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Demand for Family Planning Services in Rural Bangladesh: Effect of Cash Prices and Access

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ICDDR,B
CENTRE
FOR HEALTH AND
POPULATION RESEARCH

MCH-FP Extension Project (Rural)
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Abstract

The Family Planning Programme in Bangladesh has been very successful. The contraceptive prevalence rate (CPR) has increased from 13 per cent in 1979 to 47 per cent in 1996. Now that the programme has matured and demand for family planning has been created, the Ministry of Health and Family Welfare (MOHFW) of the Government of Bangladesh is concerned with increasing its financial sustainability[1]. Options to increase financial sustainability include cost recovery, alternative service-delivery systems, and shifting clients who have completed childbearing from short-term resupply methods to more cost-effective long-term methods. Many of these alternatives would involve additional travel time or user fees for consumers, and it is important to estimate the effect that these additional prices would have on the use of family planning methods.

The effect of economic constraints, such as cash price and access to services on contraceptive method use, the choice of contraceptive method, and provider choice, has been analyzed, taking into account the socioeconomic factors that influence decision-making for individual family members. The analysis also takes into consideration some individual characteristics of the wife and husband, such as women's membership in a credit union, that are likely to affect decision-making on the choice of method. The methods of analysis include univariates, bivariates, and multivariate regression. For the multivariate regressions, the logit model was used for estimating the contraceptive use; the multinomial logit regression for estimating the method choice, and the conditional logit model for estimating the choice of provider.

Two data sources have been used for this analysis: i) a survey on expenditure on family planning, and ii) two baseline surveys of 1993 and 1994 in the two field sites of the MCH-FP Extension Project (Rural).

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[1] Financial sustainability can be defined as sustainable generation of funding without a significant change in utilization.

The results of the analysis indicate that clients were, to a limited extent, responsive to price in making choices about contraceptive methods and providers. No effect of price was found on contraceptive use. However, there were two cross-price effects of the pharmacy price on method choice. The likelihood of using condoms and IUDs rather than pills increased with the increase of pharmacy price of pills in Mirsarai thana. However, the pharmacy price of condom was positively associated with its use for higher income groups and with the use of the private sector over home delivery.

Couples were less likely to use contraception or choose methods that were less accessible. This is also applicable in the case of choice of providers. If the travel time to the Family Welfare Centre (FWC) was greater than thirty minutes, married women of reproductive age were a quarter less likely to use contraception. In addition, as travel time to FWC and satellite clinics (SC) increased, contraceptive users were less likely to use IUDs and injectables (in Abhoynagar thana), methods obtainable only at these outlets. At Mirsarai thana, there was also a negative effect of travel time to the pharmacy on the use of condom over pill. Similarly for provider choice, as the travel time to private sources increased, condom users were less likely to use these providers rather than home delivery, although there was no similar effect for pill users. Other measures of access were negatively associated with the choice of provider, such as waiting time for pill users and travel cost for pill users of low-wealth groups.

Other demographic and socioeconomic variables also had an effect on the choice of methods. A woman's membership in a credit union, a proxy for bargaining power, had a statistically significant effect on the choice of methods and providers. A woman of Abhoynagar thana was 50 per cent more likely to use IUD as the pill if she were a member of credit union, and twice as likely to use pills as traditional methods in Mirsarai thana if she were a member. The husband's education, the wife's education, spousal age difference, and religion also were statistically significant predictors of choice of the method.

Since no effects of cash price on contraceptive use and only limited effects were found on the choice of methods and providers for users, the results of the study suggest that cost recovery for contraceptives at the union level should be tested, provided that there is a safety net for users who

cannot afford to pay. Regarding the effect of access on use and the choice of methods and providers, the results imply that improving access to static clinics through increasing the frequency of satellite clinics as well as the provision of more privacy and quality service delivery at the satellite clinics should increase the use of contraception as well as the use of IUD. In addition, gradually shifting from doorstep to static clinics may lead to the increased use of methods, such as IUD, since access will be similar for all of the methods.

The effect of bargaining variables, such as women's membership in a credit union, suggests that efforts to increase women's economic power could indeed increase the use of static clinics. In addition, the importance of the husband's educational level suggests that efforts to increase the contraceptive use should target both men and women.

Acronyms

CPR	Contraceptive Prevalence Rate
FWA	Family Welfare Assistant
FWV	Family Welfare Visitor
SC	Satellite Clinic
H&FWC	Health and Family Welfare Centre
THC	Thana Health Complex
IUD	Intrauterine Device
GoB	Government of Bangladesh
MOHFW	Ministry of Health and Family Welfare
MWRA	Married Women of Reproductive Age
LCH	Living Children
MCH-FP	Maternal Child Health and Family Planning
SRS	Sample Registration System
NGO	Non-governmental Organization
IEC	Information, Education, and Communication

Introduction

The family planning programme in Bangladesh has been highly successful in recent years with the contraceptive prevalence rate rising from 13 per cent in 1979 to 47 per cent in 1996.

Much of the success of the Family Planning Programme can be attributed to the personal contact of the field workers with married women of reproductive age (MWRA)[2]. The workers have been able to motivate MWRAs to use modern family planning methods as well as visit women who had little contact with the outside world due to the Muslim custom of purdah. The effect of field worker visits became even more prominent in the 1980s after additional field workers were recruited in the late 1980s, resulting in increased coverage of MWRAs [1].

Other factors were also important in changing the perception of women toward the use of contraception: resource competition as the population density increased [2], and increasing investment in children, associated with rising social aspirations [3-4].

The Programme has now reached a stage of maturity at which it should be concerned with other objectives in addition to creating consumer demand for family planning. Policy-makers and programme managers are increasingly focusing on finding mechanisms to improve the financial sustainability of the programme. These mechanisms include the introduction of cost recovery schemes and a gradual transition from doorstep to static clinic delivery of contraceptives.

In order to anticipate the effect of introducing additional prices and travel costs on the utilization of family planning, this paper examines the importance of current prices and travel costs on decision making about contraceptive-seeking behaviour in rural areas of Bangladesh.

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[2] Other factors that were important to the success of the Family Planning Programme include the strong political will and commitment and involvement of GoB, NGOs and private sectors [5].

Background

Now that the family planning programme has matured and demand for family planning has been created, the Government of Bangladesh is concerned with increasing its financial sustainability. The justification of this emphasis is three-fold: i) Total costs of the programme are rising with increasing number of women accepting family planning, ii) Family planning programme is heavily dependent on external funding and needs to prepare for probable future fund reductions [6], and iii) Bangladeshi women are becoming more mobile and are more able to leave their homes to obtain health services [7].

The current structure of the GoB's family planning service delivery in a rural thana of Bangladesh (administrative unit with population of approximately 250,000 made up of four to sixteen unions) includes the following points of service delivery: i) one thana hospital - the Thana Health Complex (THC) where clients can obtain clinical contraception; ii) fixed clinics - Health and Family Welfare Centres (H&FWCs) within each union, which provide IUDs, injectables, pills, and condoms; iii) outreach clinics - Satellite Clinics(SC) which also provide IUDs,[3] injectables, pills, and condoms; and iv) field workers - Family Welfare Assistants (FWAs) who provide pills and condoms and sometimes injectables to clients at their homes. No fees are charged for the family planning methods or services obtained through these outlets.

Several options to increase the financial sustainability[4] of the Programme are now being tested by the ICDDR,B's MCH-FP Extension Project (Rural). These include shifting service delivery from the client's home to static centres, and introducing fees for commodities and services.

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[3] In some SCs, IUDs are not provided due to lack of appropriate rooms for insertions.

[4] Financial sustainability can be defined as sustainable generation of funding without a significant change in utilization.

If service delivery is shifted from women's homes to cluster spots[5] or clinics, the cost of the national programme will eventually be reduced, since fewer field workers will be required to distribute contraceptives. Furthermore, the need to hire additional field workers, considering the rising population, will be reduced. However, the clients will be spending additional costs in the form of their travel time, cost of transport, and waiting time.

The second option will also involve the introduction of additional costs to the client. If pricing schemes for family planning commodities and services are introduced, recovery of commodity and service delivery costs will increase. Part of the cost will be shifted to the client in the form of user fees, prepayment fees, or other pricing mechanisms.

Both of these mechanisms to increase financial sustainability of the Programme may have an effect on contraceptive-seeking behaviour and could potentially have a negative effect on use of services. However, the evidence of studies on the price elasticity of demand for contraceptive methods from other countries suggests that demand is not very elastic for contraceptives when nominal prices are introduced (Literature Review Section) i.e. contraceptive use is not very responsive to a change in price when the change is nominal.

In order to accurately assess the effect of prices and access on use of contraception, it is also necessary to investigate factors that affect decision-making power within the household. Since disagreement may exist among couples in decision-making and there is evidence of limited communication in Bangladeshi households [8], factors that affect an individual's role in decision-making, such as access to income and assets, are also controlled for in the analysis.

Objectives of the Study

The primary objective of the study is to investigate the effect of prices and access on decision-making on contraceptive use, the choice of contraceptive

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[5] Cluster spots are neighbourhood households where the field workers provide services to a group of MWRAs.

method and the service delivery point. A secondary objective is to determine the importance of variables that affect women's decision-making power in the household with regard to contraceptive use.

Literature Review

Evidence from family planning studies has found that individuals are not very responsive to changes in price of contraceptives (price elasticity of demand is low). In most cases, they continue to purchase the contraceptives. Studies from Thailand, the Philippines, Jamaica, and other countries [9-11], have found that the demand for contraception is relatively insensitive to changes in the price of contraception within reasonable limits. Schwartz et al. [9] found, however, that while clients were not very responsive to increases in price for most methods (pills, IUDs, injectables, and sterilization), they were more sensitive to increases in price for condom.

Clients from low-income households may, however, be more responsive to changes in contraceptive price. If they are from low-income households, their contraceptive use may increase if price is lowered [10].

There is evidence that when price increases are large, use of that product may decrease, and clients may switch to another brand. In 1990, the Bangladesh Social Marketing Project [12] raised their prices by 60 per cent. The response to this large increment in price was that condom sales fell by 29 per cent and pill sales by 12 per cent. Clients chose to substitute other brands rather than paying the higher price. This trend in substitution to other brands was reversed, and the original sales volume recaptured, however, when prices were lowered for contraceptive brands of the Social Marketing Project to their original level of the 1980s.

Other studies have focused on the effect of travel time on the use of health and family planning services. Several studies [13-15] have found that travel cost is a statistically significant predictor of demand for health care.

Some studies have found travel time to significantly affect the use of contraception. In Cochrane and Guilkry's study [16] using Tunisia's 1988 Demographic and Health Survey, the effect of access to contraception on method choice was estimated. The study found that use of a short-term

method (pills, condoms, or vaginals) was positively associated with distance (if less than five kilometers) to a pharmacy or hospital, and use of an IUD with proximity to a service provider.

Existing studies have found a limited effect of cash prices on use and a more important effect of access on contraceptive use patterns in developing countries. Since relatively few studies have investigated this issue in Bangladesh and few other national family planning programmes provide doorstep distribution of contraception, an investigation into the effect of these factors on contraceptive method use will provide useful results for policy-makers and programme managers.

Conceptual Framework

A couple's fertility behaviour is affected by a variety of factors, ranging from social and economic factors to biological and technical ones. Following Easterlin's [17] model of marital fertility, completed family size is hypothesized to be affected by the family income, the household's ability to produce goods and services, biological factors that affect reproduction, infant health, individual preferences that are affected by social and economic background, costs associated with the rearing of children, and costs associated with the use of family planning methods.

The equation describing contraceptive use is as follows:

$$C_{ijt} = \alpha c_{jt}^{k} + \beta t_{ijt}^{k} + \delta x_{jt} + \phi I_{st} + \gamma F_{ijt} + \eta z_{st} + u_{ijt}$$

where, C_{ijt} – alternative measures of contraceptive use, such as its use, type, source, and levels of expenditure of individual i in community j at time t;

c_{jt}^{k} – cash price of contraceptive method k in community j at time t;

t_{jt}^{k} – time and/or travel cost associated with method k in community j at time t;

x_{jt} – prices of other goods and services in community j at time t;

I_{st} – wealth of the wife and husband;

F_{ijt} – fertility intentions of individual i in community j at time t

Z_w, Z_h – vector of demographic and sociocultural characteristics of the wife and husband, such as age, education, parity, and exposure to messages about family planning that are likely to affect the income available to, the time constraints on and knowledge and preferences of the wife and husband.

The predicted signs of the regressors are shown in Table 1. The effect of costs associated with the use of family planning, such as cash price, travel time, travel cost, and waiting time is expected to be negative on utilization, according to economic theory. However, as discussed, many studies have found that contraceptive price is not significantly related to its use (Literature Review Section). In addition, the price elasticity of contraceptives and services may vary with income level.

Table 1. Predicted signs of the relationship between contraceptive use and the explanatory variables

Explanatory Variable	Predicted Sign
Cash prices of contraceptive methods	-
Time and/or travel cost associated with method	-
Wealth of husband and wife	+
Fertility intentions	+
Age of wife, age of husband	?
Parity of woman	+
Education of wife, education of husband	+
Religion	?
Exposure to messages about family planning	+

The wealth status of husband and wife should affect contraceptive use in two ways: i) through a wealth effect, and ii) through affecting the bargaining power of the spouse. The first effect is the normal income effect: with more wealth, either the quantity of services used is expected to increase or the quality of the demanded services/commodities will increase.

The other effect is that the husband's and wife's individual wealth status should affect their bargaining power within the household. Difference in bargaining power is important since spousal preferences on contraceptive use may differ. Unearned income, such as ownership of assets is considered to be a better measure than earned income, since it is less likely to reflect decision-making with regard to labour supply that occurs simultaneously [18].

Family size preferences to space and limit childbearing are expected to increase the demand for contraception.

Other demographic and sociocultural variables are included since they should affect the income available to, the time constraints of, and

preferences of husband and wife. One demographic variable-education-may affect decision-making in several ways. The husband's education is likely to influence his power in decision-making, since it should affect i) his ability to negotiate, and ii) the nature of the decision-making that takes place. However, it may be more important in affecting his family planning preferences than influencing his bargaining power. In addition, education changes the relationship between the husband and wife and should improve their communication.

The wife's education is also likely to influence her contraceptive-seeking behaviour through other mechanisms than bargaining power. It is likely to change her perceptions on family planning as well as improve her ability to absorb the information she receives on the advantages and disadvantages of different contraceptive methods in making choices. In addition, use-effectiveness of her methods will be higher, since she is better able to understand instructions for method use.

Data

Two data sources were used in this analysis: i) a cross-sectional survey on contraceptive pricing of May and June of 1996 from two rural sites of Bangladesh: Abhoynagar thana of Jessore district and Mirsarai thana of Chittagong district; and ii) two baseline surveys that collected information on socioeconomic variables and women's status in 1993 and 1994.

The nine unions where the contraceptive pricing survey was carried out are a subset of the Sample Registration System (SRS) of the MCH-FP Extension Project (Rural). The SRS is a data collection system, which collects demographic, contraceptive use and intervention-related longitudinal data every two months in four thanas. Since data on contraceptive pricing are not usually collected, a special questionnaire collected information on the following: current status of contraceptive use by woman, type of method, source of current method, travel cost, travel time, waiting time, and cost of methods.

The data from the contraceptive pricing survey were supplemented with background information from baseline surveys undertaken in 1993 and 1994

in Abhoynagar and Mirsarai thanas, respectively. Data on socioeconomic characteristics of SRS households, such as ownership of assets, educational levels, family structure, occupation and women's status, were extracted from two in-depth surveys undertaken in 1993 and 1994.

The total sample of the contraceptive pricing survey consisted of 5,942 married women between the ages of 15 and 49. The sample selection was based on a systematic household sampling procedure, whereby every sixth household in Abhoynagar unions and every fourth household in Mirsarai unions were selected. All eligible women residing in those sample households were selected.

Data Analysis

Three types of analysis were conducted: univariate, bivariate, and multivariate. The univariates were calculated and also disaggregated by thana to examine the demographic and socioeconomic characteristics of the population. The factors that were examined include: demographic characteristics, socioeconomic variables, and facility characteristics.

Model Specification

Demographic variables included age, age difference between spouses, number of living children, having a daughter aged 8-16 years, education, and family status. Age difference between spouses was introduced because couples with larger age differences were expected to have more traditional values and/or a more distant relationship between spouses. A dummy variable for having a daughter between 8 and 16 years was included since there is evidence that Bangladeshi couples prefer to complete their childbearing before their children, particularly daughters, reach older ages [18]. A dummy variable for family structure was also included, or whether the household was nuclear over extended, since it was likely to indicate the presence of additional decision-makers within the household.

The measures of socioeconomic status included wealth status, landholdings, wife's income generation,[6] husband's occupation, and wife's membership in a credit union. Since the two thanas are in rural areas and the economy is not well-monetized, ownership of assets was considered to be a better measure of wealth status than earned income. A wealth index was constructed to measure the wealth status of households. This index was developed to test differences in contraceptive-seeking behaviour between the groups. The assets that were included in this index are: area of land owned, material of roof, ownership of gold ornaments, use of electricity,[7] and other possessions, such as motorcycle, TV, *almirah*, cot, bicycle, livestock, and sanitary/sealed latrine (Appendix A-1).

Dummy variables for a woman's membership in a credit union and generation of income were included as proxies for women's bargaining power, since these measure a woman's access to cash income and opportunity cost of her time. A woman's membership in a credit union or income generation is hypothesized to improve her "economic power" and increase her status both within the family and the community [20]. These should give her additional bargaining power when negotiating with her husband over the choice of method and provider of family planning.[8]

A woman's membership in a credit union and generation of income could potentially be considered endogenous variables. That is, these variables and the outcome variable may be caused simultaneously by some additional factors.[9] However, the assumption made here is that these two decisions were long-term and should not affect current decision-making.

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[6] Many of the respondents were involved in income-generating activities, such as raising livestock and poultry and the production of handicrafts and weaving.

[7] While electricity at the respondent's home is not an asset, it was considered to be a useful indicator of wealth status.

[8] It should be noted, however, that woman's involvement in either activity may also reflect the fact that her husband is more lenient than other husbands or that the household is more impoverished.

[9] These may be produced from within the same system that produced decision-making on contraceptive use.

The variable measuring fertility preferences is a categorical variable and measures the desire to space as well as limit. The values are the following: 0 for wanting more children within two years, 1 for wanting another child after two years, and 2 for desiring no more child.

Although the number of FWA visits with respondents was considered to be the best measure of exposure to family planning messages, this variable was likely to be endogenous since an FWA is more likely to visit users than non-users. Instead, the overall contact rate of family planning workers to respondents in a union was used since it was considered to be exogenous or not affected by the use status of individuals. The drawback of this variable is that it does not fully capture the influence of a field worker on an individual's contraceptive-seeking behaviour.

Multivariate Analysis

Three types of models are estimated in the multivariate analysis: contraceptive use, method choice, and choice of service provider.

In the model of contraceptive use, logistic regression was used for estimating the probability of using contraception. The logistic specification has the following from Greene [22]:

$$\text{Prob}\,[Y=1] = \frac{\exp\beta' x}{1+\exp\beta'}$$

The dependent variable is use over non-use of a contraceptive method. The independent variables are shown in Table 2.

Table 2. Model of contraceptive method use

Independent Variables	Contraceptive use (n = 3165)
Demographic	Wife's age Age squared Spousal age difference # of living children Muslim religion Daughter aged 8-16 Wife's education Husband's education Nuclear family Thana
Socioeconomic	Number of assets Area of land owned Wife's membership in credit union Wife's income generation
Cash price	Pharmacy price of pill Pharmacy price of condom
Access	Travel time to SC Travel time to FWC Travel time to pharmacy
Fertility Preference	Desire to space or limit childbearing
Exposure to messages about family planning	FWA contact rate

Since fertility preferences may have been endogenous to the decision to use contraception, this variable is tested for endogeneity using the two-step regression technique discussed by Bollen [21]. An equation for additional children desired is estimated using ordered probit regression. The estimated error term from the first equation is entered with the actual number of additional children desired in the second equation. If the

coefficient of the estimated error term is not significantly different from 0, the null hypothesis that the number of additional children is exogenous can be accepted.

In the equation for contraceptive method choice, five choices are estimated for contraceptive method users: pill, condom,[10] injectable, IUD, and traditional family planning methods. Sterilization was not included, since users included women who had been sterilized more than five years ago. Since the decision to be sterilized did not reflect current decision-making, it was not used in this estimation.

Since the sample to estimate contraceptive method choice only included contraceptive users, Heckmann's two-step estimation procedure[11] was used for correcting selection bias in the regression coefficients of contraceptive method choice.

In multivariate analysis, two kinds of estimation strategies are used for estimating unordered categorical dependent variables as found in the choice of method: multinomial probit or logit. Although there are some advantages to the multinomial probit estimator since its underlying error term assumes normality, it was not chosen because of its computational infeasibility when there are more than three categories. The multinomial logistic model has the following from Greene [22]:

$$\text{Prob } (Y=j) = \frac{\exp\beta'_j x_i}{\Sigma_{k=0}}$$

where the dependent variable is the log odds that individual i in community j will choose method k relative to method 1.

The dependent variable is the choice of five contraceptive methods: pill, condom, injectable, IUD or traditional over the pill. In the estimation of choice of method, the reference case used is the choice of oral

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[10] It is possible that condom use is combined with traditional methods, but the user mentioned only use of condoms.

[11] In this procedure, during estimation of use over non-use, estimates of the inverse Mill's Ratio are obtained. Then, the inverse Mill's Ratio is added as a regressor to the method choice regression being estimated.

contraceptive pill since this contraceptive is the most frequently used. The independent variables are shown in Table 3.

Table 3. Models of contraceptive method choice

Independent variable	Choice between Contraceptive Methods (n = 1921)	Choice between Contraceptive Methods in Abhoynagar Thana (n = 1059)	Choice between Contraceptive Methods in Mirsarai Thana (n = 862)
Demographic	Wife's age Age squared Spousal age difference # of living children (LCH) LCH squared Daughter aged 8-16 Muslim religion Wife's education Husband's education Nuclear family Desire to space or limit Childbearing Thana	Wife's age Age squared Spousal age difference Living children (LCH) LCH squared Girl aged 8-16 Muslim Wife's education Husband's education Desire to space or limit Childbearing Nuclear family	Wife's age Age squared Spousal age difference Living children Girl aged 8-16 Muslim Wife's education Husband's education Desire to space or limit Childbearing Nuclear family
Socioeconomic	Number of assets Area of land owned Wife's membership in credit union Wife's income generation	Number of assets Area of land owned Wife's membership in credit union Wife's income generation	Number of assets Area of land owned Wife's membership in credit union Wife's income generation
Prices	Cash price at pharmacy	Cash price at pharmacy	Cash price at pharmacy
Access	Travel time to SC Travel time to FWC Travel time to pharmacy	Travel time to SC Travel time to FWC Travel time to pharmacy	Travel time to SC Travel time to FWC Travel time to pharmacy
Exposure to messages about family planning	FWA contact rate	FWA contact rate	FWA contact rate

The third type of model that is estimated is choice of provider for the contraceptive method. The estimation of contraceptive provider is disaggregated by method, since different choices are associated with each method. The choices of provider for pill and condom were investigated, since both have more than one provider and the choice was not provider-controlled.[12] For condom, two choices of providers were estimated: private provider (pharmacy or shop) over home delivery. For pill, there were three choices: private provider vs. public clinic over home delivery.

Before estimating the choice of provider, a correction is made for selectivity bias since users of condom and pill may have different characteristics from other users. Heckman's two-step estimation procedure was also used for correcting this bias.

For the analysis of provider choice, the conditional logit model was used because its regressors include choice-specific attributes as well as individual-specific characteristics. In this analysis, the J alternatives are each characterized by a set of K attributes, x_i. The probability that an individual chooses alternative J is the following from Greene [22].

$$\text{Prob}[Y_i = j] = \frac{\exp\beta' z_{ij}}{\Sigma_j \exp\beta' z_{ij}}$$

where m equals the number of choices.

Additional models were tested to determine whether prices were interactive with income in the choice of provider, as shown in Table 4. For the regression analysis of choice of provider among condom users, wealth group dummies were also added to the equation.

A different technique was employed for pill users, since the sample size was larger. For the analysis among pill users, the regression was tested for the sample as a whole and for users from lower wealth groups.

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[12] For some methods such as injectables, the client is required to seek the first dose from the Family Welfare Visitor at the SC or the H&FWC.

Table 4. Models of choice of provider

Variable	Choice of Provider of Condom (n = 134)	Choice of Provider of Condom with Wealth Dummies (n = 134)	Choice of Provider of Pill (n = 745)	Choice of Provider of Pill for Wealth < 11 (n = 329)
Demographic	Wife's age Age squared Spousal age differ. # of living children Living children^2 Wife's education Husband's educ. Nuclear family Muslim	Wife's age Age squared Spousal age differ. # of living children Living children^2 Wife's education Husband's education Nuclear family Muslim	Wife's age Age squared Spousal age difference # of living children Living children^2 Wife's education Husband's education Nuclear family Muslim	Wife's age Age squared Spousal age difference # of living children Living children^2 Wife's education Husband's education Nuclear family Muslim
Socio-economic	Number of assets Land ownership Husband's Occupation Member credit union Wife's income Generation	Number of assets < 6 Number of assets < 11 Land ownership Husband's Occupation Member credit union Wife's income Generation	Number of assets Land ownership Husband's occupation Member credit union Wife's income Generation	Number of assets Land ownership Husband's occupation Member credit union Wife's income Generation
Price	Cash Price at Pharmacy	Cash price at pharmacy	Cash price at pharmacy	Cash price at pharmacy
Access	Travel time Travel cost	Travel time Travel cost	Travel time Travel cost	Travel time Travel cost
Exposure to FP messages	FWA contact rate	FWA contact rate	FWA contact rate	FWA contact rate

Results

Univariate Results

The characteristics of the sample are presented in Table 5. The results indicate that there is, on average, a ten-year age difference between spouses; a family has, on average, three living children; the mean educational level is between two and four years; and about half of the households have a nuclear, rather than extended family structure.[13] Approximately, half of the women are using a contraceptive method. Regarding economic pursuits, about sixty per cent of the households have some land, and half are engaged in agriculture.

Significant differences were found between the demographic characteristics of the two thanas. At the lower-performing thana, Mirsarai, the respondents have larger age differences with their spouses, have more children, and have higher levels of education than at Abhoynagar thana. The family structure is also less likely to be nuclear at Mirsarai thana.

The contraceptive prevalence is fifty per cent higher in the higher-performing thana (66 per cent), Abhoynagar, than in the lower performing thana. In this thana, the most frequently used methods are the oral contraceptive pill and the injectable. The most common provider used to obtain contraceptives is the field worker, followed by the THC.

In the lower-performing thana, the contraceptive prevalence is approximately 40 per cent whereas it was 66 per cent in the higher-performing thana. The most commonly used methods are pill and injectable. The most common source of contraceptives was FWA, followed by the THC and H&FWC. In the lower-performing thana, clients were more likely to use the fixed clinics, THC and H&FWC, and less likely to use FWA than in the high-performing thana.

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[13] A small percentage of households also had family structures other than nuclear and extended, such as living with other relatives that were not parents. At Mirsarai thana, there were several households where the husband was absent, working elsewhere, often in the Middle East, and these were excluded from the analysis.

Table 5. Descriptive statistics of respondent characteristics[1]

Variable	Entire sample	Abhoynagar thana	Mirsarai thana
Demographic Variable			
Mean age of respondents	31.4 (8.5)[2]	30.7 (8.9)	31.9 (8.1) [5.3***][3]
Mean age of husbands	41.4 (10.6)	39.4 (10.6)	42.8(10.3) [11.4***]
Mean number of living children	3.0 (1.9)	2.6 (1.7)	3.3(2.0) [13.8***]
Mean years of education of wife	2.7 (3.3)	2.5 (3.1)	2.8 (3.4) [1.81*]
Mean years of education of husband	4.0 (4.1)	3.7 (3.9)	4.3 (4.3) [5.5***]
% Nuclear family	.52 (1.1)	.58 (.49)	.46 (.50) [8.7***]
% Muslim	.78 (.41)	.77 (.42)	.76(.43) [1.6*]
Contraceptive prevalence	.52 (.50)	.66 (.47)	.42 (.49) [17.3***]
Method mix users			
Pill	33.4	31.8	35.4
Condom	6.2	5.8	6.6
Injectable	27.0	31.2	21.6
IUD	6.6	6.4	6.8
Sterilization	17.1	14.8	19.9
Traditional	8.4	8.8	9.8 [38.6***]
Method source			
FWA	43.8	52.9	32.4
SC	5.4	3.8	7.5
FWC	9.6	5.3	15.0
THC	5.0	13.3	17.1
Private	9.4	8.0	10.8 [171.9***]
Socioeconomic variables			
Mean wealth index	6.6 (3.9)	6.9 (4.2)	6.4 (3.7) [4.7***]
% Owning land	62	70	56 [11.0***]
% Husband's occupation			
Agriculture	47	50	43
Business	17	15	19
Manufacturing	11	17	4
Other	25	18	34 [8.4***]
% Member of credit union	.14(.35)	.13 (.33)	.14 (.35) [2.00**]
% Wife has income generation	.32(.47)	.33(.47)	.31 (.47) [0.68]

Contd...

Table 5. *(contd.)*

Variable	Entire sample	Abhoynagar thana	Mirsarai thana
Price (taka)			
Mean pharmacy price of condom	5.2	4.6	5.9 [12.22***]
Mean pharmacy price of pill	13.0	13.6	12.2 [4.43***]
Access (minutes)			
Mean travel time to Satellite Clinic	17.5 (11.3)	15.4 (10.2)	19.1 (11.8)[12.0***]
Mean travel time to family welfare centre	28.5(14.8)	28.6 (15.2)	28.4(14.4) (0.16)
Mean Travel to Pharmacy	38.1(32.4)	41.8 (32.9)	34.8 (30.3) [8.0***]
Exposure to family planning			
% of women in union contacted by FWA in last two months		35.7(11.8)	22.1 (6.5) [54.7***]

[1] Excludes respondents whose husbands were absent.
[2] Standard deviations are given in parentheses.
[3] The t-statistics testing the differences between the two thanas are given in brackets.
* $p<.10$; ** $p<.05$; *** $p<.01$

There were also differences in socioeconomic status between the two thanas. The wealth level and the per cent of households owning land were higher at Abhoynagar.[14] In addition, the occupational structure varied between the two sites, with more husbands working in agriculture and manufacturing at Abhoynagar and more husbands working in business, and other occupations (servants, migrant labourers working overseas, etc.) at Mirsarai.

The travel time to the SC was shorter at Abhoynagar, but the time required for travel to the H&FWC did not differ significantly. The average travel time to the pharmacy at Mirsarai was shorter than at Abhoynagar.

[14] However, this may reflect the fact that households in Abhoynagar were more likely to farm, have land, and livestock than in Mirsarai. Households in Mirsarai, on the other hand, may have had more cash and fewer possessions.

Results of Estimation of Contraceptive Method Use

The first stage of the analysis was to estimate fertility preferences and test whether it was endogenous to the decision to use contraceptives. The results of the fertility preferences regression are shown in Appendix A-2. When the error term from the regression was entered into the contraceptive use equation together with the actual fertility preference variable, as shown in Column 1 of Table 5, it was not significantly different from zero and the null hypothesis that fertility preferences were exogenous was accepted.

The regression results of contraceptive method use are presented in Table 5. After age of the mother, parity and fertility preferences were controlled for in the analysis, pharmacy prices of pills and condoms were not found to be significant predictors of contraceptive use. Access (travel time to H&FWC), however, did have a negative effect on the probability of contraceptive use. A couple was a quarter less likely to use contraception if the travel time to H&FWC was more than 30 minutes away from their home, and a fifth less likely if it was between 15 and 30 minutes away.

Table 6. Logistic regression odds ratios of contraceptive use (t-statistics in parentheses)

Variable	Total Sample (n = 3065)	Total Sample (n = 3065)	Abhoynagar Thana (n = 1412)	Mirsarai Thana (n = 1653)
Wife's age	1.05 (2.43**)	1.04 (2.21**)	1.03 (1.21)	1.01 (0.33)
Age squared	0.99 (5.48***)	0.99 (5.52***)	0.99 (3.89***)	0.99(2.62***)
Spousal age difference	0.95 (6.53***)	0.95 (6.56***)	0.95 (4.52***)	0.95(4.86***)
# of living children	1.04 (1.46)	1.03 (1.17)	1.11 (1.81*)	1.02 (0.55)
Wife's education	1.04 (2.38**)	1.04 (2.40**)	1.04 (1.61*)	1.04 (1.70*)
Husband's education	1.02 (1.39)	1.02 (1.43)	0.99 (0.66)	1.04 (2.28**)
Religion	0.59 (4.91***)	0.59 (4.98***)	0.64 (2.78***)	0.52(4.49***)
Wealth level	1.05 (3.29***)	1.05 (3.20***)	1.07 (2.97***)	1.03 (1.45)
Land ownership	0.99 (1.49)	0.99 (1.45)	0.99 (0.95)	0.99 (0.98)
Member credit union	1.18 (1.39)	1.18 (1.37)	1.23 (1.05)	1.19 (1.10)
Wife's income generation	1.06 (0.63)	1.06 (0.64)	1.22 (1.21)	1.02 (0.12)
Desire for spacing or limiting childbearing	2.70 (14.92***)	2.68 (14.87***)	2.64 (9.69***)	2.70 (10.92***)
Estimated error from additional children desired	0.68 (1.41)	-	-	-
Girl aged 8-16 (years)	1.27 (2.38**)	1.23 (2.08**)	1.32 (1.76*)	1.14 (0.99)
FWA contact rate	0.99 (.05)	0.99 (.16)	1.00 (0.48)	0.99 (0.22)
Time to SC: 11-20 minutes	1.09 (0.92)	1.09 (0.91)	1.14 (0.96)	1.04 (0.27)
Time to SC: 21+ minutes	1.01 (0.06)	1.00 (0.04)	0.86 (0.88)	1.04 (0.29)
Time to FWC: 16-30 minutes	0.82 (1.79*)	0.82 (1.88*)	0.80 (1.33)	0.79 (1.62*)
Time to FWC: 31+ minutes	0.76 (2.40**)	0.76 (2.51***)	0.71 (1.96**)	0.75 (1.95**)
Time to pharmacy: 21-39 minutes	1.04 (0.45)	1.03 (0.40)	0.97 (0.19)	1.07 (0.59)
Time to pharmacy: 40+ minutes	0.94 (0.66)	0.94 (0.62)	0.87 (0.98)	1.03 (0.22)
Mirsarai thana	0.55 (4.85***)	0.53 (5.15***)	NA	NA
Pharmacy price of condom	1.01 (0.89)	1.01 (0.90)	1.01 (0.38)	1.01 (0.59)
Pharmacy price of pill	0.99 (0.27)	0.99 (0.25)	1.00 (0.28)	1.00 (0.16)
Log-likelihood	-1809.3	-1810.2	-793.75	-1010.7
Chi-squared	569.68	567.7	210.48	269.3

*Significant at .10 level; ** Significant at .05 level; *** Significant at .01 level.

Among socioeconomic variables, wealth level was a positive predictor of contraceptive use in the high-performing area - Abhoynagar thana but not in the low-performing area - Mirsarai thana. This regional difference may reflect a contrast in consensus and norms between the two thanas.

The two proxies for women's bargaining power that affected access to income were not significant predictors of contraceptive use while women's education was.

Husband's education, on the other hand, was a significant predictor only in Mirsarai. It is possible that the effect of husband's education on the probability of contraceptive use is not significant in the higher-performing area because the contraceptive prevalence is so high that differences in education have become less important, unlike in Mirsarai thana. In addition, the husband may have a more important role in decision-making in Mirsarai.

The spousal age difference and Muslim religion were negative predictors of contraceptive use, suggesting that more traditional households were less likely to use contraception. The significance of the former variable suggests that more traditional households were less likely to use contraception.

Having an older daughter was a significant predictor of contraceptive use in the high-performing thana but not in the low-performing thana, suggesting that the desire to limit one's childbearing after a daughter matures is stronger where contraceptive use is greater.

Results of Multivariate Estimation of Contraceptive Method Choice

The next models estimated were those of contraceptive method choice. The results of the multinominal logit regression analysis are presented in Table 7 through 9.

In terms of the effect of price and access variables on method choice in the entire sample, there were several interesting findings, as shown in Table 7. A cross-price effect was found for IUD, since clients were more likely to use IUD than pill if the pharmacy price of pill increased. On the other hand, a positive own-price effect was found for condom for the high-wealth group relative to the low-wealth group: clients were thirty per cent more likely to use condom than pill as the pharmacy price of condom

increased, implying that price was associated with value for these users.[15] However, both of these effects were only significant at 0.10 level.

Access to clinics had a negative effect on the probability of using the two methods that require travel to the static clinics - injectables and IUD. An MWRA was a quarter less likely to use injectables if the travel time to SC was greater than twenty minutes relative to travel time less than ten minutes. She was also 35 to 40 per cent less likely to use IUD if the travel time was twenty minutes or more to SC or 16 minutes or more to H&FWC.

Table 7. Multinomial logit odds ratios of contraceptive choice with pill as the reference category (t-statistics in parentheses) (n = 1726)

Variable	Condom	Injectable	IUD	Traditional Method
Respondent's age	1.32 (1.89**)	1.03 (0.33)	1.13 (0.95)	1.07 (0.63)
Age squared	0.99 (1.83*)	0.99 (0.35)	0.99 (1.03)	1.00 (0.12)
Spousal age difference	1.01 (0.54)	1.00 (0.04)	1.03 (1.44)	1.05 (3.06***)
Wife's education	1.04 (1.03)	0.95 (1.94**)	0.97 (0.75)	1.05 (1.38)
Husband's education	1.10 (3.16***)	0.97 (2.41***)	0.99 (0.17)	1.00 (0.13)
# of living children	1.12 (0.63)	1.27 (2.16**)	1.49 (2.28**)	0.85 (1.21)
Living children squared	0.98 (0.62)	0.97 (1.47)	0.95 (1.93**)	1.03 (1.42)
Wealth group 2	0.62 (0.68)	0.47 (2.03**)	0.79 (0.41)	0.98 (0.04)
Wealth group 3	0.35 (1.41)	0.49 (1.72*)	1.28 (0.39)	0.65 (0.75)
Area of land owned	0.99 (0.57)	0.99 (0.93)	0.99 (2.00**)	1.00 (0.11)
Muslim	2.72 (3.72***)	1.53 (2.92***)	1.97 (2.75***)	0.98 (0.08)
Member credit union	1.03 (0.10)	1.28 (1.48)	1.59 (1.93**)	0.83 (0.76)
FWA contact rate	1.02 (1.38)	0.99 (1.01)	1.01 (0.79)	0.99 (1.02)
Travel time to SC: 11-20 minutes	1.14 (0.53)	0.99 (0.09)	0.93 (0.32)	0.93 (0.34)

Contd.

[15] Another interpretation is that there was a bias in reporting of the wealthiest condom users, i.e. these users reported the price of condom as higher.

Table 7. *(Contd.)*

Variable	Condom	Injectable	IUD	Traditional Method
Travel time to SC: 21+ minutes	1.09 (0.33)	0.74 (1.93)	0.67 (1.67*)	0.90 (0.48)
Travel time to FWC: 16-30 minutes	0.95 (0.22)	1.11 (0.63)	0.63 (2.05**)	1.26 (1.04)
Travel time to FWC: 31+ minutes	1.27 (0.89)	1.21 (1.16)	0.60 (2.07**)	1.09 (0.37)
Travel time to pharmacy: 21-40 minutes	0.78 (1.18)	1.04 (0.29)	1.03 (0.16)	1.06 (0.34)
Travel time to pharmacy: 41+ minutes	0.79 (0.94)	1.05 (0.32)	1.02 (0.07)	0.71 (1.63*)
Pharmacy price of condom	0.84 (1.46)	0.94 (1.24)	0.94 (0.88)	0.95 (0.73)
Condom price* wealth2	1.20 (1.54)	1.04 (0.56)	1.02 (0.17)	1.03 (0.40)
Condom price* Wealth3	1.32 (2.31**)	1.05 (0.68)	1.00 (0.04)	1.08 (0.87)
Pharmacy price of pill	1.04 (1.41)	0.99 (0.20)	1.03 (1.68*)	1.03 (1.15)
Pill price* wealth2	0.96 (1.08)	1.02 (0.99)	0.99 (0.14)	0.98 (0.82)
Pill price* wealth3	0.95 (1.69*)	1.00 (0.24)	0.97 (1.06)	0.95 (1.70*)
Girl aged 8-16	1.94 (2.73***)	1.03 (0.17)	1.07 (0.31)	1.46 (1.91**)
No additional children desired	0.85 (0.88)	0.88 (1.22)	1.11 (0.58)	0.70 (2.31**)
Mirsarai thana	0.91 (0.27)	0.72 (1.73*)	1.21 (0.62)	0.45 (2.86***)
Lambda	1.24 (0.91)	0.91 (0.59)	0.55 (2.20**)	0.95 (0.21)
Log-likelihood	-2226.52	-	-	-
Chi-squared	353.18	-	-	-

*Significant at .10 level.** Significant at .05 level. *** Significant at .01 level.

Membership in a credit union, a proxy for bargaining power, also had a significant effect on method choice. If a woman was a member of a credit union, she was 60 per cent more likely to use IUD, suggesting that she chose to either use a method that was more effective or a method that required relatively little effort on her part. It is also possible that her method choice was influenced by the promotion of certain contraceptive methods by the credit union.

Wealth status, or number of assets owned, was negatively associated with the probability of using injectables, suggesting that the side-effects associated with this method outranked the advantages for clients with more assets. It also may indicate that the injectable has more advantages for low-income women, such as allowing for more privacy than pill or condom.

If the area of land owned by the household was greater, MWRA was more likely to use pill than IUD. However, the magnitude of this effect was very small.

Demographic variables also had a significant effect on method choice. The spousal age difference was positively associated with the use of traditional methods, as would be expected for this proxy of traditional values. The wife's and husband's education were negatively associated with the choice of injectables, probably for reasons similar to that of the number of assets. Husband's education was also positively associated with the choice of condom, possibly because this is a male-determined method. If a client were Muslim rather than other religions, she was more likely to use condom, injectables or IUD than pill.

If there were a girl aged 8-16 years in the household, MWRA was more likely to use the condom or traditional methods than pill, perhaps because the husband was equally motivated to use a method in this case, and these methods require more involvement of the husband.[16] On the other hand, if the woman desired no more children, she was 30 per cent less likely to use traditional methods than pill, suggesting that she chose to use a more effective method in this case.

Regional differences in the probability of using a method were also found. An MWRA was more likely to use injectables and traditional methods if she were from the higher-performing thana - Abhoynagar - rather than Mirsarai. This difference may reflect programme differences between the two thanas.

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[16] Another explanation is that these couples had been married longer, and longer married couples cooperate better.

Choice of Method by Thana

The second step of the analysis of method choice was to investigate the impact of the factors that affect method choice separately by thana, since significant differences were found between the characteristics of users in the two thanas. The results of the estimation of method choice at Abhoynagar thana are shown in Table 8.

Table 8. Multinomial logit odds ratios of contraceptive choice with pill as the reference category at Abhoynagar thana (n = 935) (t-statistics in parentheses)

Variable	Condom	Injectable	IUD	Traditional method
Wife's age	1.07 (0.31)	0.98 (0.21)	1.05 (0.27)	0.99 (0.07)
Age squared	0.99 (0.18)	1.00 (0.24)	0.99 (0.35)	1.00 (0.45)
Spousal age difference	1.05 (1.43)	1.02 (.99)	1.05 (1.81*)	1.05 (1.90**)
Wife's education	0.99 (0.03)	0.93 (2.08**)	0.97 (0.60)	1.01 (0.19)
Husband's education	1.07 (1.52)	0.97 (0.93)	0.98 (0.42)	1.04 (0.94)
# of living children	2.71 (1.74*)	1.19 (0.68)	1.37 (0.69)	1.41 (0.98)
Living children squared	0.85 (1.99**)	0.99 (0.41)	0.95 (0.88)	0.99 (0.30)
Wealth level 2	0.12 (1.74*)	0.39 (1.48)	0.34 (1.03)	0.39 (0.96)
Wealth level 3	0.21 (1.26)	0.72 (0.50)	0.95 (0.05)	0.68 (0.38)
Quantity of land owned	0.99 (0.30)	0.99 (0.77)	0.99 (1.93**)	0.99 (1.11)
Muslim	2.50 (2.34**)	1.43 (1.79*)	1.67 (1.52)	0.82 (0.74)
Member credit union	1.37 (0.80)	1.30 (1.07)	2.38 (2.57***)	1.29 (0.75)
FWA contact rate	1.04 (2.35**)	0.99 (0.45)	1.02 (1.42)	0.99 (0.60)
Travel time to SC: 11-20 minutes	1.08 (0.24)	1.14 (0.71)	0.94 (0.23)	1.14 (0.48)
Travel time to SC: 21+ minutes	1.12 (0.31)	0.64 (2.01**)	0.49 (1.98**)	0.93 (0.22)
Travel time to FWC: 16-30 minutes	0.94 (0.16)	1.06 (0.29)	0.68 (1.27)	1.77 (1.74*)
Travel time to FWC: 31+ minutes	0.80 (0.60)	0.96 (0.17)	0.4 (2.54***)	1.45 (1.10)
Travel time to pharmacy: 21-40 minutes	0.56 (1.89**)	1.02 (0.13)	0.87 (0.53)	0.96 (0.17)
Travel time to pharmacy: 41+ minutes	1.29 (0.79)	1.08 (0.43)	0.86 (0.46)	0.93 (0.28)

Contd.

Table 8. *(Contd.)*

Variable	Condom	Injectable	IUD	Traditional method
Pharmacy price of condom	0.81 (0.94)	0.98 (0.19)	0.83 (1.08)	0.74 (1.61*)
Condom price* wealth2	1.48 (1.67*)	1.10 (0.81)	1.13 (0.59)	1.41 (1.68*)
Condom price* wealth3	1.34 (1.30)	0.98 (0.17)	1.09 (0.44)	1.29 (1.25)
Pharmacy price of pill	1.01 (0.27)	1.01 (0.56)	1.01 (0.35)	1.04 (1.36)
Pill price* wealth2	1.00 (0.05)	1.01 (0.34)	1.02 (0.50)	0.95 (1.49)
Pill price* wealth3	0.97 (0.71)	0.99 (0.15)	0.97 (0.74)	0.92 (2.19**)
Girl aged 8-16 years	2.64 (2.74***)	1.13 (0.59)	1.46 (1.14)	1.38 (1.12)
No additional children desired	0.84 (0.64)	0.81 (1.41)	1.00 (0.02)	0.65 (1.96**)
Lambda	1.34 (0.84)	0.79 (1.10)	0.42 (1.96**)	0.85 (0.52)
Log-likelihood	-1195.00	-	-	-
Chi-squared	224.13	-	-	-

*Significant at .10 level.** Significant at .05 level. *** Significant at .01 level.

In the Abhoynagar sample, the effect of pharmacy price of condom on method choice was marginally significant for the moderately wealthy group. If the household were from the middle wealth group, MWRA was more likely to use condom and less likely to use traditional methods than pill as the pharmacy price increased. If she were from the wealthiest group, she was more likely to use the pill than traditional methods as the pharmacy price of the pill increased, again suggesting that clients associate price with quality.

The results of the effects of access on method choice at Abhoynagar were similar to the sample as a whole. However, when the travel time to H&FWC was high, the respondent was 75 per cent more likely to use traditional methods.

One difference between the Abhoynagar sample and the sample as a whole was that the effect of the husband's education on method choice was not significant. As suggested earlier, the husband's education may not covary closely with contraceptive use as prevalence increases.

The proxy for exposure to messages on family planning was positively associated with the probability of using the condom, indicating the influence that field workers are playing in method choice.

At Mirsarai thana, where contraceptive prevalence is lower than at Abhoynagar, the impact of price, access, and income variables differed, as shown in Table 9. As the pharmacy price of pill increased, users were more likely to use condom or IUD rather than pill. The choice of condom over pill suggests that a substitution effect is occurring when the price of pill increases, and there is a switchover to condom.

In terms of access, users were 45 per cent less likely to use condom than pill if the travel time to the pharmacy was more than 40 minutes, rather than less than twenty minutes, and fifty per cent less likely to use IUD if the travel time to H&FWC was sixteen to thirty minutes, compared to less than fifteen minutes.

Table 9. Multinomial logit odds ratios of contraceptive choice with pill as the reference category at Mirsarai thana (n=862) (t-statistics in parentheses)

Variable	Condom	Injectable	IUD	Traditional Method
Wife's age	1.45 (1.68*)	1.13 (0.95)	1.24 (1.05)	0.98 (0.11)
Age squared	0.99 (1.74)	0.99 (1.02)	0.99 (1.07)	1.00 (0.72)
Spousal age difference	0.97 (0.88)	0.98 (0.87)	1.00 (0.08)	1.06 (2.75***)
Wife's education	1.07 (1.21)	0.98 (0.52)	0.97 (0.61)	1.11 (1.98**)
Husband's education	1.17 (3.22***)	0.92 (2.63***)	0.98 (0.38)	0.96 (1.16)
# of living children	0.75 (1.31)	1.32 (1.97**)	1.38 (1.58)	0.88 (0.67)
Living children squared	1.04 (1.27)	0.96 (1.73*)	0.96 (1.25)	1.01 (0.32)
Wealth level 2	1.84 (0.58)	0.94 (0.10)	1.10 (0.09)	1.25 (0.33)
Wealth level 3	0.39 (0.88)	0.50 (0.91)	1.07 (0.57)	0.12 (2.41***)
Quantity of land owned	0.00 (1.94**)	0.99 (0.73)	0.99 (0.19)	1.00 (1.94**)
Muslim	3.85 (3.22***)	1.65 (2.09**)	2.28 (2.10**)	0.99 (0.00)
Member credit union	1.06 (0.11)	1.37 (1.29)	1.11 (0.28)	0.47 (1.82*)
FWA contact rate	0.95 (1.50)	0.97 (1.93**)	0.99 (0.17)	0.99 (0.44)
Travel time to SC: 11-20 min	1.28 (0.65)	0.82 (0.82)	0.90 (0.30)	0.82 (0.60)
Travel time to SC: 21+ min	0.99 (0.01)	0.77 (1.05)	0.67 (1.10)	0.88 (0.38)

Contd.

Table 9. *(Contd.)*

Variable	Condom	Injectable	IUD	Traditional Method
Travel time to FWC: 16-30 min	0.78 (0.61)	1.16 (0.57)	0.51 (1.86*)	0.84 (0.56)
Travel time to FWC: 31+ min	1.54 (1.06)	1.50 (1.56)	0.83 (0.52)	0.81 (0.60)
Travel time to pharmacy: 21-40 minutes	0.98 (0.07)	1.03 (0.17)	1.19 (0.61)	1.23 (0.81)
Travel time to pharmacy: 41+ minutes	0.37 (2.18**)	1.02 (0.08)	1.25 (0.67)	0.53 (1.80)
Pharmacy price of condom	0.79 (1.54)	0.92 (1.17)	0.92 (0.94)	1.07 (0.81)
Condom price* wealth2	1.18 (0.87)	0.93 (0.66)	1.07 (0.57)	0.86 (1.29)
Condom price* wealth3	1.54 (2.41***)	1.16 (1.21)	0.98 (0.09)	1.11 (0.83)
Pharmacy price of pill	1.09 (2.02**)	0.98 (0.72)	1.06 (1.74*)	0.99 (0.29)
Pill price* wealth2	0.89 (1.91**)	1.02 (0.56)	0.98 (0.43)	1.04 (0.92)
Pill price* wealth3	0.88 (2.22**)	0.96 (0.95)	0.99 (0.26)	1.02 (0.33)
Girl aged 8-16 years	1.42 (0.97)	0.95 (0.24)	0.82 (0.63)	1.41 (1.16)
No additional children desired	0.78 (0.91)	0.95 (0.30)	1.39 (1.17)	0.65 (1.91**)
Lambda	1.09 (0.24)	1.11 (0.44)	0.71 (0.97)	1.04 (0.13)
Log-likelihood	-957.80	-	-	-
Chi-squared	256.44	-	-	-

*Significant at .10 level;.** Significant at .05 level; *** Significant at .01 level.

If a woman were a member of a credit union, a proxy for bargaining power, in Mirsarai, the effect was different from that in Abhoynagar. She was twice as likely to use pill than traditional methods, although in Abhoynagar, she was twice as likely to use IUD than pill. This finding suggests that credit unions either increase her desire to use a more effective method, or method promotion occurred during union meetings.

Education played a larger role in affecting method choice at Mirsarai than at Abhoynagar. In addition to being positively associated with the use of condom, the husband's education was negatively associated with the use of injectables.

Several variables were associated with the use of traditional methods. In addition to spousal age difference and desire to limit fertility, the wife's education was positively associated, and wealth level was negatively associated with use of these methods.

Choice of Provider

Two models of provider choice were estimated: the choice of private source over home delivery for condom users, and the choice of private vs. public clinic over home delivery for pill users. The results are provided in this section.

Choice of provider for condom users

The decision-making on source of provider for condom differs from other methods, since it involves negotiation between husbands and wives, and of necessity, has more male involvement than other methods.

The first step of the analysis was to estimate the probability of being a condom user. The results of this bivariate probit analysis are found in Appendix A-3. Table 10 presents the results of the estimation of choice of provider for condom users.

The results indicate that both price and access variables had a significant effect on the choice. The price of condom was positively associated with the use of the private sector, suggesting that customers associate price with product quality.[17] Clients were three-times as likely to use a private source if the travel time were fifteen minutes or less, compared to more than 35 minutes.

[17] It should be noted that there may also be a bias since condom purchasers may have been more likely to state that condom prices were higher.

Table 10. Conditional logit odds ratios of choice of private provider over home delivery for condom users (n = 134)

Variable	Odds Ratio
Wife's age	0.92 (0.57)
Wife's age squared	1.00 (0.53)
Living children	1.06 (0.25)
Wife's education	0.95 (0.52)
Husband's education	1.12 (1.34)
Wealth level	0.91 (1.11)
Credit union membership	0.53 (0.84)
Wife's income generation	2.26 (1.51)
Muslim	0.76 (0.39)
Nuclear family	0.47 (1.39)
Businessmen	2.72 (1.76*)
Travel time to pharmacy: 0-15 minutes	3.23 (1.93**)
Travel time to pharmacy: 16-35 minutes	0.57 (1.03)
Pharmacy price	1.23 (2.62***)
FWA contact rate	0.99 (0.22)
Mirsarai thana	6.94 (1.95**)
Lambda	0.59 (0.75)

A second socioeconomic variable that affected the choice of provider for condom users was occupation of the husband. The provider was almost three-times as likely to be private if the husband were a businessman, probably because he had more access to cash income.

Region also proved to be very important since a couple was seven-times as likely to purchase condom from the pharmacy if they were from the lower-performing thana Mirsarai, rather than Abhoynagar. The greater likelihood to purchase condom from the pharmacy may reflect the lower probability of being contacted by a field worker in Mirsarai.

None of the proxies for the wife's bargaining power was significant predictors of the choice of provider for condom.

When the model was tested with dummies for wealth groups, no significant effect was found by wealth group.

Choice of provider for pill users

The probability of pill use was estimated using probit regression and is shown in Appendix A-4. Table 11 and 12 present the results of the conditional logit regression estimation of provider choice for pill users. The three choices of provider were private sources vs. clinic over home delivery.

Although there was no effect of the price of pill on the choice of provider, the effect of access was statistically significant. One type of access which was significantly associated with provider choice was waiting time. Clients were less likely to use a private source or clinic if the waiting time was longer. Since the waiting time was, on an average, longer in public clinics than in private facilities, it should affect public clinics more than the private facilities.

Membership in a credit union, a proxy for bargaining power, doubled the likelihood of obtaining the commodity at a clinic, perhaps because, if a woman had greater mobility, she preferred to obtain the method at her own convenience.

Socioeconomic variables that affected the choice of provider included the husband's occupation and the area of land owned. If the husband's occupation was farming, the client was one-third less likely to obtain pill at a private facility, probably because these households have less access to cash and the wife is less likely to travel. Similarly, the area of land owned was negatively associated with the use of a private source, suggesting that the effect of more land was not a wealth effect.[18]

Several demographic variables also affected the choice of provider among pill users. If the wife were younger, the husband were more educated or they had more children, they were more likely to use a private source to obtain the pill.

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[18] If the area of land owned was closely associated with the wealth of the household, the expected effect would be that a more costly product, such as pharmacy pills would be purchased.

Table 11. Conditional logit odds ratios for choice of private vs. public clinic over home delivery for pill users (n = 745)

Variable	Private	Clinic
Wife's age	0.9287 (-1.810*)	0.9820 (-.458)
Wife's age squared	1.000 (.029)	1.000 (.018)
Spousal age difference	1.0242 (1.106)	0.9929 (-.243)
Living children	1.2323 (2.033**)	1.0169 (1.005)
Wife's education	1.0169 (.398)	1.0352 (.592)
Husband's education	1.0799 (2.178***)	0.9882 (-.251)
Wealth level	1.0322 (.765)	0.9526 (.807)
Land ownership	0.9987 (-1.983**)	0.9989 (-1.128)
Muslim	1.7769 (2.275***)	1.1746 (..472)
Credit union membership	0.6938 (-.946)	1.9876 (1.835*)
Wife's income generation	0.9877 (-.051)	1.4669 (1.165)
Nuclear family	0.6479 (-1.837*)	0.3294 (-3.366***)
Businessmen	1.1560 (.542)	1.3742 (.785)
Farmer	0.5749 (-2.112**)	1.4761 (1.16)
Travel time	1.0011 (.227)	1.0011 (.227)
Travel cost	0.9785 (-1.253)	0.9785 (-1.253)
Price	1.0095 (.852)	1.0095 (.852)
Waiting time	0.9151 (-4.784***)	0.9151 (-4.784***)
FWA	0.9972 (-.322)	0.9972 (-.322)
Lambda	0.5672 (1.593)	0.7497 (-.619)

*Significant at .10 level; **Significant at .05 level; ***Significant at .01 level.

When the model was tested for lower wealth groups,[19] as shown in Table 12, the impact of access variables on choice of provider was greater.

In addition to waiting time, the cost of travel time had a negative effect on choice of provider for pill users. This finding suggests that the pill users

[19] We were able to test the model in a lower-income group for pill users since the sample size was larger than that of the condom users.

belonging to the lower-wealth groups do not base their contraceptive decision-making as much on the opportunity cost of their time, as they do on the cash prices required to travel to the providers.

In this sample, if the woman generated income, she was twice as likely to use the clinic than home delivery to obtain pills. Credit union membership, however, had no effect on provider choice for this group.

Table 12. Conditional logit odds ratios for provider choice for lower wealth group pill users (n = 329)

Variable	Private	Clinic
Wife's age	0.8748 (-2.170**)	0.9069 (-1.536)
Wife's age squared	1.0021 (1.669)	1.0012 (0.941)
Spousal age difference	1.0298 (0.917)	1.0315 (0.890)
Living children	1.0639 (0.379)	1.2385 (1.180)
Wife's education	0.9782 (-.290)	1.0510 (.544)
Husband's education	1.1404 (2.227***)	0.9886 (-.165)
Wealth level	0.9968 (-.993)	1.0031 (1.196)
Muslim	1.8942 (1.462)	0.7447 (-.604)
Credit union membership	0.4233 (-1.289)	2.1032 1.476
Wife's income generation	0.9473 (-.122)	2.3595 (1.816*)
Nuclear family	0.7667 (-.655)	0.2794 (-2.945***)
Businessmen	0.8731 (-.266)	1.1850 (.273)
Farmer	0.6887 (-.867)	1.6585 (1.091)
Travel time	1.0107 (1.287)	1.0107 (1.287)
Travel cost	0.9505 (-1.709*)	0.9505 (1.709*)
Price	1.0206 (.995)	1.0206 (.995)
Waiting time	0.9195 (-2.999***)	0.9195 (-2.999***)
FWA	0.9978 (-.149)	0.9978 (-.149)
Lambda	0.3828 (-1.584)	0.6943 (-.534)

* Significant at .10 level; **Significant at .05 level; ***Significant at .01 level.

Discussion and Policy Implications

Effects of Price and Access

The regression estimation of contraceptive use in rural Bangladesh indicate that cash prices were not significant predictors of use, although access variables were. If the travel time to H&FWC was more than thirty minutes, an MWRA was a quarter less likely to use contraception. This finding indicates that despite the fact that there is home delivery of contraceptive methods in rural Bangladesh, having access to static clinics (where a variety of family planning methods can be obtained at any time) had an effect on use.

The analysis on contraceptive method and provider choice indicate that family planning users were, to a limited extent, responsive to price in making choices about contraception. A negative association was found between the pharmacy price of pill and method choice in the lower-performing thana - Mirsarai, although not in the higher-performing thana. Clients were more likely to use IUD or condom as a method than pill when the pill price was higher, but the magnitude of the effect was not large. On the other hand, the pharmacy price of condom was positively associated with the choice of condom over the pill in the high-wealth group, and with the use of the private sector over home delivery for condom users. This finding indicates that, for some commodities, charging somewhat higher prices may encourage use.[20]

The implication of the limited effect of cash prices on use and contraceptive method choice is that the judicial application of user fees in the government system should be tested as a means of cost recovery in rural areas of Bangladesh. The level of the fees should, however, be carefully researched based on willingness and ability of clients to pay, as well as

[20] This effect is likely to be limited, however, given the experience of the Social Marketing Company.

operational costs of service delivery. In addition, a safety net[21] for users who cannot afford to pay should be provided so that these clients will continue to have access to contraception.

Clients were also less likely to choose methods that were less accessible. Travel time affected the probability of using methods obtained only at static clinics, such as SC and H&FWC. Users in the higher-performing thana - Abhoynagar - were less likely to use injectables than pill if the travel time to SC were greater than twenty minutes, and were less likely to use IUD than pill if the travel time were greater than twenty minutes to SC or more than thirty minutes to H&FWC. In the lower-performing thana - Mirsarai, users were less likely to use IUD than pill if the travel time to H&FWC were greater than fifteen minutes.

The implications of the effect of travel time on contraceptive use are that the effect of a gradual transition to static clinics should affect use if the travel time is greater than thirty minutes. The GoB should seek ways to lower the travel time to static clinics through such interventions as increasing the frequency of SC[22] in unions where the geographical dispersion of the population is high.

The implications of the effect of travel time on method choice are twofold: i) the effect of a gradual transition to static clinics should increase the use of the more cost-effective IUD since travel time will be the same for all of the methods distributed by the GoB; ii) MOHFW should seek ways to decrease the time required to obtain IUD. There are two strategies that could be tried to increase access: i) frequency of SCs could be increased as mentioned earlier; ii) improvements in privacy, convenience, and quality of IUD insertion at SCs and H&FWCs should be undertaken.

Travel time, cost of travel and waiting time also had a statistically significant effect on the choice of provider of contraceptives. The effect can

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[21] A safety net is a mechanism to allow clients who cannot afford to pay to obtain contraceptives at no cost. For example, one safety net is designating a location where the commodities are distributed at no charge.

[22] An intervention to increase the frequency of SCs is being tested in the MCH-FP Extension Project (Rural).

be differentiated by method: i) longer travel time to the pharmacy/shop reduced the likelihood of using the pharmacy/shop for condom users, but not for pill users; ii) average waiting time decreased the likelihood of using clinics or private sources for pill users but not condom users; and iii) cost of travel was statistically significant for pill users belonging to the lower-wealth group. It is likely that these differences are associated with variations in characteristics of condom and pill users, i.e. condom use is a male-dominated method, likely to be purchased by husbands, whereas pills are more likely to be procured by wives. Therefore, the husband's characteristics more strongly affect the choice of condom provider, while provider choice of pill is more often affected by the wife's characteristics.

The findings imply that use of clinics or private sources would increase if access were improved either through decreasing waiting time or increasing access to SCs to lower the cost of travel.[23] Some mechanisms to decrease the waiting time at public clinics could be developed to increase efficiency in the delivery of services through conducting client flow analysis. One possible strategy to decrease waiting time that is being tested by the MCH-FP Extension Project (Rural) is to extend the available hours of service for the clients.

Effects of Other Factors

Although proxies for bargaining power which affected access to income were not significant predictors of contraceptive use, other variables, such as education and spousal age difference that were hypothesized to affect bargaining power and communication among couples were. Couples were more likely to use contraceptives if the wife or husband (in Mirsarai thana) were more educated, and less likely to use contraceptives as the spousal age difference increased.

A woman's membership in a credit union was found to be a significant predictor of method and provider choice. The effects on method choice did, however, differ by thana. In the higher-performing - union Abhoynagar - if

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[23] In order for increasing the frequency of SCs to be effective, it would need to be combined with IEC about the benefits and timing of satellite clinics.

a woman were a member of a credit union, she was twice as likely to use IUD as pill. In the lower-performing thana Mirsarai if a woman were a member of a credit union, she was twice as likely to use the pill over traditional methods. These differences can probably be attributed to the variation in CPR and lower use of methods other than pill in Mirsarai than in Abhoynagar.

The other variable that was hypothesized to affect bargaining power through access to income a woman's income generation - was found to be less important in decision-making on contraceptive use, perhaps because no contraceptive use promotion is associated with individual earning activities. The only case where it was significant was for lower-wealth groups in the choice of provider for pill.

Both wife's and husband's educational levels - variables that was hypothesized to affect bargaining power as well as other factors - were significant predictors of contraceptive use. However, the effect of education on contraceptive use was much stronger in the lower-performing thana than in the higher-performing thana, probably because, as contraceptive prevalence rises, use covaries less with educational level.

Other interesting findings were that family structure and husband's characteristics were statistically significant predictors of choice of pill provider. It appears that clients from extended families choose to use sources away from home to obtain privacy in choosing a method. Both husband's education (in the case of pills) and his occupation had an effect on the use of the private sector, suggesting that husband plays a strong role in decision-making when it comes to the choice between private and public contraceptive providers. It suggests that, when husbands are involved, it is more possible to use private sources.

The effect of women's bargaining power on contraceptive method and provider choice suggest that, given some bargaining power, a woman will play an important role in contraceptive decision-making, and would be willing to seek contraceptives at clinics, rather than at home. The findings suggest that efforts to raise women's bargaining power by enhancing their economic power through membership in credit unions and possibly income-generating activities would increase the use of longer-term methods and

static clinics in rural Bangladesh. It can be assumed, however, that this cannot be done immediately, but will need to be phased in on a priority basis.

The findings that husband's characteristics, such as their educational level and age difference with their wives, are significant predictors of contraceptive use, method choice, and use of the private sector to purchase pills, particularly in the lower-performing thana, suggest that a focus on men through information, education, and communication to raise their awareness about the benefits of contraceptive use is warranted.

Wealth level, as measured by the number of household assets, also had an effect on contraceptive decision-making. Lower-wealth group users were more likely to use the injectable method than were higher-wealth group users.[24] A second effect of wealth level was an interactive effect of access with wealth group. Travel cost only had a statistically significant effect on choice of provider for lower-wealth group pill users. These findings suggest that the negative effect of travel cost on the use of static centres is greater among lower-wealth group users than higher-wealth group users, and that increased access to static centres through interventions such as increasing the frequency of SCs is likely to mitigate the differential effect of access on contraceptive use patterns by wealth status.

[24] An effect of wealth probably would have been found for tubectomies as well, if they had been included in the analysis.

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Values allocated to wealth index

Points	Household has:
1	Almirah/cot
1	Buffalo/cow/goat
1	Gold ornament
1	Radio
1	Electricity
1	Sanitary/sealed latrine
2	Motorcycle/TV
1	Bicycle
1	Quilt/blanket
1	201 + decimals of arable land
1	200+ square feet of house
1	Thatched roof
2	Bamboo/jute/stick roof
3	Tile/rupban tin roof
4	Bricks/concrete/pucca or tin roof

Appendix A-2

Ordered probit odds ratios for fertility intentions[a] (t-statistics in parentheses) (n=3271)

Variable	
Wife's age	0.92 (2.55***)
Wife's age squared	1.00 (3.40***)
Spousal age difference	1.91 (1.51)
Wife's education	1.03 (2.29**)
Husband's education	1.02 (1.87*)
Number of living children	1.97 (29.84***)
Muslim religion	0.76 (4.48***)
Wealth level	1.02 (2.16**)
Area of land owned	0.99 (1.99**)
Nuclear family	1.06 (0.98)
Girl aged 8-16	0.95 (0.67)
Wife's income generation	1.06 (1.05)
Wife member credit union	1.11 (1.40)
Knowledge of family planning before marriage	0.99 (0.08)
FWA contact rate	1.00 (0.48)
Log-likelihood	-2145.2
Chi-squared	1909.7

[a] Fertility intentions are defined as 0 if the respondent wants more children within two years, 1 if she wants an additional child after two years, and 3 if she wants no more children.

* $p<.10$; ** $p<.05$; *** $p<.01$

Appendix A-3

Probit odds ratios of condom use (t-statistics in parentheses)

Variable	Odds Ratio
Wife's age	0.85 (-9.775***)
Wife's age squared	1.00 (8.284***)
Spousal age difference	0.99 (-1.041)
# of living children	1.44 (3.030***)
Living children squared	0.95 (-2.912***)
Wife's education	1.03 (1.809***)
Husband's education	1.05 (3.773***)
Family status	1.01(0.146)
Wealth level	1.00 (0.109)
Area of land owned	1.00 (0.247)
Religion	1.42 (3.417***)
Price of condom	0.99 (-0.850)
Mirsarai thana	0.99 (-0.019)

*p<.10; **p<.05; ***p<.01

Appendix A-4

Probit odds ratios for pill use (t-statistics in parentheses)

Variable	Odds Ratio
Wife's age	1.01(0.595)
Age squared	0.99 (-3.416***)
Spousal age difference	0.99 (-1.190)
# of living children	1.02 (0.903)
Wife's education	1.01(1.056)
Husband's education	1.01(1.459)
Credit union membership	0.90 (-1.292)
Income generation	0.88 (-2.028**)
Family status	0.96 (-0.595)
Religion	0.91 (1.488)
Wealth level	1.02 (1.644*)
Area of land owned	1.00 (1.984**)
Price of pill	0.99 (-2.330**)
FWA contact rate	0.99 (-1.482)
Mirsarai thana	1.14 (1.837*)

*p<.10; **p<.05; ***p<.01

MCH-FP Extension Work at the Centre

An important lesson learned from the Matlab MCH-FP project is that a high CPR is attainable in a poor socioeconomic setting. The MCH-FP Extension Project (Rural) began in 1982 in two rural areas with funding from USAID to examine how elements of the Matlab programme could be transferred to Bangladesh's national family planning programme. In its first years, the Extension Project set out to replicate workplans, record-keeping and supervision, within the resource constraints of the government programme.

During 1986-89, the Centre helped the national programme to plan and implement recruitment and training, and ensure the integrity of the hiring process for an effective expansion of the work force of governmental Family Welfare Assistants. Other successful programme strategies scaled up or in the process of being scaled up to the national programme include doorstep delivery of injectable contraceptives, management action to improve quality of care, a management information system, and developing strategies to deal with problems encountered in collaborative work with local area family planning officials. In 1994, this project started family planning initiatives in Chittagong, the lowest performing division in the country.

In 1994, the Centre began an MCH-FP Extension Project (Urban) in Dhaka (based on its decade long experience in urban health) to provide a coordinated, cost-effective and replicable system of delivering MCH-FP services for Dhaka urban population. This important event marked an expansion of the Centre's capacity to test interventions in both urban and rural settings. The urban and rural extension projects have both generated a wealth of research data and published papers.

The Centre and USAID, in consultation with the government through the project's National Steering Committees, concluded an agreement for new rural and urban Extension Projects for the period 1993-97. Salient features include:

- To improve management, quality of care and sustainability of the MCH-FP programmes
- Field sites to use as "policy laboratories"
- Close collaboration with central and field level government officers
- Intensive data collection and analysis to assess the impact
- Technical assistance to GoB and NGO partners in the application of research findings to strengthen MCH-FP services.

The Division

The reconstituted Health and Population Extension Division (HPED) has the primary mandate to conduct operations research to scale up the research findings, provide technical assistance to NGOs and GoB to strengthen the national health and family planning programme.

The Division has a long history of accomplishments in applied research which focuses on the application of simple, effective, appropriate and accessible health and family planning technologies to improve the health and well-being of the underserved and population-in-need. There are several projects in the Division which specialize in operations research in health, family planning, environmental health and epidemic control measures which cuts across several Divisions and disciplines in the Centre. The MCH-FP Extension Project (Rural), of course, is the Centre's established operations research project but the recent addition of its urban counterpart - MCH-FP Extension Project (Urban), as well as Environmental Health and Epidemic Control Programmes have enriched the Division with a strong group of diverse expertise and disciplines to enlarge and consolidate its operations research activities. There are several distinctive characteristics of these endeavors in relation to health services and policy research. First, the public health research activities of these Projects focus on improving programme performances which has policy implications at the national level and lessons for international audience. Secondly, these Projects incorporate the full cycle of conducting applied programmatic and policy relevant research in actual GoB and NGO service delivery infrastructures; dissemination of research findings to the highest levels of policy makers as well as recipients of the services at the community level; application of research findings to improve programme performance through systematic provision of technical assistance; and scaling-up of applicable findings from pilot phase to the national programme at Thana, Ward, District and Zonal levels both in the urban and rural settings.

CENTRE
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