of use of these methods, like for example, the dissemination of these issues in health centers and through health promoters.

Variables related to the geographic area in which the family lives (that is to say, those indicating whether they live in an urban area, URBAN, and whether they live on the coast of the country COAST) give us an idea of the availability of family planning services. It is expected that those families who reside in the urban areas, as well as those who live on the coast, enjoy greater access to these services. The results demonstrate that 25 percent of the coastal women do not use any method; this percentage increases to 39 percent in the rest of the country (INEI, 1996b). This difference increases when we distinguish between urban and rural areas, since 73 percent use some type of contraceptive method in urban areas while in the rural areas, the percentage decreases to 54 percent (Table 1).

The variables that specifically indicate quality and coverage of health services at the district level show a positive correlation to the use of some type of contraceptive method.

In this way, we can observe a positive correlation between the number of hospitals and clinics per person in the district (HOSCLINPER)[16] and the use of some type of family planning method. The percentage of women who do not use any contraceptive method decreases as the number of hospitals and clinics per person increases, going from 37.50 percent to 28.49 percent when considering women who live in districts below and above the average number of hospitals and clinics, respectively.

With respect to the number of doctors per person in the district (DOCPER), we also observe a positive correlation with the current use of contraceptives. According to the sample taken, 64 percent of the women who live in districts with less doctors per capita than the national average use some type of method. This percentage increases to 75 percent in those districts with a number of doctors per capita above the average.

Another variable of coverage, the number of visits to obstetricians at the district level per person, also demonstrates a positive effect on the use of some type of contraceptive.

We have tried to determine the quality of the health institutions as indicated by the state of the health infrastructure; the material of the walls, floor, and roof of the health institutions where the woman goes (WALLHOS, FLOORHOS, and ROOFHOS) are used as an indication of this variable. These three indicators show a positive correlation to the use of some method.

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[16] It is worth mentioning that all these variables of availability of district health infrastructure and personnel have been divided by respective population size in order to incorporate and correct the scale of the district.

4.2   Estimated Model

Keeping in mind the previously identified correlations, the model was estimated using the probit methodology. The final result is observed in Table 2[17].

Table 2. Estimation of the Variable Currently USE Some Type of Contraceptive Method (USE)

Dependent Variable: USE
Method: ML - Binary Probit
Observations included: 14849

Variable	Coefficient	Std. Dev.	z-statistic	Prob.	Elasticity
C	-2.825594	0.201426	-14.02796	0.0000	NA
APPROVAL	0.510242	0.037327	13.66944	0.0000	0.229180
ELECTRONICS	0.036226	0.016342	2.216704	0.0266	0.031305
COMMUNICATION	0.192109	0.021110	9.100342	0.0000	0.172362
COAST	0.123475	0.029322	4.211058	0.0000	0.022300
AGE	0.062575	0.011895	5.260735	0.0000	0.097886
AGE2	-0.000855	0.000179	-4.787426	0.0000	NA
EDUCATION	0.021281	0.003976	5.352239	0.0000	0.068981
PARTEDUC	0.010134	0.003868	2.620243	0.0088	0.039322
MARSTAT	-0.037005	0.025132	-1.472452	0.1409	0.025560
INFORMATION	0.182721	0.023982	7.619126	0.0000	0.041757
HOSCLINPER	693.5256	3.375.536	2.054565	0.0399	9.69E-08
DOCPER	9.326178	5.489.402	1.698942	0.0893	6.12E-08
NUMCHILD	0.296328	0.020662	14.34147	0.0000	0.144942
NUMCHILD2	-0.033625	0.002578	-13.04540	0.0000	NA
WALLHOS	0.021764	0.010394	2.093858	0.0363	0.030851
FLOORHOS	0.064883	0.023891	2.715811	0.0066	0.045492
RADIO	0.081893	0.027362	2.992977	0.0028	0.024409
WORK	0.098728	0.024085	4.099102	0.0000	0.028170
TVPLAN	0.144128	0.033195	4.341806	0.0000	0.041620
ROOFHOS	0.201530	0.049653	4.058769	0.0000	0.067563
URBAN	0.104282	0.033873	3.078620	0.0021	0.029822

Mean var. depend.	0.729275	Std. dev. var depend.	0.444349	
S.R. of regression	0.414752	Akaike criter	1.047232	
Sum of resid. squared	2550.534	Schwarz criter	1.058501	
Log likelihood	-7753.177	Hannan-Quinn criter.	1.050973	
Log likelihood restr.	-8671.503	Log likelihood prom.	-0.522135	
LR statistic (21 gl)	1836.651	McFadden R-squared	0.105902	
Probab (LR stat.)	0.000000			

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[17] A description of the variables used in the model are found in Annex B.

The goodness of fit of the model is verified by the LR-statistic (likelihood ratio) that indicates that, together, all the coefficients of the regression are nonzero, and that the probability of accepting the opposite hypothesis, with 21degrees of freedom, is below 5 percent.

Similarly, we observe that the R^2 of *McFadden* is at a relatively low value of 10.59 percent. However, if we observe Table 3, we can conclude that the model accurately estimates the 80.91 percent of those women who use some type of contraceptive method and the 50.70 percent of those who do not. Thus, we can conclude that we are confronted with a model that has an acceptable adjustment.

Table 3. Evaluation of Prediction

Dependent Variable (Dep): USE

Method: MV - Binary Probit

Sample (adjusted): 1 19287

Observations included: 14849

Evaluation of prediction (cut-off point C = 0.66)[18]

	Estimated Equation			**Constant Probability**		
	Dep=0	**Dep=1**	**Total**	**Dep=0**	**Dep=1**	**Total**
P(Dep=1)<=C	2038	2067	4105	0	0	0
P(Dep=1)>C	1982	8762	10744	4020	10829	14849
Total	4020	10829	14849	4020	10829	14849
Correct	2038	8762	10800	0	10829	10829
% Correct	**50.70**	**80.91**	**72.73**	0.00	100.00	72.93
% Incorrect	49.30	19.09	27.27	100.00	0.00	27.07
Total Gain	50.70	-19.09	-0.20			
Percent Gain	50.70	NA	-0.72			

In this way, based on the estimation, we find that the mean probability that a sexually active Peruvian woman use some type of contraceptive method is 72.76 percent.

4.3 Analysis of the Explaining Variables of the Model and their Effect on the Dependent Variable

The effect of the explaining variables on the dependent variables can be seen in the first place in the sign of the coefficient that accompanies the variable in the model, which indicates the direction of the relationship between them. However, in order to do a complete analysis, it is also necessary to calculate the impact and elasticity effects with the aim of determining the magnitude of those effects. Table 2 demonstrates these elasticities, from which one can determine which variables have a greater effect on the probability of using contraceptive methods; these are: the variables related to the partner, like approval of the husband over the use of some family planning method (APPROVAL) and the frequency of communication between the couple about family planning issues

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[18] This cut-off point was chosen in order to compensate for the bias of the sample towards women who do take care of themselves in family planning (66 percent); in general, this will be the criterion used to select the right cut-off point: the corresponding sample proportion.

(COMMUNICATION), as well as the number of children in the family and the educational level, especially that of the woman.

4.3.1 Analysis of the Principal Variables

4.3.1.1 Constant of the Model

The first variable to analyze is the constant (C). The sign of the constant indicates that there exists a natural bias in the female Peruvian population to not use any contraceptive method. Thus, the constant in the model can explain the existing negative correlation between the dependent variable and the other external factors not included, such as religious beliefs and traditions that can decrease the use of family planning methods.

4.3.1.2 Variables Related to Income

The current income effect could not be observed, as the variable INCOME turned out to not be very significant and showed an incorrect sign, or a negative correlation with the dependent variable. In contrast, the variable "number of electronics" (ELECTRONICS), that measures the permanent income, presents the expected positive sign. In this way, the previous conclusion about the influence of both types of income on the decisions of family planning made in the analysis of the cross tables is confirmed.

On the other hand, a positive correlation between the fact that the woman works (WORK) and the probability that she use contraceptive methods is verified. As such, it is expected that a woman who works might be more independent, have more power of decision making and responsibilities outside of work, which makes her have a greater interest in controlling or planning the size of her family.

4.3.1.3 Variables Associated with Socio-demographic Characteristics of the Woman

The age of the woman (AGE and AGE2) demonstrates a quadratic relationship with the use of contraceptives: as age increases, the use of contraceptive methods also increases. However, around 37 years of age[19], this relationship turns negative (Figure 3). It is reasonable to explain this relationship because as time goes by, the woman reduces her sexual activity and her capacity to procreate.

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[19] In order to estimate the breaking point, the regression obtained with respect to AGE was derived. This point is defined by the following equation: $0.06257500756 - 2(0.0008554642189)AGE = 0$.

Figure 3. Impact Curve: Change in Probability of Using a Contraceptive Method as Age Changes

With respect to the number of children that live in the home (NUMCHILD and NUMCHILD2), this variable presents a positive sign, indicating that somewhat larger families tend to use contraceptives more. However, this relationship is also quadratic, which explains why if the number of children is over 4, the relationship changes sign, showing that women with more children are those who least use contraceptives. The explanation of this phenomenon has already been put forth in the analysis of the cross tables.

4.3.1.4 Variables Associated with the Presence of a Partner

The model reveals that the probability of using some method increases if the woman has a permanent partner (negative sign of the variable MARSTAT).

In addition, it shows that the approval of the partner and the level of communication that is maintained in the relationship have important positive relationships with the current use of contraceptive methods. In this way, it is possible to observe that the variable APPROVAL has an impact effect of 18.59 percentage points, that is to say, if the husband approves of the use of contraceptive methods, then the probability estimated by the model that the average Peruvian woman use one of them increases. On the other hand, if the couple starts to discuss issues of family planning from time to time, then the probability of using some contraceptive method increases by approximately 6.77 percentage points; if the communication is frequent, an additional increase of 6.04 percentage points is produced. Thus, adequate planning of the size of the family is produced, since the decision is made by the couple together, and not by one partner or the other. The established relationships are confirmed in the analysis of the cross tables.

The global effect of the presence of the participation of the husband in the decisions of family planning can be observed in Table 4, where the influence of the three previous variables is combined. Here we observe that if the husband is favorably incorporated into the decisions of family planning, then the probability of regulating birth within the family will increase by 32. 7 percentage points.

**Table 4. Presence and Participation of Partner in Family Planning Decisions**

	APPROVAL	COMMUNICATION	MARSTAT	Probability Estimated by the Model
Case 1	Partner does not approve	No communication	No partner	0.476786
Case 2	Partner approves	Average value	Average value	0.744998
Case 3	Average value	Frequent communication	Average value	0.783322
Case 4	Average value	Average value	Married	0.733933
Case 5	Partner approves	Frequent communication	Married	0.803731

4.3.1.5 Variables Associated with Education of the Partner

The education of the woman (EDUCATION), as much as that of her husband (PARTEDUC), has a positive effect on the use of contraceptive methods. A more educated woman is more aware of the risks of having sexual relations without using contraceptive methods, which is why she prefers to use one. In addition, this variable has a simultaneous effect on income because it is expected that women who are more educated have a greater capacity to earn more or are married to men who also have a better socio-economic position. The effect of a higher level of education for the man can not only be explained by his greater comprehension of the necessity of family planning but also by his greater earning potential.

The effects of these two variables on the probability of utilization can be appreciated in Figure 4. There it is observed, however, that the probability is more sensitive to an increase in the years of education of the woman than those of the man, revealing the importance of the cultural level of the woman, which is reflected in her decision making capacity in the home as well.

Figure 4. Impact Curve: Change in Probability of Using a Contraceptive Method by Change in Education
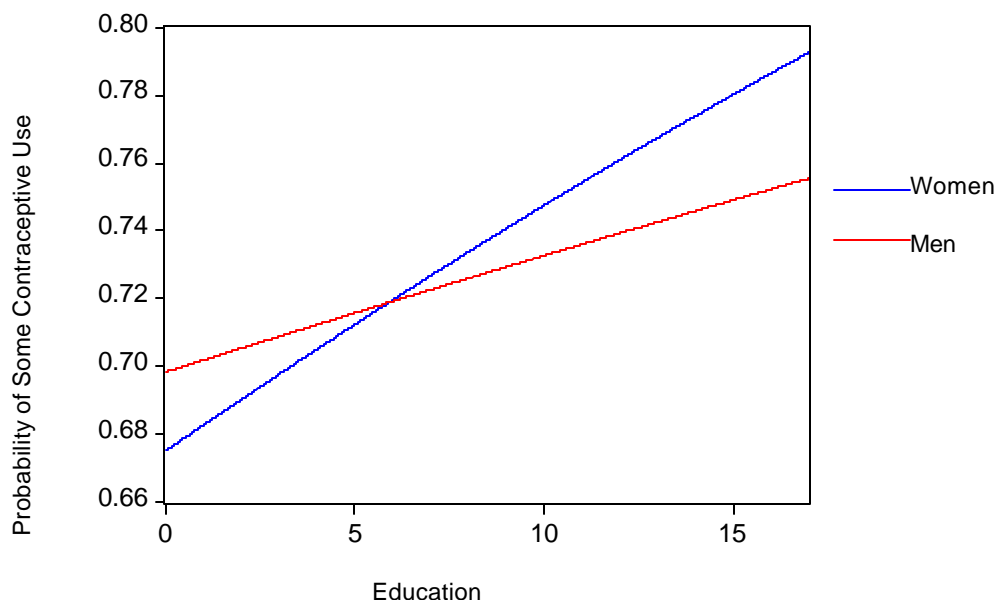
On the other hand, the information that the couple receives about family planning (INFORMATION) is also of particular importance. Here one has that the probability that a woman use some type of contraceptive method increases by 6.06 percentage points when she has access to family planning information.

The combined effect of the education of the partner and access to information can be seen in Table 5: the probability that a more educated couple that has access to information on family planning use contraceptive methods is more than 20 percentage points greater than a couple that has neither education nor access to information.

Table 5. Combined Effect of Education of the Couple and Access to Information

	EDUCATION	PARTEDUC	INFORMATION	Probability Estimated by the Model
Case 1	No education	No education	No information	0.608778
Case 2	Primary education	Primary education	Average value	0.710962
Case 3	Average value	Average value	Information received	0.757064
Case 4	High level of education	High level of education	Information received	0.839625

4.3.1.6 Variables of Access to Family Planning Services

With respect to the access to and provision of family planning services, it was confirmed that the area of residence directly affects access to services. Those women who live in urban areas can obtain them more easily, and as a consequence, use contraceptive methods more than those who live in rural areas. Thus, urban women have a probability of using contraceptive methods that is 3.49 percentage points greater than women in rural areas. More specifically, the probability that a woman who lives on the coast use contraceptive methods is 4.07 percentage points greater than that of a woman not living on the coast.

Combining the two effects in Table 6 we can determine the global affect of living on the urban coast on the probability of using some contraceptive method; this affect reaches about 8 percentage points.

Table 6. Global Effect of Living on the Urban Coast on the Probability of the Use of some Contraceptive Method

	URBAN	COAST	Probability Estimated by the Model
Case 1	Resides in rural area	Does not reside on the coast	0.688483
Case 2	Resides in urban area	Average value	0.740466
Case 3	Average value	Resides on the coast	0.752477
Case 4	Resides in urban zone	Resides on the coast	0.764569

4.3.1.7 Variables of Service Coverage

With respect to coverage variables, it is shown that a great availability of health institutions and medical personnel per capita (HOSCLINPER and DOCPER, respectively) have a positive correlation with the utilization of contraceptives.

Given the low sensitivity of the dependent variable to these explaining[20], variables, it is interesting to present a table of the combined effects as in Table 7. In this table, we have simulated the probabilities of usage taking into account the maximum value of each variable of the sample[21]..

Table 7. Combined Effects

	HOSCLINPER	**DOCPER**	**Probability Estimated by the Model**
Case 1	There are no hospitals or clinics	There are no doctors	0.760666
Case 2	Average value	0.004987*	0.738542
Case 3	0.000595**	Average value	0.840677
Case 4	0.000595**	0.004987[1/]	0.848580

* Maximum value of the variable DOCPER in the sample.
** Maximum value of variable HOSCLINPER in the sample.

Finally, the quality of the health institutions, as measured by the material of the walls, floor, and roof of the district's health institutions where the woman lives (WALLHOS, FLOORHOS, ROOFHOS, respectively), shows a positive relationship with the use of contraceptive methods. Thus it is verified that if the woman lives in a district with better health infrastructure, the probability that she utilize family planning services is greater.

From the results obtained in each of the preceding sections, it is possible to identify which variables are of greater importance in family planning decisions through the effect that changes in these variables have on the estimated probability of using contraceptives. Thus, we conclude that those variables related to the education of the couple and their engagement in the decision making process has a relatively greater importance in the utilization of these methods as compared to problems of availability and coverage of these services.

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[20] An analysis of the impact effects and elasticities of these variables on the probability of usage allows us to establish low sensitivity of the probability to unitary changes in the former (like the one by one addition of doctors or medical institutions, with a given population level).

[21] It is worth mentioning that in order to obtain the maximum value of the variable DOCPER, it was necessary to first eliminate the last decile in order to prevent extreme values from influencing the calculated probability.

5. Simulations of Policies that Alter the Principal Variables

The following simulations have been carried out in such a way as to estimate the probable impact of various policy measures directed at the improvement of the health status of the woman and her family. It is basically for this reason that we have presented some policy changes that officials could make in order to influence those variables that are susceptible to change, our aim being to show the results that such social policy changes could generate.

Based on the estimated model, we can simulate women's demand for family planning services, for different values of the explaining variables of interest.

First, the number of sexually active women at the national level was calculated for the period 1996-2000, the same period upon which the simulations [22] will be based. In order to do that, the total number of women of child-bearing age (15-49) (CUANTO 1997) was calculated, and the percentage of women identified in the ENDES of 1996 (61 percent, INEI 1996b) was applied. This procedure allows us to obtain the number of sexually active women at the national level for the period in question, who are the potential demanders of family planning services (Table 8, Column 1).

If the average probability estimated by the model is used, we obtain the first estimation of demand for family planning, given the current conditions with which the model is working (Table 8, Column 2).

Table 8. Simulations (thousands of women)

Year	Sexually Active Women (1)	Women Demanding-Original Model (2)	Women Demanding-Partner (3)	Women Demanding-Information (4)	Women Demanding		Women Demanding-All Measures at the Same Time (7)
					Geographical Area (5)	Medical Resources (6)	
1996	3818	2778	3019	3205	2919	3239	3545
1997	3912	2846	3094	3285	2991	3319	3633
1998	4007	2915	3168	3364	3063	3400	3721
1999	4101	2984	3243	3443	3135	3480	3808
2000	4194	3051	3316	3521	3206	3558	3894

(2)   72.76% of (1), according to the estimations of the original model.
(3)   79.08% of (1), according to the estimations of the original model, through variables related to the partner.
(4)   83.96% of (1), according to the estimations of the original model, through the variables related to information on family planning.
(5)   76.46% of (1), according to the estimations of the original model, through the variables related to geographical area.
(6)   84.86% of (1), according to the estimations of the original model, through the variables related to availability of medical resources.
(7)   92.86% of (1) according to the estimations of the original model considering the implementation of all measures at the same time.

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[22] The number of sexually active women is made up of married women, those who live with their partners, and those who do not have a stable partner but who have a permanent or occasional sexual partner.

Now we ask ourselves how to improve the results of family planning programs from the point of view of coverage, or rather, with the objective that increasingly more families have an understanding of the importance of regulating the number of children that can be adequately raised. In order to do this, it is necessary to focus efforts on those variables that can be manipulated relatively easily by the respective authorities. In this way, and based on the analysis of the elasticities previously made, three policy measures are proposed: those directed towards increasing the participation of the couple in the programs, those aimed at increasing access to information about family planning, and finally, measures oriented towards the improvement of service coverage.

Let us suppose that the final effect of increasing the participation of the couple in family planning programs is an increase in the approval of the husband and the communication between him and his spouse about these issues. If we were to consider that communication between the couple about family planning were frequent and that the husband approved of the use of some method, the average probability of using contraceptive methods would increase to 79.08 percent, producing an increase in the number of women demanding the methods, as can be observed in Table 8, Column 3, that for 1999, represents 8.7 percent with respect to the basic model used (second column in the same table).

Expanding dissemination of the characteristics and benefits of family planning, together with improved education for the woman and her partner, have proven to have a very important positive effect on the use of contraceptive methods; these improvements increase usage by 15 percentage points (Table 8). With these improvements, an important increase in demand for contraceptive methods is generated, as can be seen in Table 8, Column 4.

Without a doubt, it is important to guarantee the provision of quality services with the coverage necessary to reach all corners of the country homogeneously. Faced with the absence of international standards, we decided to consider the case in which coverage and quality of services are at the same level as they currently are on the urban coast, assuming that in this geographical area, services are considerably superior to those of the rest of the country, as the socioeconomic level of that area is higher in general. This way, an increase in the probability of the use of contraceptive methods is produced, reaching 76.46 percent, and generating an increase in the number of woman demanding contraceptives, as shown in Table 8, Column 5.

Finally, we can work with other variables of coverage, such as the number of doctors per capita and the number of hospitals per capita, situating the level of the entire country within that of the best district of the sample[23]. This exercise will produce the results observed in Table 8, Column 6, given the increase in average probability of using contraceptive methods of 12 percentage points (Table 7).

The combined effect of these policy measures can be simulated as representing the total impact of the program as they are simultaneously integrated. As shown Table 8, Column 7, this would generate an increase of 27.62 percent in the demand for family planning services in 1999 with respect to the base model simulated in Table 8, Column 2.

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[23] Again, this is the recourse used in the absence of easily comparable international standards. However, it should be mentioned that faced with the presence of extreme values in the sample, we have turned to the maximum value to later eliminate the highest decile.

6. Conclusions and Policy Recommendations

Based on the analysis, a series of conclusions and recommendations for family planning in the country are presented below.

> Coverage and/or use of principal reproductive health services in Peru has not been extensive, as one can note when observing the important sectors of the population who are not well attended to. For example, the insatisfaction of demand for family planning reaches 12 percent nationally, and 20 percent in the rural areas (INEI, 1996b).

> These figures can be explained as much by problems of demand as by problems of supply. Among the problems of demand are: lack of information about the various interventions and their implications on the health of the woman, beliefs and fears triggered by cultural and educational characteristics of Peruvians, a deeply rooted machismo that regulates the role of the woman in society and limits their principal rights, and the cost of services, which, in many cases, decreases demand. Restrictions in supply include: the low level of availability of health services near the homes of potential patients, restrictions in the provision of medical supplies, equipment, and health professionals in the institutions providing services; a low quality of care that makes good communication with patients difficult and reduces the probability of continued treatment, and problems in the conception and design of the existing programs in reproductive health.

> A statistical and econometric analysis of the ENDES 1996 (INEI, 1996B) and the Census on Health Infrastructure and Health Sector Resources (1996) (MINSA, 1997a) has allowed us to identify the key determinants of family planning decisions, using cross sectional methods, given that this variable is a qualitative, discrete and binomial decision variable. The estimation has yielded interesting results regarding the behavior of Peruvian families. As such, we found that the most important variables for explaining the behavior of the woman and her partner with respect to the use of contraceptive methods are those variables associated with the partner: a stable relationship, the partner's level of approval, and the level of communication of the couple. Similarly, the education of the couple and their management of information regarding the issue show an increased influence on the decision of whether to use contraceptive methods. Thus it is concluded that all these factors are much more important in the decision than the level of income, the cost of services, and even coverage of services.

> Given the variables identified as determinants of utilization of family planning, it is of particular importance to improve the educational level of the couple as well as the amount of information they manage regarding the issue. As women's partners clearly recognize the necessity of family planning and eliminate erroneous beliefs and false taboos, it will be much easier to develop programs in family planning that earn a welcomed success.

> For the most part, the efforts made up to now by the public sector have not considered these aspects. The incorporation of families into the program has been achieved through incentives that were not directly linked to adequate birth control, and has consisted mainly

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of food provision. The study has verified that in some cases, interventions have not depended on the true acceptance of the patients, given their high rate of unfamiliarity of the existing alternatives of family planning. In other words, the use of force has been invoked, based upon the belief that those who are in charge of these programs know, more than anyone else, what is best for the families who seek family planning services.

> Thus, some key elements for the true success of family planning have been forgotten, i.e., that it should be authentic (initiated by the families themselves) and self-sustaining (passed from generation to generation). In the first instance, it is absolutely necessary to inform the potential patients, as well as their partners, of the importance of planning their family and the benefits this would bring to the family as a whole. Then, it is necessary to inform them of the principal contraceptive methods, natural methods as well as artificial ones, how they are used, the effectiveness and cost of each one, and how to access them. This way, all the other elements allow for a decision about the necessity of family planning and how it will be carried out.

> It is worth mentioning that if this process indeed achieves results over a longer period of time, it is hoped that these ideas will be well accepted by families and all members of society, whatever their ideological orientation, as well as constitute self-sustainable solutions, given that they will form part of the information that the family has internalized and considers daily in family decision making.

> Another element of particular importance is the coverage and quality of health services provided. The greatest utilization that is verified in the urban areas demonstrates not only the effect of income, that leads us to conclude that a greater income favors increased demand, but it is also evidence of the positive effects of greater coverage, access, and quality of services. This last factor is of particular importance, given the type of services that were analyzed, since the woman must establish a more extensive relationship with the professional who is attending her, as well as have sufficient confidence in him or her.

Thus, not only is it necessary to make more health services available that offer greater attention to the necessities of family planning, but it is also imperative to be concerned with the capacity of the professionals providing service. This capacity not only refers to the handling of medical equipment, but also intercommunicational skills, and the amount of information they manage and are capable of communicating to the patient so that she can make her own responsible decision.

With respect to all that has been said, one must keep in mind that this study was limited by the type of variables available. As such, it measured the participation of the couple in the family planning program by whether family planning or contraceptives were used, but it is not possible to truly measure what this means to respondents nor in what measure they receive adequate information and orientation for responsible decision making. With this limitation in mind, and in summary, it can be said that an adequate family planning program should concentrate its efforts on three activities: integrating the couple directly and fully into the program, improving the amount of information that the couple can access about alternative birth control methods and what each one really means, and increasing the coverage of the program itself, rather than indiscriminately distributing contraceptives.

Annex A. Binomial Models

Binomial models are those whose objective is to explain discrete dependent variables that present two options, in such a way that it models the process by which the person chooses between two alternatives, seeking that with the greatest utility.

It is defined in the following way:

$$U_{ij}^* = \boldsymbol{b}' x_{ij} + \boldsymbol{e}_{ij} \qquad\qquad 1.$$

where Uij* is the utility that individual "i" receives from choosing alternative "j"; this utility is a function of the combination of explaining variables x_{ij}, through parameters β, which may or may not depend on the choice alternatives.

An application of this type of model may be the study of determinants of the use of contraceptive methods. Contraceptives will be used if the utility of doing so (U_{ij}^*) is positive. In this case, the endogenous variable would be defined in the following way:

Y$_i$ = Use of contraceptive methods

= 1   uses some method   (given that U_{ij}^* >0)

= 0   does not use any method (given that U_{ij}^* <0)

This type of relationship need not be specified using the general linear model, due to specific problems with the distribution of errors and values among which the prediction of the model can fluctuate[24]:

An alternative focus is to assume a function of specific density for the errors of (1) and to work with the method of the maximum likelihood, focusing interest on:

$$P_i = Pr\, ob(y_i = 1) = Pr\, ob\left[\blacksquare > -\boldsymbol{b}' x_{ij}\right] \qquad\qquad 2.$$
$$= 1 - F\left[-\boldsymbol{b}' x_{ij}\right] \qquad\qquad 3.$$

where $\mathbf{F}$ is the cumulative distribution function of $\boldsymbol{e}_i$.[25] The use of the F(.) guarantees two properties that are observed in this type of model: the estimated probability fluctuates between 0 and

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[24] To see the detail of each of these estimation problems and their form of correction, see Gujarati, 1995.

[25] If the distribution of ■ is symmetric, $1 - F(-Z) = F(Z)$, and it is possible to write:
$$\boldsymbol{e}_i = P_i = F\left[\boldsymbol{b}' x_{ij}\right]$$

1, and this varies according to the values of the explaining variables, being more sensitive to the intermediate than extreme values .

Given that the U_i observed are only realizations of a binomial process whose probabilities are given by 2 and 3, it is possible to denote the function of likelihood as:

$$L = \prod_{y_i=1} P_i \prod_{y_i=0} \left(1 - P_i\right) \qquad\qquad \textbf{4.}$$

The functional form of $\mathbf{F}$ in (3) depends on the assumption around the term of error ■■ If the cumulative distribution of $\mathbf{e}_i$ is logistical, we have the model called logit, while if the errors $\mathbf{e}_i$ follow a standard distribution, we have a probit model.

The maximization of the likelihood function (4) for the probit or logit model is achieved through non-linear methods of estimation.

Annex B. Description of Variables

USE: endogenous variable that captures the use of some contraceptive method, natural or artificial.
> = 0 Does not use any contraceptive method
>   1 Uses some contraceptive method

APPROVE: captures the approval of the partner of the use of some contraceptive method.
> = 0 Does not approve
>   1 Approves

ELECTRONICS: captures the number of electronics in the home (radio, television, refrigerator, computer).

SCHOOL: establishes whether the woman went to school.
> = 0 Did not go to school
>   1 Went to school

COMMUNICATION: captures the frequency of communication between the couple about issues of family planning.
> = 1 Never
>   2 Sometimes
>   3 Frequently

COAST: establishes whether the woman lives on the coast.
> = 0 Does not live on the coast
>   1 Does live on the coast

AGE: age of women between 15 and 49.

AGE2: age of women squared.

EDUCATION: number of years of education the woman has.

PARTEDUC: number of years of education the partner has.

MARSTAT: establishes the marital status of the woman.
> = 1 Married
>   2 Lives with partner
>   3 Has no partner

HOSCLINPER: number of hospitals and clinics per person in the district in which the woman lives.

INFORMATION: determines whether the woman has received some type of information about family planning.
> = 0 Has not received information
>   1 Has received information

INCOME: determines the annual income of the woman in new *sols*. This variable has been constructed using the Heckman procedure of estimating potential income (productivity) of the women in the sample that did not report having a job.

DOCPER: Number of doctors per person in the district in which the woman lives.

NUMCHILD: number of children living in the home.

NUMCHILD2: number of children living in the home squared.

WALLHOS: establishes the material of the walls of the health institution of the district where the woman lives.
    =   1 *Quincha*
         2 Wood
         3 Adobe
         4 Cement or high quality material

FLOORHOS: establishes the material of the floor of the health institutions of the district where the woman lives.
    =   1 Earth and other
         2 Cement, wood or vinyl

RADIO: establishes whether the woman has heard information on the radio about family planning
    =   0 Has not heard
         1 Has heard

SERVICES: number of basic services in the house (water, light, plumbing)

ROOFHOS: establishes the material used in the construction of the roof of the health institutions of the district where the woman lives.
    =   1 Other
         2 Cement or high quality material

WORK: establishes whether the woman works either part or full time
    =   0 Has no work
         1 Has work

TVPLAN: indicates whether the woman has seen information about family planning on TV.
    =   0 Has not seen
         1 Has seen

URBAN : indicates the place of residence of the woman.
    =   0 Resides in a rural area
         1 Resides in an urban area

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