

Working Paper No. 150

**Demand for Child Curative
Care in Two Rural Thanas
of Bangladesh: Effects of
Income and Women's
Employment**

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Barkat-e-Khuda**



**CENTRE
FOR HEALTH AND
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Operations Research Project
Health and Population Extension Division

1998



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Abstract

Child mortality is still high in Bangladesh, despite significant improvements in levels of child mortality. The Ministry of Health and Family Welfare, Government of Bangladesh is planning to enhance child healthcare facilities by introducing an essential package of health services. To introduce this package effectively, policy-makers and programme managers are required to understand how different issues may affect the decision-making process in relation to the use of child healthcare.

The main causes of child morbidity and mortality, which are though preventable, include acute respiratory infections, diarrhoea, malnutrition, measles, and neonatal tetanus. The occurrence of these diseases can be prevented through effective curative care and child immunizations. However, both availability of and access to low-cost effective treatments are essential for this.

Several sources of child curative care are available in rural Bangladesh, but its quality care and access to trained practitioners vary widely. The healthcare providers range from public sector clinic-based providers to several types of private providers. The private sector in Bangladesh comprises *kabiraj* (herbalists), homeopathic practitioners, untrained allopathic practitioners (or village doctors), and trained allopathic practitioners. The most widely used practitioners for curative care in rural areas include village doctors, also known as quacks, followed by homeopathic practitioners.

This paper investigates the determinants of child healthcare-seeking behaviour in rural Bangladesh. The effects of income, women's access to income, and the prices of child healthcare have also been examined.

Data on the use of child curative care were collected from two rural areas of Bangladesh – Abhoynagar thana of Jessore district and Mirsarai thana in Chittagong district in March 1997. These data were supplemented with socioeconomic and community data from the baseline surveys obtained from Abhoynagar and Mirsarai thanas in 1993 and 1994, respectively. 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 included: demographic and characteristics, and socioeconomic variables and characteristics of the facility.

Heckmann's two-stage estimation procedure was used for correcting the sample selection bias of limiting the analysis to households with children that had illness episodes. Then logistic regression was used to estimate use of child curative care, and conditional logit regression to estimate provider choice. The nested logit model was used.

The univariate analysis of use of curative care for children indicates that parents were likely to seek care outside of the home three-quarters of the time, paid a median payment of Tk.45, and were most likely to use the care of the village doctor for an episode of illness, followed by the homeopath. Parents from Mirsarai were more likely to seek care for their children, to pay higher fees, and use the pharmacy than in Abhoynagar.

The data on the use of curative care for children indicated that the parents sought care from outside of their home for three-quarters of the time, spent an average of Tk.52 and were most likely to use the care of the village doctors for an episode of illness, followed by the homeopath. Parents from Mirsarai were more likely to seek care for their children, to pay higher fees, and use the pharmacy than in Abhoynagar.

The involvement of the mother either in the credit unions or in the income generation had an effect on the likelihood that child curative care was sought. The two had opposite effects on healthcare-seeking behaviours, however. Care was 50 percent more likely to have been sought, if the mother was a member of a credit union. On the other hand, it was less likely to have been sought (25%), if the mother was involved in individual income-generating activities, such as handicrafts or raising livestock.

The choice to seek care for a child was also affected by the socioeconomic factors. Care for a sick child was more likely to have been sought (77%), if the household belonged to the middle-wealth group rather than from a low-wealth group. In addition, if the father was a businessman, the child was 80 percent more likely to obtain care from a service-provider than self-care, suggesting that either businessmen have more access to cash or have greater accessibility to the service providers.

Introduction

Child mortality is still high in Bangladesh, despite significant improvements in levels of child mortality. The Ministry of Health and Family Welfare, Government of Bangladesh is planning to enhance child healthcare facilities by introducing an essential package of health services. To introduce this package effectively, policy-makers and programme managers are required to understand how different issues may affect the decision-making process in relation to the use of child healthcare.

Bangladesh, a relatively small country, has experienced very high population growth rates in the last 50 years. The population has increased from 42 million in 1941 to about 123 million in 1997. During this time, various steps were taken to lowering fertility and mortality in the country. As a result, the total fertility rate, i.e. the average number of children per woman, has declined from 6.3 in the mid-1970s to less than 3.3 in 1996-1997 (BDHS, 1997). The mortality of children aged less than five years has also declined, although not at an expected level, from 180 per 1,000 children in 1979-1983 to 133 per 1,000 children in 1989-1993.

The main causes of child morbidity and mortality, which are though preventable, include acute respiratory infections, diarrhoea, malnutrition, measles, and neonatal tetanus (Perry 1997). The occurrence of these diseases can be prevented through effective curative care and child immunizations. However, both availability of and access to low-cost effective treatments are essential for this.

Several sources of child curative care are available in rural Bangladesh, but its quality care and access to trained practitioners vary widely. The healthcare providers range from public sector clinic-based providers to several types of private providers. The private sector in Bangladesh comprises *kabiraj* (herbalists), homeopathic practitioners, untrained allopathic practitioners (or village doctors), and trained allopathic practitioners. Previous studies have found that the most widely used practitioners for curative care in rural areas include village doctors, also known as quacks, followed by homeopathic practitioners (Levin, 1997).

The social context of the decision-making process prevalent in rural Bangladesh should be taken into account when examining the patterns of service use. There are two important factors: (i) the mobility

of women in Bangladesh is changing, but continues to be limited; (ii) the decision to seek care and where to seek this care for a sick child are often taken jointly with her husband and/or other concerned persons such as in-laws. Results of a study on decision-making on healthcare show that although mother themselves mostly took decisions to seek child healthcare, their husbands decided the place of treatment, particularly in more conservative areas, such as Chittagong division, (Levin, 1997). In addition, it is mostly the husband or in-laws who took the child to the service provider.

This paper investigates the determinants of child healthcare-seeking behaviour in rural Bangladesh. The effects of income, women's access to income, and the prices of child healthcare have also been examined.

Literature Review

Several studies on demand of healthcare have examined the effects of costs and income on the use of healthcare. While estimating the effects of costs, both direct pecuniary costs and indirect or time costs have been examined. These costs include the direct cost involved in getting the services from health proviers and the cost of transport, as well as the indirect cost of time for travelling and waiting time. Since in many countries, government facilities do not charge any fees for the services offered or the fee is uniform throughout the country, many studies have, thus, focused on the effect of time-cost on demand rather than cash prices (Gertler et. al.,1987; Diop, 1990).

While results of several earlier studies on demand for healthcare show that effects of costs (including time) and income were not significant (Akin, 1981; Heller, 1982; Akin 1985), but results of subsequent studies have shown that these were significant (Dor, 1987; Gertler, 1987; Diop 1990). The latter studies differed from the earlier ones in their model specifications as follows: (i) price was interacted with income, and (ii) time prices were entered into the utility function rather than in the budget constraint. Most of these sutdies used the health investment models.

Analyzing the data from the Ivory Cost, Dor et al., 1987 showed that the travel time played an important role in rationing healthcare in

rural Ivory Coast. The authors also found that the magnitude of the effect was larger for individuals from lower income groups than individuals from higher income groups. Other variables that were significant were age, the number of adults in the household, and the amount of land owned. Another study in Peru (Gertler 1987), using a similar methodology, found prices and time cost to be the statistically significant predictors of demand for health care.

Diop, 1990 modelled healthcare demand for children in the Ivory Coast, using a health production model. The author found that distance was negatively associated with use of health services, and that this effect was greater when the members of the family were self-employed or engaged in agricultural pursuits. In addition, the family income significantly increased the use of modern medical services as well as the probability of a child survival.

Effects of women's income on health status

Although most studies have focused on the effects of household income on child health, some have investigated the effects of women's employment on healthcare-seeking behaviour.

Several studies have found that women often allocate a greater portion of their income on subsistence consumption and child health than do men (Bruce, 1988; Thomas, 1990). Other studies, however, have found a negative impact of mother's labour participation on her child's well-being. For example, studies done in India have found that maternal employment is associated with higher infant or child mortality and undernutrition (Basu and Basu, 1991; Desai and Jain 1992), because the working women can not make time available to care of children; this is particularly true for those who hail from socioeconomically disadvantaged homes. However, one study in India found lower sex differentials in mortality among children of working women than among women who did not work (Basu and Basu, 1991).

The impact of a mother's employment on her child's health has two opposite components: (i) the direct impact of employment of the mother, and (ii) the indirect impact through the household's increased income. Regarding the direct impact, it is likely that working women have less time for child care, and may be unable to arrange adequate

substitute child care. Combination of this effect may further increase the totality of negative effects on the child's well-being. On the other hand, the effect of the household's increased income is likely to increase the likelihood of a child's survival through improved nutrition and access to child care.

A woman's membership in a credit union has been found to have positive effects on her healthcare-seeking behaviours in Bangladesh (Levin 1997), and differs from that of the individual income-generating activities. One explanation is that the credit unions hold periodic group meetings that promote healthcare-seeking behaviours. Another is that a woman's membership in a credit union or income generation is hypothesized to improve her "economic power" and to increase her status both within the family and the community (Khuda, 1993). These should give her additional bargaining power when negotiating with her husband over the amount of resources to allocate to curative care.¹

The question that is being analyzed here differs from those of other studies in South Asia, since it investigates the effects of the mother's employment and household income on the intermediate output, use of child curative care rather than on the impact variable of child mortality.

Conceptual Framework

Individuals make choices about whether to seek healthcare for a particular illness episode and what service provider to use. Since they have limited resources available (money and time), they have to weigh the choice of treating an illness episode and choosing a particular type of healthcare against the need of goods and services. The following model draws heavily upon Muirum (1982) and Diop (1990).

A household is assumed to derive utility (satisfaction) from consumption of a composite consumption good, $C_i(t)$ at time t , and from the health (h) of household members. Since preferences on the use of household resources for healthcare may differ between the mothers, fathers, and other members of the household, household utility is made of s utility functions, where s is the number of household members.

¹ It should be noted, however, that the 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.

$$U_t = U[u_1(C_{i1}(t), h(t)), u_2(C_{i2}(t), h(t)) \dots u_s(C_{is}(t), h(t))]$$

An individual's health stock changes over time as it is augmented or diminished and produces their health. The production of health (h) from health stock (H) can be expressed as the following:

$$h(t) = f[H(t)] \quad f_H > 0, \quad f_{HH} < 0^2$$

Expansions in the stock of health occur if investments in health inputs exceed depreciation of the stock. That is, additional health is produced with investments in health inputs, such as healthcare and adequate nutritional intake. On the other hand, the health stock will decrease with increasing age and disease.

The level of increase or maintenance of health is determined by the technical relationship between healthcare and change in the child's health stock. The child will benefit more from healthcare if the mother and father have knowledge about the efficacy of types of healthcare through either health promotion activities or personal experience with the provider. In addition, their formal education operates as a shift parameter through improving their understanding of the benefits of curative care and teaching them better evaluative skills to assess the alternatives. Depreciation in the health stock also occurs as a result of aging, disease, environmental factors, and exogenous variables, such as exposure to disease. The change in the child's health stock can be expressed as :

$$H(t) = I[M(t); K] - \delta(t, E)H(t); \quad I_1 > 0$$

where $I[M(t); K]$ is the gross investment in the child's health through the use of medical care, with $M(t)$ denoting medical care services, and K denoting knowledge that the mother and father have about health technologies. The second term, $\delta(t, E)H(t)$, is the depreciation in health stock that occurs as a consequence of aging (t) and the environmental factors.

Household utility is maximized, subject to the budget constraint. That is, the amount of commodities that can be consumed multiplied by their price must be equal to wage and non-wage incomes. Household

² A person's health is positively related to its stock of health, since better health translates into more immunity against diseases. The rate of increase in health will also decrease over time as the person becomes old.

wealth is assumed to change over time, according to the following equation:

$$W = rw(t) + y(t) - [c(t)C(t) + \{m(t) + tr(t) + y(F_m)\}M(t)]$$

where w is the non-wage income, r is the interest rate, y is the wage income, $c(t)$ is the price of $C(t)$, $m(t)$ is the price of $M(t)$ or medical services, $tr(t)$ is the price of travel time for medical services, and $y(F_m)$ is the lost income associated with the use of medical services, and F_m is a vector of family-specific characteristics.

The utility function is maximized, subject to the production function for health and the joint wealth constraint, to yield the following reduced-form demand equation:

$$M^* = M^*(c, tr, m, w_h, w_w, Z_h, Z_w, A_h, A_w)$$

which is a function of prices (price of consumer goods (c), price of medical services (m), cost of the travel time (tr), non-wage income (w) of the husband/father, non-wage income of the mother/wife), demographic characteristics (Z), and community characteristics (A) of husband/father and mother/wife.

Survey Design

Data on the use of child curative care were collected from two rural areas of Bangladesh – Abhoynagar thana of Jessore district and Mirsarai thana in Chittagong district in March 1997. These data were supplemented with socioeconomic and community data from the baseline surveys obtained from Abhoynagar and Mirsarai thanas in 1993 and 1994³ respectively.

The unions where the contraceptive pricing surveys were carried out are part of the Sample Registration System (SRS) of the MCH-FP Extension Project (Rural) of the International Centre for Diarrhoeal Disease Research, Bangladesh. For this analysis, the same households that were in the SRS sample were surveyed, so that the information already available on these households could be supplemented with data on the use of child curative care.

³ An assumption was made that the socioeconomic data from the 1993-1994 surveys still held.

The total sample of the expenditure survey covered 2,304 households with married women in the age group 15-49 years. The sample was selected 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. Of these households, 911 households had children aged under ten years who had had illness episodes in the last two months.

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 included: demographic characteristics, socioeconomic variables, and characteristics of the facility.

Model specification

The dependent variables included (i) the use of service-provider vs. self-care during an illness episode during the last two months, and (ii) the choice of four categories of providers. The four categories of providers included: (i) public provider where the service providers were in most cases trained paramedics, but in some cases they were physicians (M.B.B.S.), (ii) trained physicians (M.B.B.S.), (iii) untrained village practitioners providing a mixture of allopathic and traditional treatments, and (iv) traditional practitioners where some providers were trained (homeopaths) and others (herbalists, known as *kabiraj*) were untrained. The quality of care was assumed to be associated with the level of training. M.B.B.S. physicians were the most highly trained, followed by public sector paramedics, and then by either village practitioners⁴ or traditional practitioners.

⁴ In an in-depth study of healthcare-seeking practices (Rahman, 1997), customers indicated that they liked to use village practitioners because of their greater accessibility: (i) they come to patients' homes, and (ii) they are available around the clock.

The factors that are hypothesized to affect the use of curative care include: prices, income, demographic, and community variables. The prices include the following: consultation fees of healthcare providers, travel cost (includes travel time), and cost of the waiting time.

The measures of socioeconomic status included wealth status, household landholdings, wife's income generation⁵, husband's occupation, and wife's membership in a credit union. Since the two thanas are located in rural areas, and the economy is not well monetized, ownership of assets was considered to be a better measure of wealth status than the earned income. A wealth index was constructed to measure the wealth status of households. This index was developed to test the differences in contraceptive-seeking behaviour between the wealth groups. The assets that were included in this index included the amount of land owned, material of roof, ownership of gold ornaments, use of electricity⁶, and other possessions, such as motorcycle, TV, *almirah*, cot; bicycle, livestock, and sanitary/sealed latrine.

The 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 they measure a woman's access to cash income and opportunity cost of her time.

A woman's membership in a credit union and generation of income could potentially be considered the endogenous variables, i.e. these variables and the outcome variable may be caused simultaneously by some additional factors⁷. However, the assumption made here is that these two decisions were long-term and should not affect current decision-making.

The demographic variables included age and sex of children, age of mothers, age difference between spouses, number of living children, wife's education⁸, and family status. The age difference between spouses

⁵ Many respondents were involved in income-generating activities, such as raising livestock and poultry and the production of handicrafts and weaving.

⁶ While electricity at the respondent's home is not an asset, it was considered to be a useful indicator of wealth status.

⁷ They may be produced from within the same system that produced decision-making on contraceptive use.

⁸ The husband's education was found to be correlated with the wife's, and for this reason, it was excluded.

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 the 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.

Multivariate analysis

Two types of models were estimated in the multivariate analysis: (i) the use of child curative care among the households where both parents were present, and (ii) the use of child curative care among the households where the father was absent. The latter model was also estimated to test whether the effect of factors on health care decision-making differed within the households where the father was absent.

Because differences were found between the households with children who had had an illness episode and other households, Heckman's two step estimation procedure was used for correcting the selection bias in the regression coefficients of the equation to estimate the use of curative care. The probability that a child was ill in the last two months was estimated with a logistic regression. The logistic specification has the following form (Greene, 1990):

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

In estimating the use of child curative care, the nested multinomial logit specification was used. The probability that a provider is chosen, P_{ij} , is the probability of the i th individual making the j th choice. This is assumed to be the following:

$$P_{ij} = \text{prob}(\text{provider}) = \frac{e^{[b'X_{ij} + a_jZ_i]}}{\sum e^{[b'X_{ij} + a_jZ_i]}}$$

where Z_i are the individual-specific variables and X_{ij} is the vector of values of the attributes of the j th choice as perceived by the i th individual (Maddala, 1983).

The nested logit models the decision-making process as a set of nested choices. This model was used rather than the multinomial logit, because some alternatives were assumed to have more in common with each other than with the other choices. This model relaxes the independence of irrelevant alternatives (IIA)⁹ assumption, so that a third alternative can affect the ratio of the choice probabilities of the two alternatives.

Decision-making on the use of child curative care is modelled as a two-step process. First, the choice to use a service provider vs. self-care is the first choice, and then the second choice is that occurring between the four types of service providers.

The estimator used for the nested MNL analysis is a two-step 'limited information' estimator. After the first choice of healthcare provider was estimated, the weighted average of the attributes of these choices, or inclusive values, was calculated (Hausman and McFadden, 1984). The second set of choices was then regressed on the independent variables and the inclusive values. If the coefficient on the inclusive values is one, the null hypothesis that the MNL model is appropriate is accepted.

⁹ The IIA assumption considers the error terms to be independent across alternatives. Such an assumption is problematic when two alternatives are more similar to one another than to other alternatives.

The independent variables are shown in Table 1.

Table 1. Model of child curative care

Independent variables	Curative care use
Demographic	Mother's age Age squared Spousal age difference # of living children Age of child Sex of child Severity of illness Muslim religion Mother's education Nuclear family Thana
Socioeconomic	Number of assets Father's occupation: businessman Mother's membership in credit union Mother's income generation
Cash prices	Consultation fee for private sector
Access	Travel time to Satellite Clinic Travel time to Family Welfare Centre Travel time to village doctor Travel time to private doctor

The sample sizes for the estimation of probability of using curative child care were 911 and 271 for the households where both parents were present and only the mother was present respectively.

Results

In the first section, the characteristics of the respondents and the patterns of their use of curative care for children and women of reproductive ages are presented. This section is followed by a discussion of the regression results on the equations estimating the use of child curative care and the sources of child curative care. The next section estimates the use of curative care for the married women of reproductive age (MWRA) and the choice of curative care.

Descriptive statistics of curative care use

The characteristics of the entire sample as well as those by thana are presented in Table 2. The ages of the mother and father were approximately 29 and 37 years respectively; the households had, on an average, three children; over 80 percent of the households were Muslims, and the husband was absent in 12 percent of the households. In 12.4 percent of the households, the mother was a member of a credit union; and in 27 percent of the households, she generated some form of income.

The data on the use of curative care for children indicated that the parents sought care from outside of their home for three-quarters of the time, spent an average of Tk.52 and were most likely to use the care of the village doctors for an episode of illness, followed by the homeopath. Parents from Mirsarai were more likely to seek care for their children, to pay higher fees, and use the pharmacy than in Abhoynagar.

The characteristics of the households where the father was absent differed from other households since the husband is likely to be working abroad and sending remittances home. The majority of these households were located in Mirsarai, the mothers had more years of education, few mothers were members of the credit unions, and the households had more assets. The expenditure for an child's illness was higher in this group.

Table 2. Descriptive statistics of respondent characteristics

Variable	Total sample (n = 2,308)	Abhoynagar thana (n = 1,314)	Mirsarai thana (n = 994)	Households where husband is absent (n = 271)
Wife/mother's age	28.8	27.5	30.1	29.1
Husband's age	37.4	35.4	40.0	NA*
Number of living children	2.9	2.4	3.3	2.4
Education of wife/mother	2.9	3.1	2.7	3.8
Education of husband/father	3.8	3.6	3.9	NA
% Nuclear household	50.6	55.7	45.5	NA
% Muslim	82.7	82.5	82.9	92
Husband absent	12.3	4.7	20.1	NA
# assets owned	6.2	6.5	5.9	6.7
% owning land	55.2	65.9	45.2	NA
% husband's occupation:				NA
farming	39.6	40.7	38.3	
business	19.3	17.1	22.2	
manufacturing	14.2	23.0	3.2	
nonagriculture/service	14.0	11.5	17.2	
other	12.9	7.7	19.1	
% mother member of credit union	12.4	10.8	14.0	4.2
% mother generates income	27.3	21.7	32.6	21.7
% children having illness episode	51.1	47.0	56.5	53.9
% obtaining curative care from outside of home	77.6	72.6	82.6	79.4
Mean and median expenditure on child curative care (in Taka)	51.7/0	50.1/0	53.5/5.0	63.0/20
Mean travel time:				
SC	17.7	17.6	17.8	17.4
H&FWC	27.4	26.7	28.0	28.2
Village doctor	26.2	21.8	30.7	31.6
Kabiraj/homeopath	39.8	27.7	52.3	52.6
Private doctor	57.6	55.4	60.0	62.1
Mean consultation fees (median):				
Village doctor	0	0.0	10.0	7.1
Kabiraj/homeopath	0	0.0	0.0	0.0
Private doctor	25.0	20.0	40.0	35.4
Source of care used:				
Self-care	23.6	27.4	19.4	19.9
Public clinic	6.3	9.2	3.0	3.4
Private doctor	5.0	4.7	5.3	4.1
Village doctor	38.7	34.3	43.6	48.0
Traditional	26.4	24.4	28.6	24.7
% Mirsarai thana	43.1	NA	NA	79.5

* NA = Not applicable

Multivariate results

The results of the multivariate analysis are presented in this section.

The likelihood that a child was ill

The first analysis that was done was to determine the likelihood of a child being ill within the last two months.¹⁰ The results of the logistic regression analysis are shown in Table 3.

Table 3. Odds ratios of the likelihood that a child was ill in the last two months (n = 1,772)

Variable	Base variables	Base variables + women's employment
Mother's age	1.17 (7.29)***	1.17 (7.20)***
Mother's age squared	0.99 (11.36)***	0.99 (11.28)***
Spousal age difference	1.01 (0.96)	1.01 (0.99)
Number of living children	1.33 (6.00)***	1.33 (6.00)***
Age of child	0.77 (7.09)***	0.46 (7.11)***
Male gender	1.09 (0.78)	1.09 (0.78)
Mother's education	1.03 (1.52)	0.97 (1.58)
Middle wealth group	0.78 (1.89)**	0.78 (1.80)*
Highest wealth group	0.66 (2.61)**	0.67 (2.48)***
Latrine	1.02 (0.20)	1.02 (0.20)
Muslim religion	1.47 (2.99)***	1.46 (2.92)***
Mirsarai thana	1.21 (1.54)	1.20 (1.46)
Credit union membership		1.02 (0.15)
Mother's income generation		1.11 (0.85)
Log-likelihood	-1012.3	-1012.0
Chi-square	430.76	430.2
Significance	0.00	0.000

*p < .10, **p < .05, ***p < .01

¹⁰ The two-month recall period was chosen, since it was felt that caretakers were likely to remember healthcare-seeking behaviours within that period.

The mother's involvement either in income generation or in a credit union did not affect the likelihood that the child had an illness episode. On the other hand, the socioeconomic variables did affect the likelihood that the child had been ill. A child was 20 percent and 30 percent less likely, respectively, to be ill, if s/he was from a middle or a high-wealth household rather than from a low-wealth household.

The demographic variables also affected the likelihood that a child had an illness episode in the last two months. If the child had more siblings, there was an increased likelihood that the child was ill, suggesting that, in these households, there was more competition for limited resources. The age factor also affected the likelihood that the child was ill. The older a child was, the less likely that s/he was ill. On the other hand, the older the mother was, the more likely that the child had been ill. A child was also more likely to be ill, if s/he was a Muslim (50%) rather than from another religion.

The decision to seek treatment

The next analysis related to the decision to seek treatment for a sick child. The first decision in the two-step decision-making process was whether to seek care from a service-provider or use self-care. The nested discrete choice odds ratios are shown in Table 4.

The involvement of the mother either in the credit unions or in the income generation had an effect on the likelihood that child curative care was sought.¹¹ The two had opposite effects on healthcare-seeking behaviours, however. Care was 50 percent more likely to have been sought, if the mother was a member of a credit union. On the other hand, it was less likely to have been sought (25%), if the mother was involved in individual income-generating activities, such as handicrafts or raising livestock.

The choice to seek care for a child was also affected by the socioeconomic factors. Care for a sick child was more likely to have been sought (77%), if the household belonged to the middle-wealth group rather than from a low-wealth group. In addition, if the father was a

¹¹ It should be noted, however, that the co-efficients were only statistically significant at the 0.10 level.

businessman, the child was 80 percent more likely to obtain care from a service-provider than self-care, suggesting that either businessmen have more access to cash or have greater accessibility to the service providers.

Table 4. Nested discrete choice odds ratios for use of service-provider vs. self-care (n = 899)

Variable	Odds ratio without selectivity bias correction	Odds ratio with selectivity bias correction
Mother's age	0.99 (0.33)	1.03 (0.75)
Mother's age squared	1.00 (0.71)	0.99 (0.69)
Spousal age difference	0.98 (1.38)	0.98 (1.60)
Number of living children	0.96 (0.49)	0.99 (0.03)
Child's age	0.75 (1.81*)	0.72 (2.12**)
Child's gender	1.09 (0.49)	1.06 (1.06)
Severity of Illness	2.23 (7.83***)	2.19 (3.92***)
Mother's education	1.03 (0.77)	1.02 (0.59)
Father's education	0.99 (0.02)	1.00 (0.11)
Middle wealth group	1.77 (2.82***)	1.67 (2.52***)
High wealth group	1.28 (0.93)	1.22 (0.75)
Father's occupation businessman	1.80 (2.50**)	1.74 (2.36**)
Mother member of a credit union	1.54 (1.61*)	1.56 (1.65*)
Mother generates income	0.72 (1.64*)	0.73 (1.60*)
Muslim religion	1.35 (1.42)	1.45 (1.75*)
Mirsarai thana	2.19 (3.92***)	2.24 (4.02***)
Distance	0.65 (2.96***)	0.63 (3.14***)
Inclusive value	0.76 (4.91***)	0.77 (5.18***)
Selectivity bias correction		0.95 (0.26)
Log-likelihood	-430.83	-429.25
Chi-square	384.61	387.78
Significance	0.000	0.000

*p < .10, **p < .05, ***p < .01

Another factor that affected the choice to seek care was the distance to the service-provider. As the distance to the provider increased, the likelihood of seeking care declined.

The selectivity correction factor was not significant, and the null hypothesis that the sample of households with sick children does not differ significantly from the household with children without illness episodes cannot be rejected.

The choice of service-provider

The second level of the decision-making process relates to the choice of a service-provider. The choice of a provider was estimated with the reference case being the use of a village doctor. The regression results are shown in Table 5.

Parents were more likely to take their children to a public sector provider, if the mother was a member of a credit union, perhaps as a result of health promotion activities, the parity was higher, or they were Muslims rather than non-Muslims. The latter effect was observed probably because non-Muslims used the public sector provider less. The child was less likely to be taken to a public sector provider, if the mothers had more years of education, or they were from Mirsarai Thana, perhaps because of a perception that public sector care was of low quality.

The use of the private doctors, the most highly trained providers, was more likely to be used, if the mother was younger or if the child was male, reflecting the evidence of son preference, although it was less likely if the mother was involved in income-generating activities.

The traditional practitioner was less likely to be used, if the child was younger.

The travel time to a provider was also found to be a statistically significant indicator of the use of a provider. A child was less likely to be taken to a public provider, a private doctor, or a traditional practitioner (70%) than a village practitioner, if the travel time was 40 minutes or greater compared to 15 minutes or less.

Table 5. Nested discrete choice odds ratios for choice of child curative care provider (with reference group village practitioner) (n = 677)

Variable	Public provider	Private doctor	Traditional practitioner
Mother's age	0.99 (0.15)	0.85 (2.87***)	1.00 (0.10)
Mother's age squared	0.99 (0.80)	1.00 (4.93***)	1.00 (2.30**)
Spousal age difference	0.99 (1.59)	9.87 (0.57)	1.01 (0.56)
Number of living children	1.37 (2.14**)	0.85 (1.04)	0.97 (0.33)
Child's age	0.68 (1.39)	0.72 (1.10)	0.73 (1.92**)
Male gender	1.01 (0.04)	2.86 (2.96***)	1.06 (0.32)
Severity of illness	1.03 (0.25)	1.06 (0.49)	0.98 (0.35)
Mother's education	0.90 (1.75*)	1.09 (1.52)	0.98 (0.46)
Mother member of a credit union	2.19 (2.05**)	1.53 (0.85)	1.04 (0.14)
Mother generates income	1.16 (0.44)	0.43 (1.73*)	1.12 (0.56)
Middle wealth group	0.91 (0.27)	0.92 (0.19)	0.97 (0.13)
High wealth group	0.89 (0.35)	1.70 (1.16)	0.92 (0.34)
Muslim religion	1.76 (1.26)	1.07 (0.16)	1.11 (0.44)
Mirsarai thana	0.20 (4.20***)	1.08(0.21)	1.13 (0.65)
Price	1.00 (0.20)	1.00 (0.20)	1.00 (0.20)
Distance to provider between 16 and 40 minutes	90 (0.75)	0.90(0.75)	0.90(0.75)
Distance to provider greater than 40 minutes	69 (2.04**)	0.69 (2.04**)	0.69 (2.04**)
Log-likelihood	-713.14		
Chi-square	450.76		
Significance	0.000		

*p<.10, **p<.05, ***p<.01

The choice to seek child curative care among households where the father was absent

The decision to seek child curative care when a child was ill was also examined in the households where the father was absent, since the time constraint was likely to be greater in these households.

Table 6 indicates that a mother had a greater time constraint if she was involved in income-generating activities when the father was absent than when the father was present. When the father was absent, a mother who generated income was 90% less likely to seek care compared to only 25% less likely when the father was present.

Table 6. Logistic regression odds ratios for use of service-provider vs. self-care in households where father is absent

Variable	Odds ratios	Without child's characteristics and mother member of credit union
Mother's age	1.14 (0.96)	1.12 (1.01)
Mother's age square	0.99 (0.94)	0.99 (0.91)
Child's age	1.04 (0.08)	
Child's gender	1.02 (0.03)	
Severity of illness	2.79 (2.31**)	2.75 (2.28**)
Mother has primary school education	0.19 (2.11**)	0.20 (2.13**)
Mother has secondary school education	0.22 (1.88*)	0.23 (1.86*)
Wealth status	1.09 (0.93)	1.09 (0.92)
Mother member of a credit union	1.01 (0.49)	
Mother generates income	0.10 (3.16***)	0.11 (3.17***)
Distance to a private doctor	0.54 (1.41)	0.55 (1.38)
Log-likelihood	-45.02	-45.153
Chi-square	23.69	23.43
Significance	0.005	0.001

A second finding was that when a mother had more years of education, the less likely she was to seek care for her child during an illness episode. Women with primary education and secondary school education were only 20 percent and 25 percent respectively, as likely as women with no education to seek care. This means that the educated women can effectively self-treat their children than the women with no education.

In addition, the severity of illness was an important factor that was taken into account when making a decision to seek child curative care.

Discussion and Policy Implications

The findings of the analysis indicate that a woman's involvement either in a credit union or in an income generating activities affected the likelihood that curative child care was used. However, since these are two very different activities, the effect on the use of child curative care varied. A mother's membership in a credit union increased the use of child curative care, while her involvement in income-generating activities decreased the use of child curative care. The major difference between these activities is that the credit union has organized activities, such as meetings where numerous subjects are discussed, including the promotion of healthcare-seeking behaviour as well as other ways to improve the quality of their lives. These activities help motivate women to seek preventive and curative healthcare.

Women, involved in individual income-generating activities, may have severe time constraints. Without support systems that may allow her access to appropriate technology with reduced time involvement, she may have a little time left over for other household production activities, such as child rearing.

These results suggest that a conflict may exist between a woman's involvement in income-generating activities and the use of curative health-care for her children. Although the mother contributes to increased resources for the household, she gets less time to take care of her children and is less aware of the benefits of preventive and curative healthcare. This is made even more complicated by the fact that these women often

hail from the low-wealth status households and have little disposable income available to pay for any curative care.

The effect of the time constraint may be lessened by appropriate interventions, such as those offered by credit unions, or for income-generating projects that provide support to their members. These credit unions and income-generating projects extend support to their members through providing educational activities as well as, in some cases, access to appropriate technologies.

The implications of these findings are that the credit unions and income-generating projects should be supported not only for their contributions to the increased household income, but also for their roles in child well-being. In addition, policy-makers should consider targeting health promotion activities at women who are involved in individual income-generating activities, so that they are better informed of the benefits of healthcare-seeking activities.

Household wealth also decreased the likelihood that the child had an illness episode and affected the likelihood that curative child care was sought. As expected, access to wealth increases the resources available for child well-being, and mediates the effect of women's income generation on child welfare.

There was also the evidence of gender bias in pursuing healthcare for children who were ill. The gender bias was found to affect the choice of a provider, although not the decision to seek care or the likelihood that the child had an illness episode. This finding indicates that continued education should be provided to the mothers, so that they understand the detrimental effects of gender bias.

Of the facility characteristics, the travel time was statistically significant and was negatively associated with the use of a provider. The effect was found for the providers where the travel time was greater than 40 minutes compared to the providers where the travel time was 15 minutes or less. The finding regarding the travel time indicates that longer the distance to the providers lessen the likelihood that child curative care

will be sought from longer distances. The policy implication is that interventions that increase access to providers should be tested¹².

The cash price of the providers was not found to be significant, which may be due to difficulty in measuring this variable.

¹² Two such interventions, namely, the increased frequency of satellite clinics combined with Expanded Programme on Immunization (EPI) and the essential service package are being tested by the Operations Research Project.

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ORP's Publications

a. *Special publications:*

1. Ahmed S, Parveen SD, Shams I.
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3. Operations Research Project.
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b. *Working papers*

1. Ahmed S, Parveen SD, Islam A, Khanum PA.
Induced abortion: results from two rural areas of Bangladesh. Dhaka: Operations Research Project, International Centre for Diarrhoeal Disease Research, Bangladesh, 1997. (ICDDR,B working paper, 102; Operations Research Project working paper, 142).
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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. In 1982, the MCH-FP Extension Project (Rural) with funding from USAID began to examine in rural areas how elements of the Matlab programme could be transferred to Bangladesh's national family planning programme. In its first year, the Extension Project set out to replicate workplans, and record-keeping and supervision systems, 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, management information systems, and 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.

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: improving management, quality of care and sustainability of the MCH-FP programmes, and providing technical assistance to GoB and NGO partners. 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 in international scientific journals.

In August 1997 the Centre established the Operations Research Project (ORP) by merging the two former MCH-FP Extension Projects. The ORP research agenda is focussed on increasing the availability and use of the high impact services included in the national Essential Services Package (ESP). In this context, ORP has begun to work with partners in government and NGOs on interventions seeking to increase coverage in low performing areas and among underserved groups, improve quality, strengthen support systems, enhance financial sustainability and involve the commercial sector.

ORP has also established appropriate linkages with service delivery partners to ensure that research findings are promptly used to assist policy formulation and improve programme performance.

The Division

The Health and Population Extension Division (HPED) has the primary mandate to conduct operations research, to disseminate research findings to program managers and policy makers and to provide technical assistance to GoB and NGOs in the process of scaling-up research findings to strengthen the national health and family planning programmes.

The Division has a long history of solid 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 underserved and population-in-need. There are various projects in the Division which specialize in operations research in health, family planning, environmental health and epidemic control measures. These cut across several Divisions and disciplines in the Centre. The Operation Research Project (ORP) is the result of merging the former MCH-FP Extension Project (Rural) and MCH-FP Extension Project (Urban). These projects built up a considerable body of research and constituted the established operations research element for child and reproductive health in the Centre. Together with the Environmental Health and Epidemic Control Programmes, the ORP provides the Division with a strong group of diverse expertise and disciplines to significantly consolidate and expand its operations research activities. There are several distinctive characteristics of these endeavors in relation to health services and policy research. For one, the public health research activities of these Projects are focused on improving programme performance which has policy implications at the national level and lessons for the international audience also. Secondly, these Projects incorporate the full cycle of conducting applied programmatic and policy relevant research in actual GoB and NGO service delivery infrastructure, 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 program performance through systematic provision of technical assistance; and scaling-up of applicable findings from pilot phase to the national program at Thana, Ward, District and Zonal levels both in the urban and rural settings.



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