AREAL VARIATIONS IN USE OF MODERN CONTRACEPTIVES IN RURAL BANGLADESH

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DEDICATION

This thesis is dedicated jointly to my loving husband Major General Dr. Anis Waiz who has stood by me through all trying times giving me both love and support, and my dear father Mr. Justice Mustafa Kamal who has patiently waited for this day and has also taught me to appreciate the inner beauties of life.

ABSTRACT

In Bangladesh, use of modern contraceptive methods has increased dramatically in the last decade. However, the level of use has not been the same between rural clusters. This dissertation investigates the plausible reasons for areal variations in use of modern contraception in rural Bangladesh.

This study randomly selects sixteen rural clusters as sub-samples from the 1991 Contraceptive Prevalence Survey of Bangladesh. Information from female respondents of eligible age, as well as family heads and family planning workers are collected along with cluster-level community data, and family level information. The data are analyzed using simple bivariate tables as well as more sophisticated multilevel analysis using the software 'MLn'.

Analysis of respondents using **modern reversible methods** finds that apart from the woman's age and number of living children, education of the family planning worker is the most influential predictor of use. Other significant predictors of ever use of modern reversible methods are the woman's education, religion, socio-economic status and her position within the family. Bari-level random effects were significant, indicating that a woman with 'typical' characteristics but residing in the most favourable bari would have a higher probability of use than a woman with very favourable characteristics residing in a 'typical' bari. Simultaneous confidence intervals of probabilities of use, for all clusters, found that most clusters were not significantly different in their ever use, although pockets of low use were observed.

Analysis of **acceptors of sterilization** finds that apart from age and number of living sons, religion is the most influential predictor of use. Non-Muslims are more likely to be acceptors. Other significant predictors are the woman's education, position within the family, the participation of bari members with non-government organisations, and sanction of bari girls' education by bari head. Bari-level random effects showed in the same directions as those in the modern reversible methods model. Heterogeneity in the bari-level effect could not be explained by the recorded explanatory variables. After controlling for these explanatory variables, between-cluster variance was very small for users of sterilization. However, educated women had more between-cluster variance compared to non-educated women.

Religiosity, attitude and beliefs of the respondents are vitally important in shaping attitudes towards contraceptive use. Replacement of some family planning workers with those having appropriate education and training are recommended. Family Planning programmes are strongly recommended to target 'bari heads' and encourage them to look favourably upon modern contraception. Attempts should be made at removing ill-conceived religious barriers. Further recommendations are to encourage non-government organisations in areas which have low contraceptive prevalence, and encourage female education and emancipation generally.

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GLOSSARY

CP Contraceptive Prevalence

EPI Expanded Programme on Immunisation

FWA Family Welfare Assistant

FWC Family Welfare Centre

FP Family Planning

GOB Government of Bangladesh

NGO Non-Government Organisation

THC Thana Health Centre

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CHAPTER 1

CONTEXT

1.1. INTRODUCTION TO BANGLADESH

1.1.1. Geographical setting

Bangladesh is a small country of 143,998 square kilometres in area, located in the south east of Asia. It is bounded by the Bay of Bengal on the south and by India on the other three sides - east, north and west - except for a short border with Burma on the south-east. It is one of the largest delta lands in the world, with more than eighty-five percent of the country comprising flat alluvial delta, traversed by large rivers. (NIPORT, 1981; Satter, 1982, BBS, 1991).

Administratively, the country is divided into four divisions - Rajshahi, Khulna, Dhaka and Chittagong[1]. Each division is further divided into districts, and each district into thana (sub-districts). In total there are 64 districts, and 460 thanas. The rural thana is again subdivided into unions which are clusters of villages and constitute the lowest administrative unit in Bangladesh.

1.1.2. History

Bangladesh was ruled by the Moghuls from the 13th century to the 18th century. The British took over in the 18th century and ruled until 1947. During British rule, Bangladesh was part of India. In 1947, the independent states of Pakistan and India were created with the present Bangladesh territory as a part of Pakistan, renamed East Pakistan.

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[1]Two new divisions Sylhet and Barisal have been added in 1994.

In 1971, Bangladesh won a war of liberation lasting nine months, the end of which was marked with the emergence of a sovereign state named 'Bangladesh' after its language 'Bangla' for which the war was fought.

1.1.3. Socio-economic background

Bangladesh has a per capita income of about US $220 and is one of the poorest countries (9th) in the world. Agriculture is the main occupation of the people, employing more than 60 percent of the labour force and contributing about 47 percent of the gross domestic product (BBS, 1989). In a review of poverty trends in Bangladesh, Hossain et al. (1992) concluded that the prevalence of poverty has remained unchanged in the last 25 years. The number of people estimated to be living under the poverty line was 43 percent in 1988-89 compared to 44 percent in 1963-64. These authors also reported that although the poverty level deteriorated in the immediate post-independence period, owing to the war of liberation, severe droughts, floods and famine, by 1980-81 pre-independence levels had been attained, although land holdings had diminished in size. They also showed that landlessness had changed little over time.

Levels of literacy are very low among Bangladeshis, particularly for females. Census statistics on educational achievement show that there has been very slow progress in female education over the last two decades. The literacy rate for males was 29.3 percent in 1961, 32.9 percent in 1974, 31.0 percent in 1981 and 30.2 percent in 1991. The corresponding figures for females were 9.6 percent in 1961, 14.8 percent in 1974, 16.0 percent in 1981 and 19.2 percent in 1991.[2]

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[2]Literacy rates for 1981 and 1991 were calculated on the basis of population aged 6 or more years.

Islam is the predominant religion of the country; more than 85 percent of the population are Muslims. Hindus constitute 13 percent, and Buddhists and Christians less than 2 percent. Sociologists have remarked that the identity of Bangladeshi Muslims is distinctly different from those of Middle Eastern Muslims. Having lived side by side with adherents of other religions, the Muslims of Bangladesh are found to practice a more 'syncretistic' version of Islam. 'Animist' ideas of Buddhism and practices of Hindu culture have found its place alongside Islamic beliefs in Bangladesh (Abecassis, 1990).

Bangladesh is predominantly a rural country with 91.2 percent of the population living in the villages. The rate of urban population growth increased from 1.4 percent per annum in 1911 to around 6.7 percent in 1974. Although this trend is likely to continue, Bangladesh will remain a predominantly rural country for many years to come.

1.1.4. Women's role in Bangladesh

Women in Bangladesh are not viewed as independent persons. They are expected to remain under the 'protective guardianship' of successive male kinsmen at the appropriate stages of their life cycles: father or brother, husband and eventually, son. As a consequence, women are often incapable of, or are prevented from, making their own decisions (Westerguaard, 1983; Adnan, 1988).

Arranged marriage and large differences in age at marriage between bride and bridegroom places a woman in a subordinate position relative to her husband at the onset of marriage (Cain, 1984). Moreover, a new wife has to prove herself to her mother-in-law, and other female relatives (Jahan, 1975). Paramount to the consolidation of her identity and status amongst her in-laws is the socio-biological role of reproducing the patrilineage (Chen, 1986a). This crucially requires her to give birth to one or more sons (Jahan, 1975).

Any reluctance or inability on her part in childbearing may lead to abuse and physical assault from her husband and in-laws.

The scope of education is limited for rural women as it is often seen as an impediment to the prospect of a good marriage (Sattar, 1975). It is thought that an educated girl might not obey her in-laws and husband (UNICEF, 1977).

Seclusion or 'purdah' is a social custom practised in various degrees in rural Bangladesh. It essentially means the separation of post-pubescent women from non-related males. It requires women to wear a veil in the presence of non-related males. It is used as a means to subjugate women in rural Bangladesh (Mabud, 1985). Purdah extends beyond physical segregation. A woman is expected to remain not only unseen but unheard too (Abdullah, 1974). Movements outside the home are allowed 'only at prescribed times and for prescribed purposes' (Chen, 1986c). Poor women who need to work for a living cannot afford to remain indoors and observe purdah only in a token way by covering the head with the sari. Most women, however, do not or cannot go to public places and take part in public events (McCarthy, 1978).

Women are usually allowed to visit each other within the 'bari' or family compound. A bari is a unit of residence in rural Bangladesh. Bari members are usually related by patriarchial relationship, although some cases of affinal relationships are also to be found (Aziz, 1979). A bari usually comprises of a common compound, a common entrance within which exists two or more separate homes, usually one family in each (details are given in Chapter 5). When the bari has a tubewell (source of drinking water), it is usually located within the premises of the bari and is for use by all. Usually each bari is demarcated by a plantation of banana trees. In the strictest purdah-observing families, a rural Bangladeshi woman can only visit other members of the bari unescorted. Bari,

therefore, not only serves as a physical boundary, but is also a social boundary to a village woman (Rahman, 1986).

Several baris make up an institutional framework called the 'samaj'. Samaj has a geographical boundary and whoever falls within that boundary belongs to that samaj. Traditionally, women are excluded from participating in the different social institutions of the community such as the samaj. These institutions are male dominated and there are hardly any instances of women heading such institutions (Cain et al., 1979; Chen, 1986a). These institutions exclude women from participation, but intervene directly or indirectly in issues related to women and their social status (Adnan, 1988).

A few samajes make up a community called the village. Villages are the basis of common social and cultural life. Each village has a name given to it by the local people and is a distinct geographical area which is used by the census authority and local administration. Villagers share common values and it is common to find one village having a higher degree of female freedom and mobility compared to another. Villages are often headed by leaders called 'village matabbars' (headman, details are given in Chapter 5) or Union Council Member[3] and their viewpoints are highly reflected in the major decision making process of the village residents.

1.2. POPULATION POLICY AND THE FAMILY PLANNING PROGRAMME

Numerous developing nations of the world are still faced with the major problem of an ever growing population. In many of them high fertility rates still prevail, and their

[3] The Union Council is an elected body for about 10,000 adult voters, distributed over a number of villages. Each village elects one or more representatives, one for every 1,000 inhabitants. The Chairman of the Council receives an honorarium from the Government for looking after the wards.

governments along with important international agencies, have tried to implement National Family Planning Programmes in the hope that they will lead to a decline in fertility rates, a subsequent curb in growth rates, and ultimately a prospect of a better economy.

In several nations, the family planning programmes have been successful. In Sub-saharan Africa, contraceptive prevalence (CP) has increased although at widely divergent rates. In Zimbabwe at 3.1 percentage points a year, in Botswana at 2.1 points a year and in Kenya at 1.7 points a year, and in Ghana at 0.9 points a year. The countries in East Asia, Thailand and Korea have almost 70 percent CP, and Indonesia is on the verge of achieving 50 percent. In South East Asia, the setting was unsuitable for a fertility decline. Traditional large families and cultural values resulted in no demand for contraception. Yet, Sri Lanka has achieved a 2.3 percentage points rise in CP since 1965, Indian CP rose by 1.7 points and Bangladesh rose by 1.5 points, while Pakistan lagged behind (World Bank, 1993). Countries experiencing fertility decline also have their GNPs rising, indicating a growing economy. Although earlier theories of fertility transition posited that socio-economic development was a prerequisite for fertility decline (Notestein, 1945), later versions of the theory conceded that interventions could possibly meet unmet demands for limiting family size and hence fertility reductions could be achieved at low levels of socio-economic development (Notestein, 1983). In a multi-national study by Mauldin et al. (1990) it was found that, in spite of low socio-economic development, high performance family planning programmes can achieve increased contraceptive use and hence low fertility. Bangladesh is an example of such a nation where in spite of low socio-economic development, the family planning programme has been successful (Cleland et al., 1992, Amin et al., 1994).

1.2.1. The Family Planning Programme of Bangladesh

Bangladesh is one of the most densely populated countries of the world. The total population in Bangladesh grew from 76 million in 1974 to 90 million in 1980 and 111 million in 1991 (BBS, 1993). The 1991 census indicated that 45 percent of the population is below fifteen years of age. The relatively young age structure of the population indicates continued rapid population growth in the future (Mitra, 1994). From 1975 to 1990 the elderly population (above 65) increased from 2 to 3.1 million and it is expected to increase to 4.3 million by the year 2005 (GOB, 1994). The unprecendented increase in population in Bangladesh and the growing awareness of the detrimental effects of such rapid growth resulted in a general consensus in favour of the initiation of a family planning programme. The Bangladesh population programme has gone through several phases with changes in strategy, structure, contents, goals and overall dimensions. The development of the programme can be divided into the following six stages:

(a) **First phase (1953-1959)** Small scale contraceptive services sponsored by a group of voluntary organizations and individuals.

(b) **Second phase (1960-1965)** Official government programme, clinic based and implemented through health care facilities on a limited scale.

(c) **Third phase (1965-1970)** Introduction of a field-oriented programme with a strong information and education component; administered by autonomous organizations.

(d) **Fourth phase (1970-1972)** Transitional phase with social unrest and political turmoil: the programme was interrupted due to the war of liberation.

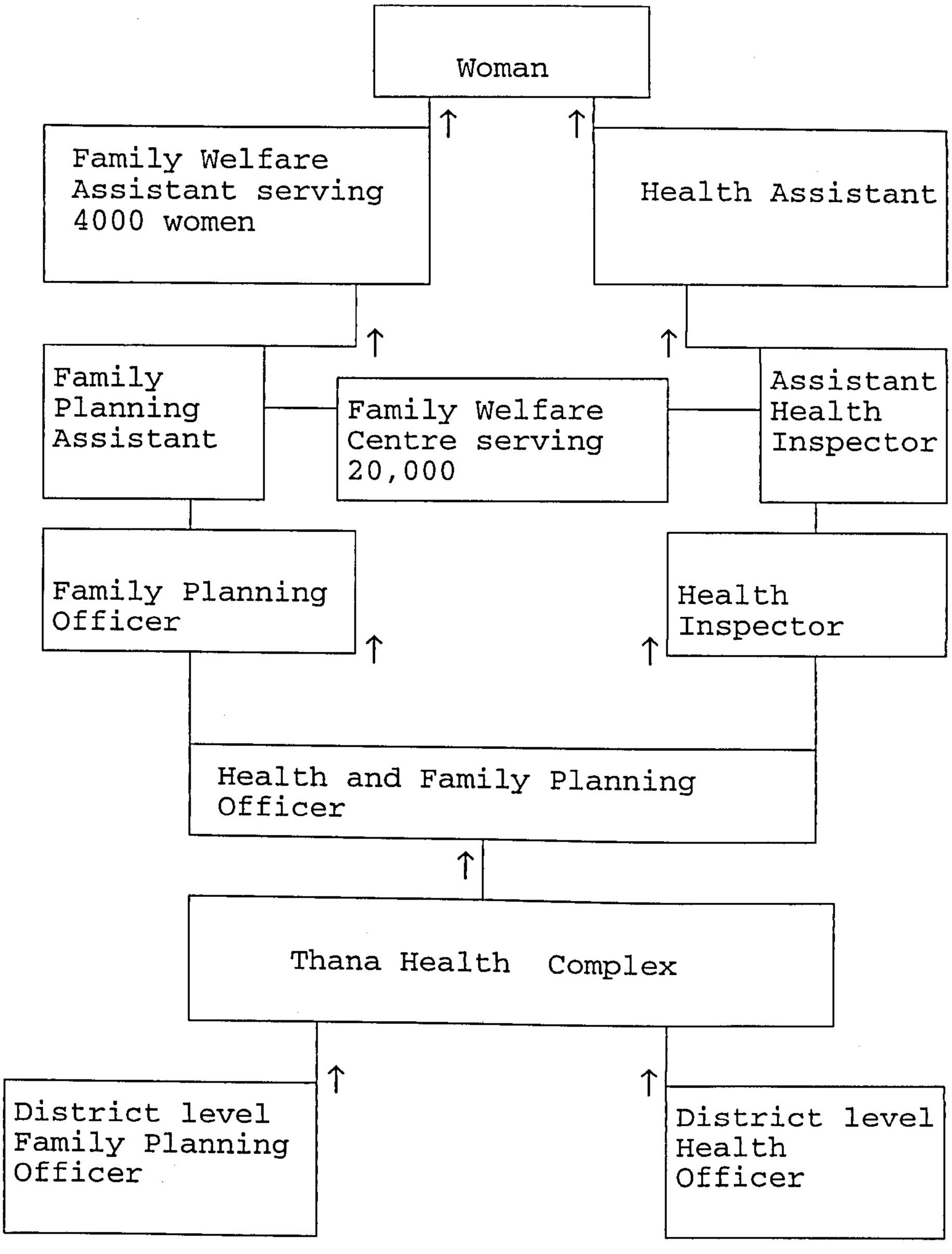
(e) **Fifth phase (1975-1980)** Start of government administered integrated health

and family planning programme, declaration of the national policy, and identification of population growth as the number one problem of the country. This phase was restructured by emergency additions during 1976-1978. The additions included introduction of young, educated, female FP workers at the *grassroot* level called the Family Welfare Assistants (FWA). It also included establishment of rural health centres at the union level called the Family Welfare Centre (FWC). The programme involved a multisectoral approach.

(f) **Current phase (1981 to date)** The main objective of this phase is to strengthen the family planning programme with the involvement of government and non-government infrastuctures. This phase has been marked with an emphasis on the 'supply side' and FWAs have been increased considerably in 1993 to afford wider coverage specially to the rural population.

Figure 1.1 gives a pictoral representation of the existing National FP programme in Bangladesh.

Figure 1.1 Simplified Organization Chart of Health and Family Planning in Bangladesh, 1994.



Explanation of the terms used in the National Family Planning Programme

Family Welfare Assistant (FWA) During the period of 1976-1978, 13,000 female family planning workers were recruited at the grass root level. They are young, educated, female workers (GOB criteria is 'completed grade 10') and are expected to visit, motivate and supply FP methods to women in their catchment area by bringing these services to their doorsteps. In 1993, another 10,000 FWAs were added to the previous number making the frequency of visitation to each woman higher than before. Presently, each FWA is expected to serve a population of approximately 4000 (Koenig et al., 1992). She is expected to visit each eligible woman once in every two months.

Family Welfare Centre (FWC) The Government of Bangladesh (GOB) also established health centres at the lowest level of administration that serves an approximate population of twenty thousand. The FWC is staffed with one paramedic (known as the family welfare visitor, FWV) who provides IUD insertions, menstrual regulation and injectable contraceptives.

Family Planning Assistant (FPA) One male administrative officer is assigned to each family welfare centre (FWC) to supervise and coordinate the work of the FWAs.

Family Welfare Visitor (FWV) Is a trained female paramedic assigned to each FWC who performs menstrual regulations, inserts IUDs and administers injectable contraceptives. She refers complicated cases to the Thana Health Centre.

Thana Health Centre (THC) These are also government health centres at the second lowest administrative unit (thana). They offer the same services as the FWC but in addition sterilization and other minor surgery is performed.

Qualified doctors are assigned to the THC.

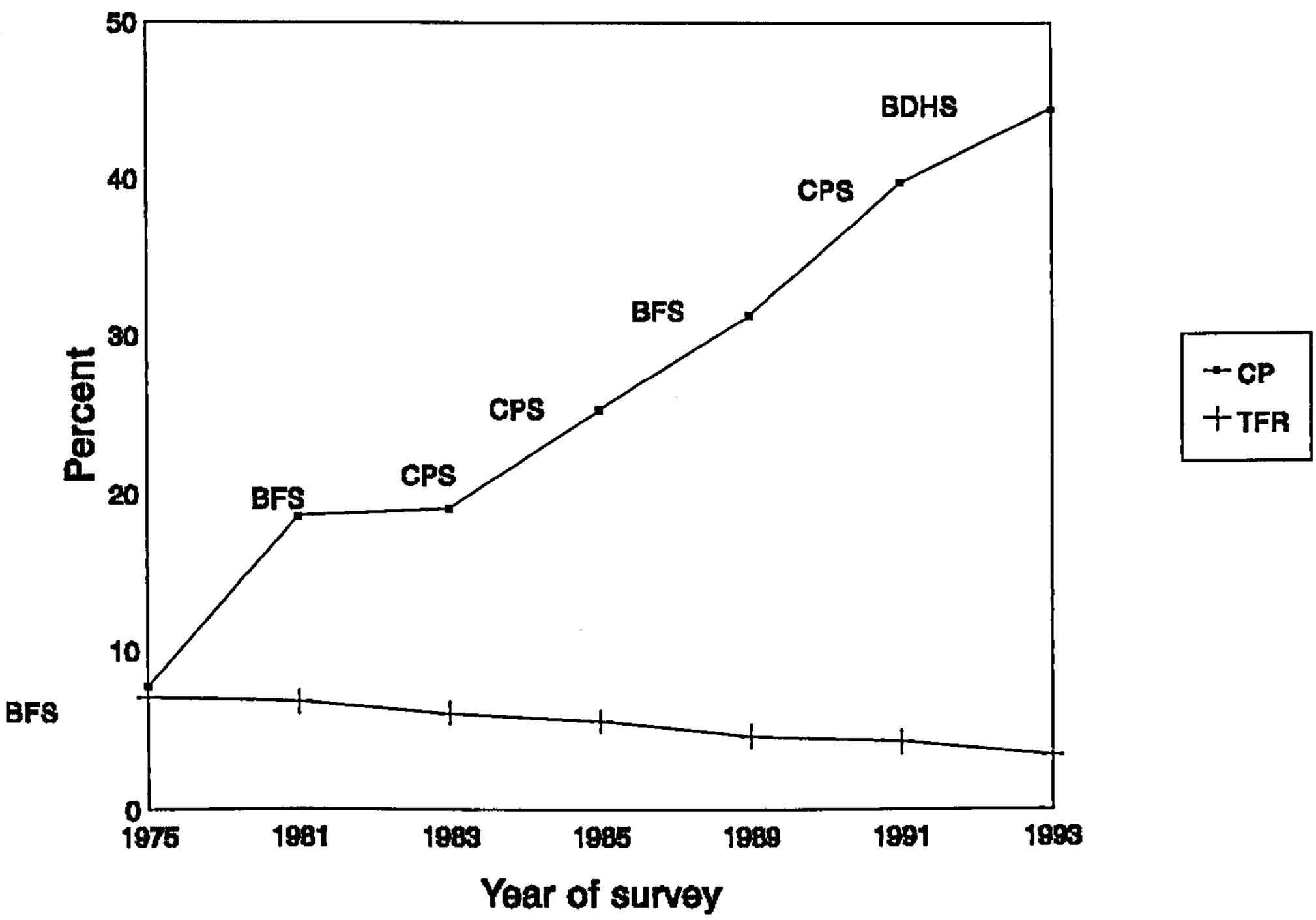
Thana Family Planning Officer (TFPO) Is the administrative officer in charge of all

staff in the Thana who are part of the FP programme.

1.2.2. Trends in contraceptive use and fertility decline

In Bangladesh, the use of contraceptives has risen from a mere 8 percent in 1978 to a peak of 44.6 percent in 1993. The major increase occured during the period 1978-1989 when the level rose to 25 percent from a mere 8 percent, achieving more than three-fold increase in eleven years. Figure 1.2 presents the trends in contraceptive prevalence (CP) and total fertility rates as documented from various nationally representative surveys in Bangladesh from 1978 to 1993.

Figure 1.2 Trends in Contraceptive Prevalences and Total Fertility Rates, Bangladesh 1975-1993.



Studies have shown that the rise in CP in Bangladesh is attributable mainly to increased

use of hormonal methods and other modern reversible methods (Mitra et al., 1994). The figures for sterilization have levelled off in recent years, and are now accounting for about one-third of the various methods used. One explanation is that perhaps the demand for sterilization has been effectively met (Islam amd Islam, 1993). Among traditional methods, safe period usage has grown but all other methods have been relatively static.

Along with an increase in contraceptive prevalence, Bangladesh has experienced a steep decline in its Total Fertility Rate (TFR). Cleland et al. (1992) have attributed this decline to a fall in marital fertility and not a rise in age at marriage. They claim that the fall in marital fertility reflects increase in the proportion of contraceptive users. Figure 1.2 also illustrates the declining trend in reported total fertility, as available from various survey data. The TFR in Bangladesh fell from 6.03 in 1983 to 3.4 in 1993, a forty-four percent decline in eight years. These TFRs were calculated from data obtained from the various major surveys (Mitra et al., 1991, 1993). All sources show that there has been a gradual decline in the TFR since the end of 1980s. The most dramatic decline of 21 percent occurred between the period 1989-1991 to 1991-1993. Analysis of age-specific marital fertility rates has found that older women have experienced a steeper decline in fertility rates than younger women. This trend suggests higher use of contraceptive methods amongst older women.

1.3. THE RESEARCH QUESTION

As early as 1986, Rahman in his work in a deltaic area of Bangladesh, found huge inter-village variation in contraceptive use in rural Bangladesh. He showed that some villages had very high contraceptive use rates while others had very low rates. His fieldwork involved a detailed study of 148 villages in Matlab, a deltaic region of Bangladesh (Rahman, 1986). The Rahman study, which forms the starting point of this dissertation is summarized in the next section.

1.3.1. Summary of Rahman's study titled 'Tradition, Development and the Individual'.

Rahman's study showed that village level literacy rates (indicated by number of educated bari heads) was an important village level predictor of use of modern contraception. He also found the FP worker's societal strength to be positively correlated with use of modern contraceptives in her catchment area. Bari head's education, occupation and religiosity were also significant determinants of use of modern contraceptives. At the individual level, number of living sons, couple's education and exposure to radio were found to be important predictors of use of modern contraceptives. The study makes important policy recommendations. It focuses on the need for more education both for males and females. It also recommends the recruitment of FP workers from local areas where they serve and also from influential families.

1.3.2. Objectives of this study

Since the Rahman study in 1986, no one has looked at the inter-village variations in contraceptive use in Bangladesh. Although various major surveys have documented village level CP, the study of inter-village variation has been completely neglected in the

subsequent literature. Therefore, the purpose of this study is to document inter-village variation in CP and attempt to explain it in terms of individual, bari, and village-level factors. This study analyses data from 16 rural clusters of Bangladesh. Each cluster is at most a collection of two villages, hence the between-cluster variation is almost synonymous with the between-village variation in this study.

Many researchers have searched for individual level determinants of contraceptive use in Bangladesh. Koenig et al., (1992), Shahidullah & Chakroborty (1993), Phillips et al. (1993), and Kamal & Sloggett (1993) found 'Visits to the woman by an FWA' to be a significant determinant of contraceptive use in Bangladesh, independent of other socio-economic and demographic predictors. However, visits to a woman by an FWA may have a circular relationship with use, FWA's frequenting those houses which are already known to be users. In another study, 'visits to the cluster by an FWA' was found to be highly predictive of the level of contraceptive use of a woman (Kamal, 1994). Neaz and Banu (1992) and Rahman (1986) found FWA characteristics to be correlated with use in her area. Since the FP program of Bangladesh is so heavily dependant on FWAs, it is a matter of interest to establish whether personal and professional attributes of the FWAs have an effect on the CP of her catchment area.

Other researchers have found *female education* (Cleland et al., 1995), her *mobility* and *decision making ability* (Kamal and Sloggett, 1993), *experience of child mortality* (Chowdhury et al., 1993), *sex of surviving children* (Chowdhury et al., 1992) and *administrative division of residence* (Shahidullah and Chakroborty, 1993; Kamal and Sloggett, 1993; Rashid, 1993; Islam and Islam, 1993) to be important correlates of contraceptive use by Bangladeshi women. One study uses a three level model and considers a woman nested in a cluster and a cluster nested in a district. This study finds

district level *aggregate education and religiosity scores* to be predictive of contraceptive use. This study does not use any cluster or district-level information, it also finds between-cluster variation to be more significant than between-district variation (Amin et al., 1995).

These studies (except Amin et al., 1995) and surveys have usually targeted women as individuals capable of making independent decisions on the adoption of family planning. A deeper knowledge of Bangladeshi kinship, social norms and behaviour patterns reveals the interactions in the social hierarchy to which the couples belong. The individuals of a bari may be heavily influenced by other members of the bari, especially by the attitudes of the bari head. Apart from the Rahman study, one other study by Nahar and Rahman (1995) found the education of bari head's wife to be positively correlated with the adoption of contraceptives of other women in the bari. This study considers a woman as a member of a bari and also takes into account bari variables and bari head characteristics in the same multivariate model. The model also includes access variables like the presence of an FWA and FWC at the cluster level, as well as other development indices like presence of paved road, public TV, post office and primary school. The study is, therefore, unique in its design of considering variables from the individual level, the bari level, and the cluster level, in the same model as predictors of contraceptive use by Bangladeshi women.

It will be hypothesized in this study that the causes of areal variations in contraceptive use may be due to:

1) Structural and socio-economic characteristics of the cluster.

2) The availability of the FWA assigned to the cluster and her personal and professional characteristics, and access to static FP services.

3) Socio-economic and demographic characteristics and religiosity of the bari head.

4) Socio-economic variables of the bari.

5) Individual demographic characteristics of the woman.

The significance of this study is that it incorporates the various levels of information in a single model. This is achieved by using a relatively new software 'MLn' which can handle multilevel models (Goldstein, 1990). This study, unlike that of Rahman, samples women from all four administrative divisions of Bangladesh.

1.3.3 Policy relevance of this study

The results of this study have important relevance to future policy recommendations. If the study can identify important bari level and cluster level variables correlated with contraceptive use by Bangladeshi women, those variables may receive more attention in future policies of the Government of Bangladesh. Specially whether attributes of the bari head such as education, religiosity, occupation affect the level of contraceptive use by bari couples. If they are found to be correlated, future policy recommendations may be made to make 'bari heads' the target groups of future FP programmes.

If characteristics of the FWA such as her education, professional training, marital status or proximity of her residence to the village are found to be positively correlated with contraceptive use, recommendations may be made to strictly employ FWAs possessing those criteria. If the presence of cluster-level static health centres are found to be important determinants of use of modern contraceptives in Bangladesh, policy recommendations will be targeted towards improving these facilities and increasing them in number. The observed correlation of other cluster-level variables like presence of public TV, post office, paved road etc with increased contraceptive use may suggest putting

priorities on strengthening socio-economic developments in future.

1.4. METHODS AND MATERIALS

The present study was conducted on sub-samples from the 1991 Contraceptive Prevalence Survey (CPS). In the first phase of the study, two areas of extreme observed contraceptive prevalence were identified. They were Panchbibi (69 percent CP) and Dewanbazar (11 percent CP). Both these areas were studied in great detail. This initial study was conducted to identify possible causes of areal variation which could be pursued in the subsequent survey.

In the second stage, four clusters from each of four administrative divisions of Bangladesh were randomly selected from among those included in the 1991 CPS. Bari heads and users in approximately sixty households were interviewed in each cluster. In all, there were sixteen rural clusters where the following investigations were conducted (See Appendix C for questionnaires)

1) **Cluster survey** Sixteen clusters were selected from four divisions of Bangladesh, and infrastructural information about the infrastructure of these clusters was collected in a structured questionnaire from knowledgable and responsible informants in the village such as school teacher, pharmacist, social worker etc.

2) **FWA survey** This involved interviewing all FWAs from each of the sixteen selected clusters, and also those who were working in the same union (of which the cluster was a part). This resulted in interviews of eighty FWAs.

3) **Bari survey** The bari survey was conducted in all baris chosen from each of the

sixteen clusters. These baris were randomly chosen from the 1991 CPS household list. Baris with only one household in the bari were purposely excluded. A total of 936 baris formed the sample. The following information was collected from each bari: ownership of tubewell, girls' attendance of school, number of members in the bari, participation with some non-government organisation, etc (See Appendix D for questionnaires).

4) **Bari head survey** For each of these baris, the bari head was interviewed. If he was absent, the interviewer tried again. If he was absent on the second occassion, his wife or the next important bari member was interviewed. This was a detailed structured interview concerning both socio-economic and demographic information of the bari head, as well as his religiosity and his perceptions of the relationship between religiosity and FP use in general and his own use in particular (See Appendix C for questionnaires).

5) **Eligible woman survey** In each of the 936 baris, each eligible woman was interviewed. A woman was considered eligible if she was ever married and aged between 15-49. This was a short structured interview on her ever use of modern contraceptives, age, education, parity and experience of infant mortality. Total women interviewed in this survey was 3165.

1.4.1. FIELDWORK

The fieldwork started in September 1993. In the first two months, a detailed in-depth study of Panchbibi and Dewanbazar was conducted. Three men and three women

including the principal investigator, formed a team of investigators. The team resided in the cluster, usually within half an hour's walking distance of the villages under study.

The main study started in November 1993 and ended in March 1994. Clusters were mapped out according to their locations, one division being considered at a time. Because the sample was a subset of the 1991 CPS, household lists of the 1991 CPS were obtained from the 1991 CPS survey. The team sent out letters to the Thana Family Planning Officers ahead of time informing them about their arrival date, as well as a date to assemble all FWAs of that union. The Thana Family Planning Officers also arranged accommodation for the team. The team resided in the village for ten to fifteen days, collecting village level information and bari level information, and conducting the bari head survey and the eligible woman survey.

Under the supervision of the principal investigator, lists of households from the 1991 CPS list were assigned to the investigators in groups of two, one male and one female. Each morning they set off in directions previously identified from the 1991 CPS maps. The male interviewer interviewed the bari head and the female interviewer interviewed the eligible women in the house. The male interviewer also completed the bari form. If one household was non-responsive, an alternative household was selected from the 1991 CPS household list. The study used purposive sampling to include only those baris which had more than one household. The study in each cluster was considered complete after sixty households were interviewed. The 1991 CPS had a greater number of households for each cluster, this sample was restricted to sixty only because of budgetary restrictions. Cluster-level information was collected from some knowledgable informants as well as from the team's own observations.

On a selected day, the FWAs were assembled in the Family Welfare Centre or

Thana Family Planning Officer's office and the interviews were conducted by the principal investigator herself. Having completed one cluster, the team moved on to the nearest cluster according to the location.

In this way, the study was completed in all four divisions of Bangladesh by March 1994.

1.5. ORGANISATION OF THE STUDY

The primary objective of this study, as mentioned earlier, is to identify which factors related to the characteristics of the cluster, FWA, bari, bari heads and eligible women residing in rural Bangladesh have contributed to the observed areal variations in use of modern methods of contraception. To accomplish this objective, the dissertation is organised as follows.

Chapter 1 contains the introduction, objective, significance, methods and materials of the study.

Chapter 2 contains a multivariate analysis of the 1989 Bangladesh Fertility Survey data (BFS) which sets the background for the present study.

Chapter 3 presents an in-depth discussion of the findings from two clusters of extreme CPs (high and low) in rural Bangladesh.

In **Chapter 4**, comparison of observed CPs of the sixteen clusters with the 1991 CPS are presented, along with a regression analysis, using data from eighty FWAs to measure relationship between CP and the attributes of the FWAs.

In **Chapter 5**, bari heads' personal attributes and socio-economic variables at bari level are investigated as possible explanatory variables in explaining bari heads' 'ever use' of modern contraceptives.

Chapter 6, presents the multilevel model of ever use of modern methods of

contraception by eligible women, using selected variables for cluster, FWA, bari, bari heads and the individual.

Chapter 7 summarizes the findings from this study and offers policy implications, and future research recommendations.

CHAPTER 2

PRELIMINARY INVESTIGATIONS OF AREAL VARIATIONS IN CONTRACEPTIVE USE USING THE BANGLADESH FERTILITY SURVEY OF 1989.

2.1. INTRODUCTION

This chapter examines areal variations in use of modern methods of contraception using data from the 1989 Bangladesh Fertility Survey (BFS). Primary and secondary analysis of the survey has shown that considerable areal variation in contraceptive use exists among the four administrative divisions of Bangladesh (Huq & Cleland, 1990; Kamal & Sloggett, 1993; Shahidullah & Chakroborty, 1993). Table 2.1 presents data on areal variation of contraceptive use as obtained from four major surveys. Chittagong division consistently shows low use, and Rajshahi division shows high use compared to the two other divisions Dhaka and Khulna. Although the wide variation in divisional contraceptive prevalences (CPs) was observed since 1983, no one has investigated the reasons. One study by Rashid (1993) investigated the low use of Chittagong division against comparatively higher use of other divisions, using the 1989 BFS. The results were inconclusive, and no variables could be identified as possible correlates of low use in these parts. Differences in CPs among other divisions has not been investigated.

The administrative hierarchy of Bangladesh At the time of the survey (1989), Bangladesh had four administrative divisions: Dhaka, Chittagong, Rajshahi, Khulna. Each division is divided into districts. Each district has several units called 'Thana'

(subdistrict). Each Thana has 20 to 30 'Unions' which is the lowest administrative unit in Bangladesh. Each 'Union' in Bangladesh comprised a collection of approximately twenty villages.

The entire administration of Family Planning Services in Bangladesh is controlled by a central administration based in the capital, Dhaka. All posts rotate, except those of the *grass root* level family planning workers (FWA).

Table 2.1 Percentage of women aged 15-49 using any method of contraception, Bangladesh 1983-1993.

Division	1983 CPS	1985 CPS	1989 BFS	1991 CPS	1993 DHS
Chittagong	12.6	16.1	21.0	20.5	29.3
Dhaka	20.5	26.0	32.0	32.9	44.3
Khulna	20.7	28.2	35.0	34.6	52.8
Rajshahi	22.6	30.0	38.0	37.2	54.8

The central administration keeps a constant check, and high performance staff are relocated to areas of low performance. Thus the possibility of areal differences arising from faulty staff management in one division is reduced because of the constant rotation.

Apart from divisional variations in CPs, it was observed in each of the major surveys that there were significant differences in contraceptive prevalence among the probability sampling units or 'clusters'. The variations between clusters may be due to community factors such as the distance to static health centres and visits to cluster by FP workers. Owing to the absence of any cluster level information in the previous fertility surveys, this variation was not investigated.

The 1989 BFS collected community-level information for the rural clusters. Using this information, this chapter investigates cluster-level differences in CPs.

2.2. METHODS AND MATERIALS

The 1989 BFS is a two-stage survey. In the first stage, the clusters or probability sampling units were chosen from census enumeration areas throughout the four administrative divisions of Bangladesh. A total of 270 clusters, 100 urban and 170 rural were chosen in this sample.

In the second stage, each household in each cluster was listed, and households were randomly chosen from within clusters. There was a 98 percent response to this survey resulting in a total of 11905 women of eligible age being interviewed. Community data were available for 8466 rural women, and these women are the subject of this analysis. Two models are considered in this chapter, one for modern reversible methods the other for acceptors of sterilization. Previous studies have found separate sets of predictor variables for reversible methods and permanent methods in Bangladesh, hence the need for two models (Amin et al., 1995; Kamal & Sloggett, 1994; Kamal, 1994). Modern reversible methods include pill, condom, IUD, injection and foam only. Sterilization applies to both male and female methods. Users of traditional methods like safe period, abstinence or withdrawal are considered non-users. Pregnant women are also classified as non-users.

2.2.1 Variables used in the analysis

The variables used in this analysis are broadly classified into two groups called the macro-level factors and the intervention factors respectively. Macro-level factors are those that indicate the socio-economic climate, modernity, or major economic activity. They are expected to influence the demand for contraception.

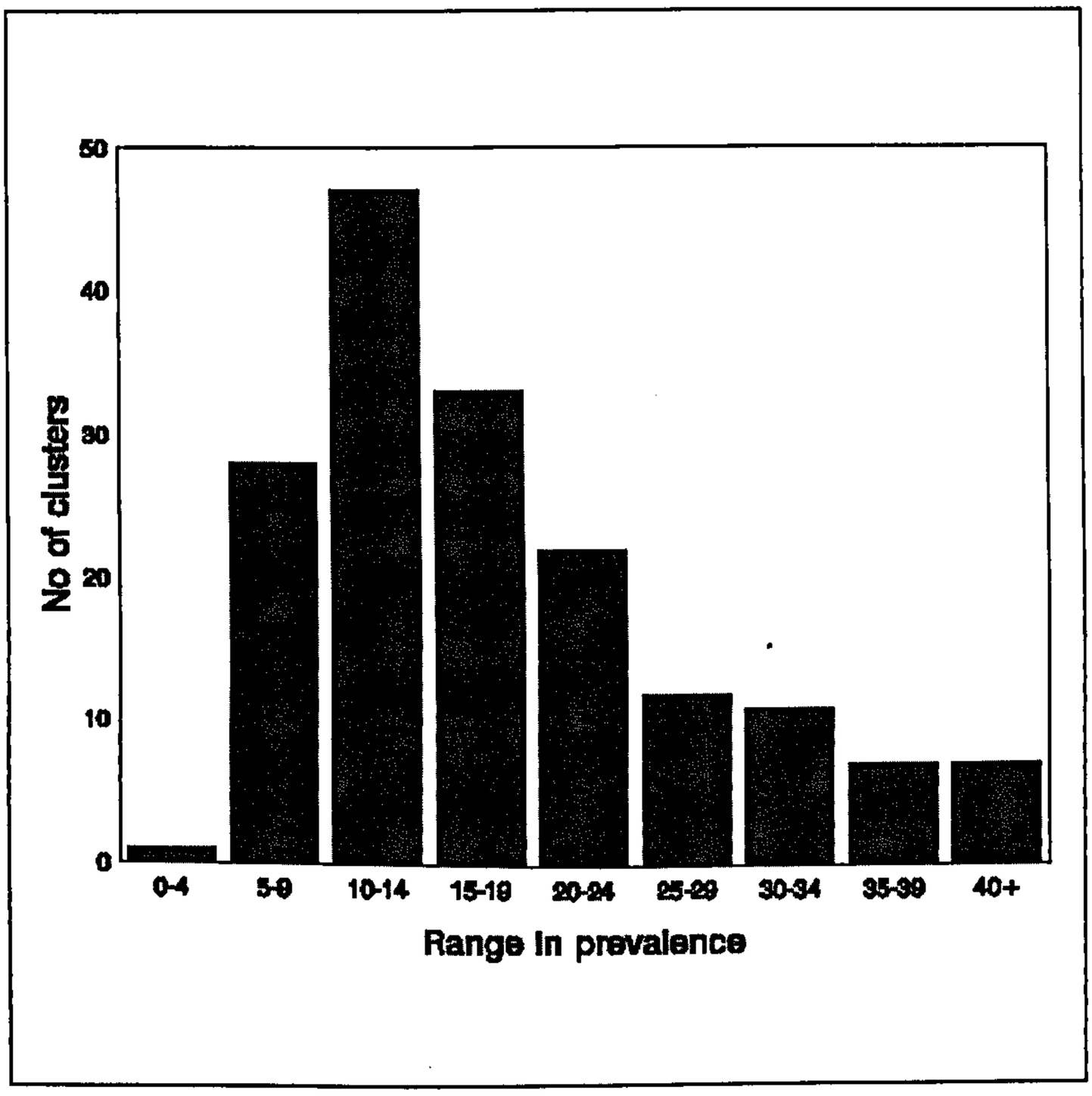
'Intervention factors' describe the programme or service environment such as

distance to services and presence of FWA in the cluster. Specifically it is hypothesized that the distance to services such as free health centres and retail outlets for FP, and visits to the cluster by FWAs will increase use.

2.3 DIFFERENCES BETWEEN CLUSTERS

Figure 2.1 presents the distribution of rural clusters according to cluster prevalence rates. Across 170 clusters, the percentage of current users of any method of contraception ranges from 3.0 to 65.0 percent. As Fig 2.1 shows it is a positively skewed distribution, indicating a few clusters in the high use range. Thirty one clusters have CPs below 10 percent, while the modal value occurs between 10-14 percent. A prevalence of 40 percent or more in only 7 clusters represents 3 percent of women.

Figure 2.1 Distribution of cluster level contraceptive prevalence, rural BFS 1989.



2.3.1 Socio-economic indicators at the cluster level

The variables available as socio-economic indicators may be grouped into two. Firstly, the communication variables and secondly, the economic variables.

Communication variables Ten variables were available in the survey, which may be

classifed as communication variables. These are distances to: railway station, paved road, bus stop, launch quay, steamer quay, newspaper, rickshaw (cycle transport), telegraph office, telephone office and post office. Only four variables among these had enough variability to be considered as possible predictors of contraceptive use. They are distance to paved road, railway station, public television and post office.

To identify the correlation amongst these variables, they were investigated by Principal Component Analysis (PCA).

Principal Component Analysis This is a statistical technique, employed on highly correlated variables. PCA has considerable utility in reducing numerous variables down to a few factors. Mathematically, PCA produce several linear combinations of observed variables, each linear combination a factor. A factor is interpreted from the variables that have high 'loadings' on it, ie are highly correlated with it (Tabachnick & Fidell, 1989).

Here, PCA produced two factors. Table 2.2 presents the factors and the loadings. The first factor weighs heavily on distance to railway station and paved road. The loadings are almost the same. The second factor has high loadings for distance to post office and public television. In this factor also, the loadings of the two variables are almost the same.

Table 2.2. Results of PCA on selected communications variables, rural BFS 1989.

Variable	Loadings	
	Factor 1	**Factor** 2
Road	.74	-.00
Railway	.64	-.04
Post Office	-.40	.76
TV	.47	.69

Two new variables, communications 1 and 2 were constructed. All four variables were coded as 1 if facility within 3 miles of cluster, 0 otherwise. The first variable sums scores for distance to rail station and paved road ; the second variable sums scores for distance to post office and public TV. Because of almost equal factor loadings, no weights were used to construct the new variables. The distribution of these two new variables is presented in Table 2.3.1 along with cluster level economic variables.

Economic variables

The economic variables included in this study are the following:

Distance to market These are village markets held once a week in a fixed location, selling all kinds of fruits, vegetables, meat, as well as FP products.

Distance to industrial unit In some areas of rural Bangladesh there are industrial plants such as a cement factory, brick making factory etc. The distance to the industrial unit is considered as an economic variable, because workers usually reside in neighbouring areas and also benefit from FP clinics available specially for industry workers.

Distance to mill In some areas of rural Bangladesh mills have been established and workers in these mills also enjoy priviledges of having exclusive FP clinics for them.

In Table 2.3.1, analysis of variance (ANOVA) tests (Steel & Torrie, 1989) indicates that there are significant between group differences in mean CPs for distance to market (*haat*) for modern methods. The nearness to markets indicates more exposure to FP products, because they too are sold in the market. It also indicates more diffusion of ideas, because people travel from far and beyond to buy and sell on these occassions. By way of mutual exchange as well as mass media advertisement of FP in the market, they are exposed to FP methods.

Table 2.3.1 Cluster percentages of use of modern reversible methods and sterilization according to selected communication and economic variables, rural BFS 1989.

Variable	No of clusters	Percent Modern	F test p	Percent Sterilized	F test p
Rail & Road					
None	80	9.0	.24	8.1	.09
One	74	11.0		10.5	
Both	16	9.0		11.7	
Post Office & TV					
None	63	10.0	.23	10.4	.49
One	77	10.4		9.2	
Both	30	13.0		8.5	
Market					
Within 3 miles	98	12.4	<.01	9.3	.15
3 miles away	72	8.5		9.8	
Industrial unit					
Within 3 miles	24	13.6	.06	10.6	.52
3 miles away	146	10.3		9.3	
Mill					
Within 3 miles	102	10.1	.23	8.5	.03
3 miles away	68	11.7		11.0	
N	**170**				

For acceptors of sterilization the only economic variable that is significant is the distance to a mill. Why this economic variable 'distance to mill' influences the proportion sterilized and not modern reversible methods is not clear from these data. It is possible that exclusive FP clinics for mill workers promote modern reversible methods more than sterilization, but the exact nature of this relationship needs further research.

The effects of all other variables available for this analysis were insignificant.

Educational variables and development indicators

Table 2.3.2 presents macro-level educational and development indicators for the 170 rural clusters. These variables include the following:

Distance to Madrasah 'Madrasahs' are Islamic schools. Arabic is the medium of instruction, the Holy Koran and its teachings, interpretation, and recitation is taught up to grade ten. Apart from these subjects, mathematics and the vernacular are also taught. On completion of grade ten, students are tested in a common countrywide exam. Madrasah produces a group of very religious orthodox young men 'Mullahs' (clerics). Mullahs have considerable influence on societal behavioural patterns, because they are known to be well versed in the Holy Koran and Islamic laws and are respected by common people (Ahmed, 1981). As a result there may be greater religiosity in clusters where Madrasahs abound. It is hypothesized, that the variable 'distance to Madrasah' may affect cluster prevalence rates of modern contraceptives because of the influence of orthodox values being practised by clerics from the Madrasah.

School Many authors have linked women's education with their contraceptive use and fertility (Zaki et al., 1993; Cleland et al., 1992), specially in Bangladesh women's education has played an important role as a determinant of contraceptive use (Cleland et al., 1995, Amin et al., 1994; Shahidullah & Chakroborty, 1993; Islam and Islam, 1993). It is hypothesized that increased educational attainment of women in a cluster (enhanced by distance to girls' primary and secondary school) contributes to higher level of use in that cluster. Alternative hypothesis is that clusters where schools are present may have been progressive from earlier times and thus led to higher usage of contraceptives. Some more discussion on the relationship of women's education with contraceptive use is presented in Chapter 4 (Section 4.2.1).

Table 2.3.2 finds that for this sample, distance to primary school has significant between cluster variation for percentage use of both modern methods and acceptors of sterilization in rural Bangladesh. It also finds 'distance to Madrasah' to be negatively (5

percent level of significance) correlated with acceptance of sterilization.

Table 2.3.2 Cluster percentages of users of modern reversible methods and sterilization according to distance to NGOs and educational institutions, rural BFS 1989.

Type of facility	No of clusters	Percent Modern	F test p	Percent Sterilized	F test p
Madrasah					
Within 3 miles	99	11.4	.20	8.5	.05
3 miles away	71	9.8		10.8	
Primary school (Both sex)					
0-3 miles	28	14.7	<.01	11.5	.03
4-8 miles	34	10.1		11.5	
9+ miles	108	9.9		8.3	
Girls' high school					
0-3 miles	59	12.6	.10	9.1	.19
4-8 miles	59	9.9		10.9	
9+ miles	52	9.6		8.3	
N	**170**				

2.3.2 Intervention variables

The variables in this category are again subdivided into two groups. The first group are the variables of 'indirect intervention'. For example, the distance to various health centres, retail FP outlet, etc. The second group consists of variables which deal directly with FP intervention in rural Bangladesh.

Indirect intervention variables

1) **Distance to any free health centre**

The most common health centre is the FWC (static family welfare centre, introduced as part of the National Family Planning Program by the Government of Bangladesh) at the union level. At the thana level, the Thana Health Complex is also a free government facility offering both FP and other health services (Figure 1.1). Apart from these, there were a few other government sponsored health clinics which were built prior to the FP programme and are also counted

as facilities.

2) **Distance to qualified doctor**

Private practitioners reside in some rural areas, setting up private clinics addressing both FP and other health related problems.

3) **Retail FP outlet**

In many clusters of Bangladesh, there exists retail outlets of FP products. Most common medicines, along with antibiotics and FP devices (pills, foam and condoms) are available in these shops. It is hypothesized that distance to an outlet may affect cluster CPs, specially use of modern reversible methods.

Table 2.3.3 Cluster percentages of use of modern reversible methods and sterilization according to various static health facilities, rural BFS 1989.

Variable	No of clusters	Percent Modern	F test p	Percent Sterilized	F test p
Any health centre					
Within 3 miles	124	10.2	.20	9.8	.48
3 miles away	46	12.0		8.8	
Retail FP outlet					
Within 3 miles	43	10.9	.82	11.3	.08
3 miles away	127	10.6		8.8	
Qualified doctor					
Within 3 miles	70	11.1	.47	9.6	.72
3 miles away	100	10.2		9.2	
N	**170**				

In Table 2.3.3 none of the variables have any significant between-cluster variation (at 5 percent level of significance).

Direct intervention variables Five variables are used in this category. These are:

1. Number of visits in last three months by FWA assigned to this area.

2. Distance to the residence of FWA assigned to this area.

3. Number of visits to the cluster in the last three months by government health

workers. Government health workers work under a separate health programme (Figure 1.1). They provide health related doorstep services including FP.

4. Number of visits to cluster in the last three months by health assistants who are employed at the union level under the separate health programme.

5. Number of visits to the cluster in the last three months by local NGO health workers.

Table 2.3.4 gives the distribution of clusters according to the five direct intervention variables. It is found in this survey, that only 'visits to the cluster by NGO worker' has significant between-cluster variation in use of modern reversible methods, and 'visit to the cluster by an FWA' is correlated with acceptance of sterilization in a cluster. The effects of all other variables considered as 'direct intervention' variables are insignificant.

Table 2.3.4 Cluster percentages of use of modern reversible methods and sterilization according to direct intervention variables, rural BFS 1989.

Variable	No of clusters	Percent Modern	F test p	Percent Sterilized	F test p
FWA visits					
None	32	8.9	.19	6.5	.04
1-4 times	66	10.3		11.0	
5+ times	72	11.9		9.0	
Distance to FWA's residence					
In cluster	92	11.2	.79	9.6	.84
1-3 miles	61	10.5		9.1	
4+ miles	17	9.8		10.2	
Visits by Health Assistant					
None	49	10.0	.37	8.6	.23
1-4 times	79	10.0		9.1	
5+ times	42	12.2		11.2	
Visits by Health Worker					
Visited	17	10.2	.08	9.5	.62
Not visited	153	10.8		8.6	
Visits by NGO workers					
Visited	23	14.9	<.01	7.7	.43
Not visited	147	10.0		8.6	
N	**170**				

2.4. MULTIPLE REGRESSION ANALYSIS

Simple ANOVA tests conducted on the 1989 BFS data revealed some significant correlates of contraceptive use. This section uses multivariate analysis to model cluster percentages of use of modern methods and sterilization on selected variables.

Multiple regression analysis is conducted to identify significant determinants of cluster-level use using separate models one for modern reversible methods and for sterilization. Previous analyses of contraceptive use of Bangladeshi women have found users of modern reversible methods and those of sterilization to have predictor variables varying in opposite directions, hence the need for separate models (Amin et al.,1995;

Kamal, 1994; Kamal and Sloggett, 1993). The dependent variable is the percentage of use of modern methods or acceptors of sterilization in each cluster (N=170). Sterilization acceptors are excluded from the model on modern reversible methods and vice versa. Pregnant women are considered non-users. Only cluster level variables are entered into the model. The multiple regression model is given by

$$y=a+b_1x_1+b_2x_2+...+\epsilon$$

Here, y=cluster proportion of use of any method, a is the constant in the model, b_i is the coefficient of the ith correlate and $\acute{\epsilon}_i$ is the error term.

2.4.1. Modern reversible methods

Only four variables: distance to market, primary school, retail FP outlet and visits by NGO workers to the cluster, are chosen because of their significant correlations with cluster percentage of use of modern reversible methods (Section 2.3). The economic variable 'Distance to market' is first entered into the regression model. The development indicator 'Distance to primary school' is entered next. Indirect intervention variable 'Distance to retail FP outlet' and direct intervention variable 'Visits by NGO worker' are next entered into the model presented in Table 2.4.1. One measure of the relative importance of each category of variables is its incremental contribution to adjusted R square (Theil, 1971) and is included in Table 2.4.1. The model finds 'Distance to market' to be the best indicator of cluster percentage use of modern reversible methods. Visits by NGO workers to the cluster also increases use, distance to primary school is also a positive correlate of cluster percentage of use of modern reversible methods. Distance to retail FP outlet is an insignificant predictor of use in this model.

Table 2.4.1 Multiple regression of cluster percentage of use of modern reversible methods on selected macro-level variables, rural BFS 1989.

Variable	Model 1		Model 2		Model 3		Model 4	
	Coeff	P	Coeff	P	Coeff	P	Coeff	P
Market within 3 miles	3.90	<.01	3.91	<.01	3.91	<.01	3.80	<.01
Primary School	-	-	2.06	<.01	2.06	<.01	1.96	<.01
FP retail shop	-	-	-	-	0.19	.88	0.35	.79
Visits by NGO worker	-	-	-	-	-	-	1.02	.03
Constant	8.49	<.01	7.79	<.01	5.29	<.01	3.98	<.01
Adjusted R sq.	.05		.09		.09		.11	

2.4.2. Sterilization acceptors

The first variable entered into this model is the economic variable 'Distance to mill', structural variables 'Distance to madrasah' and 'Distance to primary school' are entered next. Lastly, the direct intervention variable 'Visits by FWA to cluster in last three months' is entered. The final model is presented in Table 2.4.2. Although adjusted R square is very small, it finds 'Distance to primary school' to be the only significant predictor of percentage sterilization acceptors in clusters.

Table 2.4.2 Multiple regression of cluster percentage of acceptance of sterilization on selected macro-level variables, rural BFS 1989.

Variable	Model 1		Model 2		Model 3	
	Coeff	P	Coeff	P	Coeff	P
Mill	-2.54	.03	-1.59	.19	-2.00	.10
Madrasah	-	-	-1.95	.11	-1.92	.12
Primary School	-	-	1.62	.03	1.49	.05
FWA visit	-	-	-	-	1.14	.15
Constant	11.02	<.01	7.54	<.01	6.20	<.01
Adjusted R sq.	.04		.04		.07	

2.5 SUMMARY

This chapter uses multivariate regression analysis to model cluster level of CP, on selected cluster level variables, for both modern reversible methods and sterilization. For the modern reversible methods model, visits by NGO workers, distance to primary school and market are significant indicators of higher use prevalences. For sterilization acceptors, distance to primary school is the only significant predictor. For both models the coefficients are modest for any one variable.

However, the objective of this exercise was to identify important cluster level factors and include them in the subsequent study. For this purpose the factors identified in this chapter are the distances to girls' primary school, NGO and market. They were found to be important predictor variables in the 1989 BFS, and will be included in the study to follow.

CHAPTER 3

IN-DEPTH STUDY OF TWO EXTREME AREAS - DEWANBAZAR AND PANCHBIBI

3:1. INTRODUCTION

Chapter 2 reveals that socio-economic and intervention factors influence cluster-level contraceptive use. To study these effects in greater detail, this chapter examines the circumstances of two clusters of extreme contraceptive prevalence in rural Bangladesh.

To identify the various correlates of high and low use of modern methods in rural Bangladesh, an in-depth study was conducted on two rural clusters having extreme contraceptive prevalence (CP). One each of high prevalence and of low prevalence was chosen for this purpose. The study was a detailed interview of couples (questionnaires in Appendix B), mostly on Knowledge, Attitudes and Practices (KAP) of family planning (FP). It also included questions on influences of local community leaders on the contraceptive use of individual couples, their inter-spousal communications regarding FP and the diffusion process through which knowledge on FP had reached an individual. The main aim of this study was to provide hypotheses for the next phase of the main research. This chapter presents the results obtained from this study.

3.2. METHODS AND MATERIALS

Choice of methodology:

Since demography is one of the more numerate branches of the social sciences, the methods used in data collection have usually dealt with huge numbers for statistical validity. Researchers have argued that more intensive studies commonly reveal

contradictory findings at the individual level although a surprising consistency often emerges when the data are aggregated (Caldwell and Hill, 1988). While looking at social dynamics, many researchers have used a combination of anthropological as well as survey type questionnaires to combine micro-and macro-level information in a single consolidated piece of work. Micro level in-depth information from a single community enables the researcher to focus on the aspects of social dynamics that are under observation.

In this study, two rural clusters, each comprising of two villages were studied in detail. Individual level information was collected from respondents of these areas by formal questionnaires as well as open-ended discussions.

3.2.1 Objectives of the study

As discussed before in Section 3.2.1 large sample surveys elicit information in a totally different manner from small in-depth studies. The areal variations in contraceptive use in Bangladesh has been noted and remarked upon in several studies involving surveys (Mitra et al., 1992; Huq & Cleland, 1990). One study has looked at various aspects of low use areas (Neaz and Banu, 1992). There has been no research on detailed comparative description of areas where contraceptive use is low or high. The two clusters of extreme prevalence were chosen for in-depth study with a view to finding explanations for the differences in contraceptive use. The broad objective was to use non-structured questionnaires to find possible explanations for high and low use. The information gained from these two areas would be used in the main survey-type study to follow. The specific objectives of this in-depth survey may be summarized as follows:

1) To obtain information on the diffusion process of FP information.

2) To compare similarities of response among couples in the two clusters.

3) To compare access variables in the two areas.

4) To examine and compare the opinion of community leaders on contraceptive use in the two areas.

3.2.2 Design of the study

The basis of the study is the 1991 Contraceptive Prevalence Survey (CPS), which is the sixth in a series of similar surveys conducted since 1983. One of the clusters in this study had recorded sixty-nine percent CP which is one of the highest recorded in rural Bangladesh. Another cluster recorded eleven percent CP which is one among the lowest.

The 1991 CPS is a two-stage nationally representative survey of households, and clusters and households were chosen in the same manner as in 1989 BFS (Section 2.2). Usually each cluster was a village ranging from 150-500 households. If the number of households exceeded 500, two clusters were made. Similarly, if there were less than 150 households in a village, two villages were considered as one cluster. In this study both the clusters of interest comprise two neighbouring villages.

Both the villages are under the same 'Union' (lowest administrative unit). Female respondents who were interviewed earlier in the 1991 CPS were re-interviewed along with their husbands. In case of a missing respondent, random sampling was utilized to obtain a new household. Because the variable of interest is 'Ever use' of modern methods as well as inter-spousal communication regarding FP; women who were divorced, separated or widowed were excluded from this study. Women who were passed childbearing ages but whose husbands were available were retained. To avoid discussion bias, couples were interviewed at the same time. A total of one hundred and forty-nine couples were interviewed from the two clusters.

3.2.3 Description of fieldwork

The field work was conducted with five members forming a team. Under the author's supervision two experienced male and female investigators were employed. The area of high prevalence, Panchbibi, was visited in the month of September 1993. Residing in the cluster for a fortnight, both community-level and individual-level information was collected. Fieldwork in Dewanbazar was conducted in the month of October 1993. Here, Sultanpur village was the base of the team.

Knowledgeable people like the school master, local pharmacist, village head, and the like were taken as the key informants for community level information; while structured questionnaires and interviews were posed for individual level information (Appendix B). The team combined a variety of methods like informal discussions, in-depth interviews, and group discusssions to collect information. Special mention may be made to informal sessions of discussions between village women and the author on various FP related topics to find out their perceptions, beliefs and practices which would later form a basis for the main survey to follow. These usually took place after the structured interviews were completed. Women gathered under a tree near their bari and discussed various episodes in their lives along with answering questions posed to them. Tape recorders were used to record information in these informal discusssions, and texts were made from the recordings. Knowledgeable people were interviewed separately to retain privacy, taking tape recordings or field notes, and very in-depth information was obtained. This field study was completed by end of October 1993.

The experiences in the two clusters are as widely varied as the difference in their CPs. The following sections provide more detailed description of the information elicited

from this in-depth study.

3.3. DESCRIPTION OF STUDY AREAS

Dewanbazar - Cluster with lowest CP This cluster comprises two villages named Ratanpur and Sultanpur both in the union of Dewanbazar. The union is situated eight miles from Sylhet, which is a major city, accessible by bus service only and otherwise having very poor transport facilities. The administrative thana to which this union is assigned is Balaganj, which is thirty miles away from the villages. There are electric connections in the village, and TV sets are owned by some affluent families, but most of the population has no electricity. This union has the largest number of Madrasahs (Islamic schools) in Bangladesh. No women were seen working outdoors in the field. Even within the common bari or patrilineal compound, women were not visible.

The largest Madrasah in Bangladesh is situated here. Candidates compete from neighbouring villages to gain a place in this Madrasah (details in Section 2.3.1) which is also taught by famous 'Alems' (Learned Islamic scholar) of national repute. The area seemed very conservative, and unlike other villages of Bangladesh, 'purda' or seclusion is practiced rigorously. It is almost a model Muslim village because the residents are mostly Madrasah teachers or students and strongly influence the life of the common people.

The villagers are mostly illiterate, very poor almost to the point of starvation. There are no tubewells except in a few relatively affluent houses and the women use ponds for the purpose of washing clothes, bathing and drinking water. The principal livelihood is catching fish in the rivulets (*haor*) and selling in the local market. Other occupations include daily labourer, land owner, madrasah teacher, and small vendor.

Houses are extremely shanty, there is no sanitation. Access to each house is also quite difficult because of poor sanitation and bad roads.

Panchbibi - Cluster with highest CP

Panchbibi thana is under the district of Jaipurhat, which is in Rajshahi division. As in Dewanbazar, respondents from two villages Ramnagar and West Rasulpur comprise this cluster which had the highest recorded CP in rural Bangladesh in the 1991 CPS. The thana, is only nine miles away from Jaipurhat and very well connected by paved road and efficient bus services are available to major cities. The railway station in Jaipurhat is also a main junction connecting this area to other parts of the country.

The villages are only five kilometres away from the paved road in the thana and are quite well exposed to all amenities. The respondents are very poor and very few have electricity or TV, but the facilities are present nearby.

People seemed quite modern and women were seen working side by side with men in the paddy fields and in other agricultural jobs. Women flocked together going from house to house as our team went from door to door. They were also seen bathing in the river, young girls enjoying playful mirth around their own areas which was in complete contrast with the one witnessed in Dewanbazar. Young girls aged ten to twelve were seen riding bicycles to school, which is quite a remarkable situation for rural Bangladesh, in fact not even common in Dhaka, the capital.

The Panchbibi thana is also famous for having many schools and colleges which were established around 1954 by the wife of a renowned statesman who hailed from this area. It is interesting to note that female literacy is higher here compared to male literacy. One possible explanation may be that men start working at early ages and do not attend school, as they are expected to be the main bread earners. On the other hand, women have

an opportunity to be literate because of the existence of numerous schools in the area and also the fact that the atmosphere is congenial. The existence of girls' schools and girls' colleges in the thana over the years had certainly produced some literate mothers and it was their children who were now seen going to school riding bicycles.

In Dewanbazar, 'Mullahs' were seen walking around in groups which was not the case in Panchbibi. Women were seen in groups along with their husbands and other male members chatting away, carrying food for the husbands to the field and conveniently travelling in boats carrying vegetables for sale in the local market. Women prepared rice and vegetables as they talked about their private lives. If one respondent was sterilized, the knowledge was shared by almost all neighbours and women pointed out at each other and said 'She had her stomach cut (*pet kata*).'

Table 3.1 Characteristics of respondents from sample villages Dewanbazar and Panchbibi, Bangladesh 1993.

Characteristics	Dewanbazar	Panchbibi
Demographic variables		
Mean age	28.6	31.0
Currently pregnant	13.5	4.0
Mean no. of surviving children	3.2	2.7
% Literate female respondent	20.3	42.7
% Literate husband	24.4	26.7
Relative wealth of household		
Have tin or cement roof %	48.6	45.0
Have tin or cement wall %	8.2	8.0
Have cement floor %	1.4	1.3
Have tubewell %	9.5	12.7
Have electricity %	1.4	1.3
Access to FP		
Ever visited by FWA %	58.1	97.3
FWC in Union	No	Yes
Women's empowerment		
Involved with NGO %	20.0	21.3
Works for money %	13.5	22.7
N	**74**	**75**

3.3.1. Family Welfare Assistant (FWA)

Dewanbazar During the initial days of the family planning drive in Bangladesh in the late '70s, only one FWA was allotted to these villages. There were no qualified women applicants from this area. The area being so conservative and the nature of the job being unusual, the only applicant who applied had to be retained, while other vacancies remained unfulfilled. The selection criteria were relaxed and the FWA had completed grade five only (instead of ten). Neaz and Banu (1992) reported identical situations in other parts of Bangladesh where there is low contraceptive prevalence. This FWA had also given birth twice herself, accidentally after joining the job, and her own sense of responsibility seemed questionable.

She complained of having too many couples under her care from 1978 to 1990. She found it extremely difficult to work in this area. The entire society was against her and it was almost impossible to speak to the women in private. Usually, each house had a couple of sons who were studying in the Madrasah. These boys were constantly present in the house making it more difficult to access the women alone. The only possible efforts at motivation were those made to men who were willing to listen to her. Along with older religious men, older women also offered much resistance, specially during the initial years.

Hearing her speak of devices to stop childbearing was almost like hearing *Satan* speak. She tried to visit people at unusual hours when the men were away, but the houses were so close to each other that other male members leaked the information. Similar situations in other villages have been described in a study by Simmons et al. (1992) where FWAs narrated identical roles in the earlier days of FP drive, and claimed that it had changed towards a more respectable role now. However, the situation in Dewanbazar

matched the earlier description, indicating that the cultural and societal values in this area have not undergone much change since the late seventies.

Only couples in abject poverty accepted modern methods, but these were limited to pills or condom. In recent years injections have gained some popularity. Sterilization could not even be discussed. According to the 1991 CPS, there was a contraceptive prevalence rate of only eleven percent in Dewanbazar.

On the other hand, women in the area complained about the non-availability of the FWA and wrong advice during their hours of need. The FWA seemed extremely ill-informed about the insertion of IUD, safe period, and use of FP methods to avoid pregnancy among newly married couples.

In 1990, one new FWA was recruited and the number of couples for each FWA was reduced. At present, the original FWA is responsible for only one village (Ratanpur), out of the two in this study. The other village, Sultanpur has another FWA assigned to it. This new FWA was recruited in 1990 and resides in another union Fenchuganj. She has to travel twenty miles from there to visit her area of visitation. She was unmarried at the time of the study and had major limitations in travelling alone to and from the villages and her area of residence. Neaz and Banu (1992) have also found in their study that in lower performance areas there were thirty percent unmarried FWAs compared to only eleven percent in high performance areas. 'The primary cause of recruiting unmarried women is the shortage of married women who meet the education criteria' (Neaz and Banu, 1992).

Confidential in-depth interviews revealed that there was a greater demand for use of modern methods than that met by the present FWAs.

Majority of the women admitted knowing about limiting childbirth, they had also

heard that it is a sin to do so. They had heard about this mainly from the religious leaders. A well read religious man or 'Alem' seemed to have a major influence on the decision making role of the husband. It was perceived that wives were totally dominated by their husband's decision. One man replied that his wife will accept whatever he says (*Ja bolbo tai mene nibe*). One man said (regarding FP): 'It is a sin to hinder the will of God' (*Allahar icchai badha dewa naformani kaj*).

Community workers, however, did not have this opinion. They felt that a local lady would have been more welcome as an FWA in place of the newly recruited FWA. In the villages, knowing the family, having an association with the FWA's family, and knowing her personal background seemed very important.

Panchbibi The FWA situation in the village was almost a model. For each village there was one FWA. In West Rasulpur the FWA had been working for six years. Being married to a resident of this village she was like a daughter-in-law of the village. She resided in a concrete house, with electricity, and in the middle of the village. She seemed very popular among the inhabitants. Almost everyone mentioned her name as the first informant on family planning matters.

3.3.2. Family Welfare Centre (FWC)

Dewanbazar There is no formal Family Welfare Centre (FWC) in this area. There is a small structure in the form of one room which is called the Rural Health Centre (RHC). This is situated in the village of Sultanpur, Ratanpur village being within a mile. The nearest FWC is in Sylhet city which is eight miles away, and the facilities in Sylhet are not meant for use by the villagers. They are assigned to the thana Balaganj which is thirty miles away and in the opposite direction of Sylhet. The residents of the union tried appealing to the government for a proper FWC. A response to these appeals is yet to

materialise.

There is an urgent need for a proper FWC in this village which would also cover the neighbouring villages. Due to absence of cold storages, monthly rations of medicines and injections deteriorate on the way from Balaganj. Immunisations are administered on a first come first serve basis. People coming late in the day do not receive any and are disappointed. After repeated performance of this kind the villagers stop coming to the RHC altogether. In an earlier study using the 1989 BFS data, the author found that static FWCs did not play a significant role in the reproductive behaviour of the inhabitants of that area (Kamal, 1994).

Panchbibi No FWC existed in either of the two villages, but the FWC is in a third neighbouring village, Koria, under the same union. This FWC is very well attended by the inhabitants of the neighbouring villages and Koria itself, but villagers from Ramnagar or West Rasulpur (our study villages) found it too far (more than seven km) and did not frequent it. They are comfortably looked after by 'Satellite clinics' and Expanded Programme on Immunisation (EPI) clinics, and efficient FWAs.

Satellite clinics

These clinics are organised by the Government and are part of the greater FP programme. They are held in some convenient locations according to the need assessed by FWAs. The local FWV (Family Welfare Visitor) who is a paramedic assigned to each FWC is present at the satellite clinic. The clinic supplies pills, condoms, injections. It also inserts IUDs and refers cases for sterilization. Satellite clinics have been a very successful addition to the family planning programme in Bangladesh. In many villages where there are no FWCs the FP needs have been successfully covered by satellite clinics. Both in Ramnagar and West Rasulpur, these clinics were held three times a month and in various

locations. The clinics were very well attended. The venue and dates were well publicised ahead of time and couples found them more convenient than visiting FWCs.

Along with these, EPI clinics were also held regularly in these two villages. EPI clinics offer immunization to children for various diseases like measles, polio and tetanus. The EPI movement in Bangladesh is also a success story. It was also noticed that the FP and EPI staff had unusual cooperation between them in this area. As a result of this strong cooperation, satellite and EPI clinics were sometimes held side by the side on the same premises. This proved to be very successful. The observed motivation for couples to visit the EPI clinics was stronger than that to visit FP clinics and this cooperation had yielded strong results. It is worth replicating the same in other villages of Bangladesh, so as to incorporate Mother and Child care and FP under the same banner.

3.3.3 Non-Government Organisations (NGO)

Important NGOs presently active in Bangladesh

Grameen Bank The Grameen Bank, founded by Prof. Yunus (Hossain, 1988) is a very successful NGO in Bangladesh and has been accorded worldwide acclaim. It offers loans to groups of five persons, without any collateral and to be repaid at very low interest rates. This has encouraged couples to establish themselves in various schemes like fertilizer production, small poultry farms, bullock carts, vendor's cart, tailor shops, and other cottage industries (potteries, embroidery work, basket weaving). It has proved to be very successful and researchers have also shown that Grameen Bank beneficiaries (majority women) have lower fertility rates than their counterparts (Schuler et al., 1994; Kamal et al., 1992).

BRAC Bangladesh Rural Advancement Committee is another NGO which has shown high success rates. It has many laudable projects like the Food for Work programme,

schools for female children, and a house building project. Self reliant activities specially for women like cottage industries, culture of silk worms, poultry farm, etc are also features of this NGO.

Swanirvar Bangladesh This NGO has branches in various villages. It is an FP based NGO with specific goals of reducing fertility in their project areas. It employs local women (having only basic literacy) to supply free pills and condoms to couples in areas where the government FWA has an unusually large population. To avoid redundancy, these areas are pre-determined in consultation with the government. So far, the cooperation of Swanirvar with FWA's has enabled many areas to be covered exhaustively, and high CPs have been reported from such areas, enabling Swanirvar to be judged the best FP based NGO in 1992.

Dewanbazar There were no FP based NGOs in this area. Two main reasons may be identified for the absence of any other NGOs. Firstly and principally, the fact that the villagers are extremely conservative had hindered NGOs (specially foreign based NGOs) from selecting this as a site. Secondly, the area lacked proper road communications with the major city Sylhet and had no telephone link. NGOs have found it difficult to select sites which are so remote. Neaz and Banu also found that in low prevalence areas there are no FP based NGOs (1992).

However, Grameen Bank had a branch nearby, and some respondents (20%) were members of the Grameen Bank.

Panchbibi

Grameen Bank There was a head office of Grameen bank in this union only five kilometres from both the villages. This branch was opened in 1989 and has beneficiaries in both Ramnagar and West Rasulpur (our study villages). Of our sample, only fifteen

couples (20%) were involved with the Grameen bank. This is quite a low figure considering the fact that people seem highly motivated in this area and communications are far better than Dewanbazar where the sample shows the same number of couples involved.

BRAC There were few respondents who were members of BRAC.

Swanirvar This NGO had a branch very near (5 km) from the two villages, and Swanirvar workers distribute pills and condoms in areas where the FWAs did not go. Many respondents also mentioned Swanirvar workers as their first informants on FP matters.

It was also observed that in both clusters, bari members were either participating with BRAC, Swanirvor or Grameen Bank, there were no members from the same bari who participated in different NGOs.

3.3.4. Public facilities

Dewanbazar There were some local primary schools. Young girls aged nine or ten were seen with their books, going to school, every inch covered in veil (*chadar)* in observance of purdah.

The nearest railway station was in Sylhet which is eight miles away and very poorly connected with Dewanbazar. There were no public or private telephones in this union.

Panchbibi In this union there were several primary and high schools for both boys and girls. There was a girls' college established by the wife of a famous politician. Chapter 2 has already shown the positive effect of primary schools on cluster proportion of use of both modern reversible methods and adoption of permanent methods.

A central railway station and bus station were located in this thana. Post office and

telegram facilities were available.

3.3.5. Community Leaders

Dewanbazar As mentioned earlier, this union is situated thirty miles away from the thana to which it is attached. As a result it was not possible to meet the Thana Family Planning Officer of this area. However, it was possible to have conversations with other community leaders like the pharmacist in the village RHC and Union Council Chairman (details are given in Section 1.4). The pharmacist was acutely aware of the lack of health and FP facilities, as well as low use in the area. The Union Council Chairman was totally unaware of the problem, but he did not seem opposed to any new FP based development programmes.

Panchbibi The community leaders in Panchbibi thana deserve special mention because they have been acting as catalysts towards enhancing the CP in this area. The whole success seemed like a joint effort from all sides. The bureaucrat in charge of the area, the Union Council Chairman as well as the Thana Family Planning Officer were concerted in their efforts to lower fertility, increase contraceptive use and acheive modern standards.

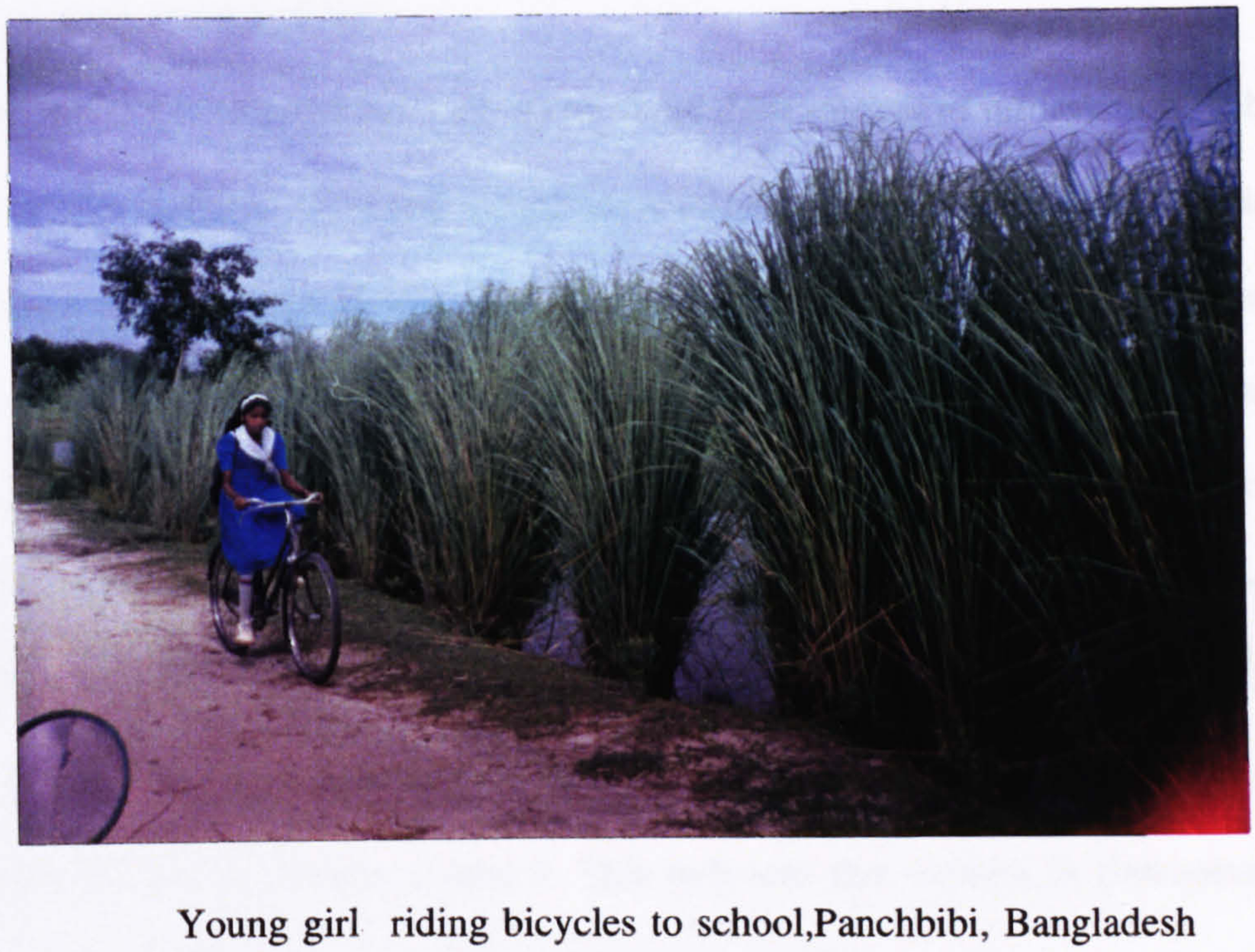
Table 3.2 Summary of access and other cluster-level variables in Dewanbazar and Panchbibi, Bangladesh 1993.

Variables	Dewanbazar	Panchbibi
Access variables.		
FWA in the cluster	Yes	Yes
FWA resides within 5 km.	No	Yes
FWA educated beyond primary level.	No	Yes
FWA recruited in year.	1978	1978
Population covered by FWA in 1978.	10,000	7500
Total no of FWAs in Union	2	5
Marital status of FWAS married/single.	1/1	4/1
FWC in cluster.	No	No
FWC in Union.	No	Yes
FP clinics held.	No	Yes
EPI clinics held.	No	Yes
FP based NGO present within 5 km of cluster	No	Yes
Other NGOs present within 5 km of cluster	Yes	Yes
FP shop within 5 km of cluster.	Yes	Yes
Educational variables		
Madrasah within 5 km.	Yes	No
Girls' primary school within 5 km.	Yes	Yes
Girls' secondary school within 5 km.	No	Yes
Communications variable		
Paved road within 5 km.	No	Yes
Railway station within 8 km.	No	Yes
Public TV within 5 km.	Yes	Yes
Post office within 5 km.	No	Yes
Economic variable.		
Market held within 5 km.	Yes	Yes

Rural Health Centre with pharmacist and field workers, Dewanbazar, Bangladesh 1993.

Family Welfare Centre, with FWAs and Thana Family Planning Officer and his motor bike, Panchbibi, Bangladesh 1993.

Young girls going to school in 'purdah', Dewanbazar, Bangladesh



Young girl riding bicycles to school,Panchbibi, Bangladesh

3.4 DIFFUSION OF INFORMATION AND FERTILITY PREFERENCES

The Government of Bangladesh has made continuous efforts towards propagating the knowledge of family planning in all areas of Bangladesh. Since the introduction of the first five year plan in 1976, the mass media has embarked upon a massive promotion of family planning. Radio, television and the cinema broadcast popular programmes advertising pills and condoms, and also motivate people to have smaller families. The introduction of FWAs was also conceived with the idea of taking FP information to various remote parts where radio and television are scarce. The 1991 CPS found that 98 percent of the women in the sample had heard of family planning (Mitra et al., 1992). In a rural traditional society most information is shared by members of the common 'bari' (details of bari are given in Chapter 5). Neighbours and relatives are also prime sources of information, both good and bad.

In this study the respondents were asked about their sources of information. Table 3.3 presents various variables regarding the diffusion of information about family planning for both areas in this study. In Dewanbazar 97 percent women had heard about FP and in Panchbibi it was 100 percent. The majority of women had heard about FP from family planning workers (60 and 64 percents). Among others who were first informants both samples mentioned relatives as the main source. Almost all women in Panchbibi were visited by FWAs in the last three months, whereas only 75 percent women were visited in Dewanbazar. In Panchbibi only 24 percent of women ever visited the FWC whereas in Dewanbazar 58 percent women visited it. This indicates that women in Dewanbazar may not visit the health centre even when it is located nearby.

Most women had heard some unfavourable reports about FP methods. The source of such reports in both were the 'bari heads'. In Panchbibi, 37 percent women thought

someone disapproved of family planning, while in Dewanbazar this was 63 percent. This shows the difference in perceived disapproval of FP practices in the two areas.

Table 3.3 Frequency distribution of selected variables on diffusion of FP information, and fertility preferences, Dewanbazar and Panchbibi, Bangladesh 1993.

Variable	Category	Dewanbazar		Panchbibi	
Have you heard about FP?	Yes	71	97.3	75	100.0
	No	3	2.7	0	0.0
Who did you first hear from?	Relative	13	17.6	13	17.3
	Bari member	4	5.4	1	1.3
	FWA	45	60.8	48	64.0
	Doctor	1	1.4	0	0.0
	Radio	6	8.1	4	5.3
	Others	3	4.0	9	12.0
	NA	2	2.7	0	0.0
Motivation of seeking FP information	FWA motivated	43	58.1	43	57.3
	Sought	1	1.4	10	13.3
	voluntarily	20	27.0	15	20.0
	Met by chance	10	13.5	9	9.3
	Don't know				
Were you visited by an FWA in the last three months?	Yes	56	75.7	73	97.3
	No	18	24.3	2	2.7
Have you heard any unfavourable reports regarding FP methods?	Yes	39	52.7	33	44.0
	No	35	47.3	42	56.0
From whom did you hear unfavourable reports	Chairman	9	12.1	11	14.7
	Religious leader	7	9.5	0	0.0
	Bari head	16	21.6	12	16.0
	Relative	1	1.3	2	2.7
	Others	6	8.1	7	9.3
	NA	35	47.3	43	57.3
Who, in your opinion disapproves FP?	Husband	12	16.2	3	4.0
	Father-in-law	2	2.7	0	0.0
	Bari member	2	2.7	0	0.0
	Other relative	12	16.2	6	8.0
	Neighbour	18	24.3	14	18.7
	Others,non-relative	1	1.4	5	6.7
	NA	27	36.5	47	62.7
Have you/spouse ever used modern contraceptives?	User	11	14.9	65	86.7
	Non-user	63	85.1	10	13.3
Want more children in future?	Yes	28	37.8	24	32.0
	No	46	62.2	51	68.0
Desired family size		3.55		2.49	
N		**74**		**75**	

Table 3.3 also shows that the percentage of women wanting no more children in the future is almost the same in both areas. However, the desired family size differs significantly in the two areas, Panchbibi respondents desiring one fewer child compared to respondents in Dewanbazar. This is an important finding indicating that family size preferences may be high in areas where contraceptive use is low and might account for between-cluster variation. However, during the data collection it was observed that women had not really thought about the ideal family size, and getting responses to these questions was very difficult. Most women, specially in Dewanbazar did not want to answer it, they even thought that it was a bad omen to wish for fewer children than what they had. They would rationalise this sentiment by stating that the number of children that they presently have is what they think is the desired family size. Hence the vailidity of this question and the figures that they yield were not fully guaranteed. This question was not, therefore, included in the main survey (Chapter 4).

3.5. SIMILARITIES IN RESPONSES

Women's role in Bangladesh may best be described by the title of an article 'Birds in a cage' (Adnan, 1988). In this traditional Muslim society, women are expected to remain passive partners and most decisions are taken by the male alone. 'Despite increasing consciousness of possible control of family size, such discussion is traditionally not expected, and many couples do not have a relationship conducive to such discussion' (Aziz & Maloney, 1985). Although the last few years have witnessed some changes, not all walks of life have afforded the same degree of freedom to the female members of the population. Demographers posit that 'An important criteria for successful contraceptive

behaviour is the degree of communication between spouses' (Kane & Sivasubramaniam, 1989). In Bangladesh, Shahidullah and Chakroborty (1993) found the variable 'inter-spousal discussions on FP' to be a positive predictor of CP, using the 1989 BFS. This section examines the consistency of responses among couples in the two study areas of extreme prevalence. The objective of this exercise is to examine if high cluster-level contraceptive use is correlated with greater consistency in responses, indicating more interspousal communications among couples from the cluster. To examine the similarities a measure called a Kappa statistic is used.

3.5.1. Kappa Statistic

'The Kappa coefficient of agreement is the ratio of the proportion of times that the raters agree (corrected for chance agreement) to the maximum proportion of times that the raters could agree (corrected for chance agreement)' (Seigel and Castellan, 1988). One drawback of this measure is that it can only be used for variables which have the same number of classifications.

3.5.2 Calculation of Kappa

Kappa is calculated from the observed and expected frequencies on the diagonal of a square table of frequencies (Altman, 1991). If there are n observations in g categories, then the observed proportional agreement is

$$p_0 = \sum_{1}^{g} \frac{f_{ii}}{n}$$

where f_{ii} is the number of agreements for category i.

The expected proportion of agreements by chance is given by:

$$p_e = \sum_{1}^{g} \frac{r_i c_i}{n^2}$$

where r_i and c_i are the row and column totals for the ith category.

The index of agreement kappa is given by

$$K = \frac{p_0 - p_e}{1 - p_e}$$

3.5.3. Interpretation of Kappa

The interpretation of the Kappa measure is quite simple. For a perfect agreement the value of Kappa should be 1.00. A value of zero indicates no agreement greater than chance, and negative values show worse than chance agreement. The values between 0 and 1 may be interpreted as follows (Altman, 1991):

Table 3.4 Interpretation of Kappa statistic

Value of kappa	Strength of agreement
Poor	<.20
Fair	0.21-0.40
Moderate	0.41-0.60
Good	0.61-0.80
Very good	0.80-1.00

3.5.4. Findings

Table 3.5 and 3.6 present the responses and consistencies of some selected variables including access variables for both the study areas. In Table 3.5 it is observed that mostly there is poor agreement between spouses responses in Dewanbazar. The

response to the question on ever use of modern contraceptives shows fair agreement, while that on current pregnancy shows good agreement. Both men and women have heard 'unfavourable reports' and show fair agreement in their responses. Kane and Sivasubramaniam (1989) found that in Sri Lanka more male respondents volunteered information on usage of male methods while corresponding female respondents denied usage. However, it was exactly the reverse in Dewanbazar, where women seemed to use contraceptives without the knowledge of their spouses. The response to 'Want more children in future' (Table 3.6) also shows moderate agreement, all other responses on fertility preferences and access variables show poor agreement. Communication with each other on FP (Table 3.6) also has poor agreement for Dewanbazar.

For Panchbibi, the agreements are better. Spouses show 'good' agreement on ever use of modern contraceptives, indicating both spouses being aware of usage. The question on whether 'currently pregnant' also shows good agreement. In Table 3.5 all other variables show poor agreement except the visits by FWA in last three months which show moderate agreement. In Table 3.6 for Panchbibi, the agreements are certainly better than those in Dewanbazar. Moderate agreement is observed in response to 'Whether want more children in future', as well as 'future use of FP' indicating that spouses have similar fertility preferences which is highly conducive of higher contraceptive usage (Kane & Sivasubramaniam, 1989). There is 'fair' agreement in 'Discussed with husband about FP use' and also 'moderate' agreement in 'How many girls thought to be ideal', but 'poor' agreement in 'How many boys thought to be ideal'. It is felt that in Panchbibi spouses are agreeing on the number of daughters in the family, but there remains disagreements about the number of sons in the family.

Table 3.5 Spouses responses and strength of similarity in selected variables,Panchbibi and Dewanbazar, Bangladesh 1993.

Variable		Dewanbazar				Panchbibi			
		Wife	Hus-band	% same	Kappa	Wife	Hus-band	% same	Kappa
Are you/your wife currently pregnant?									
	Yes	10	10	91.8	.713	3	4	93.0	.725
	No	61	63			72	71		
	Don't Know	3	1			0	0		
Have you/spouse ever used modern methods of contraception?	Yes	20	11	85.1	.401	65	65	92.0	.653
	No	54	63			10	10		
Have you heard any unfavourable reports on FP?	Yes	39	16	58.1	.187	33	7	55.0	.004
	No	35	58			42	68		
About which method did you hear unfavourable reports?	Pill	9	2	52.7	.339	5	2	56.0	.050
	All	30	14			19	4		
	NA	35	58			43	68		
	Others	0	0			8	1		
Did FWA visit you/spouse in last three months?	Yes	51	50	66.2	.361	73	66	88.0	.564
	No	23	24			2	9		
Did FWA discuss FP during the visit?	Not visited	43	28	56.6	.159	28	36	56.0	.292
	Did not discuss	3	5			10	12		
	Yes, discussed	28	41			37	37		
Do you/spouse ever visit FWC or RHC?	Yes	43	62	63.5	.180	22	63	61.0	.148
	No	31	12			53	51		
N		**74**	**74**			**75**	**75**		

Table 3.6 Spouses responses and strength of similarity in fertility preferences,Panchbibi and Dewanbazar, Bangladesh 1993.

Variable		Dewanbazar				Panchbibi			
		Wife	Husband	% same	Kappa	Wife	Husband	% same	Kappa
Want more children in future?	Yes	28	27	72.9	.459	24	21	80.0	.544
	No	44	45			50	53		
	Don't Know	2	2			1	1		
Will you use modern FP in future?	Yes	30	26	43.2	.115	69	68	89.0	.443
	No	44	48			6	7		
How many boys do you think is ideal in a family?	0	2	1	43.2	.038	2	1	63.0	.190
	1	15	23			52	51		
	2	43	43			17	21		
	3	8	4			3	1		
	4	6	5			1	1		
How many girls do you think is ideal in a family?	0	0	0	45.9	.027	2	2	84.0	.471
	1	41	40			62	62		
	2	26	30			8	9		
	3	5	2			2	1		
	4	2	2			1	1		
N		**74**	**74**			**75**	**75**		

The findings from the analysis of inter-spousal communications in Panchbibi and Dewanbazar offer a new dimension to the interpretation of reproductive behaviour of rural women in Bangladesh. The two study areas are total contrasts as already described in previous sections of this chapter. One would expect that in the two areas inter-spousal communications would also be a contrast, it would be high in Panchbibi and low in Dewanbazar. The analysis presented in Tables 3.5 and 3.6 negates this hypothesis. In fact, the analysis finds that although a few questions do have moderate/good agreement (Kappa=0.4-0.6, 0.6-0.8) between spouses, in most questions the Kappa statistic shows poor agreement for both Dewanbazar and Panchbibi. This result strongly indicates that in rural Bangladesh higher use of modern contraceptives is not associated with greater inter-spousal communications. Although women in Panchbibi do not appear to commmunicate particularly well with their husbands, they continue to be users, it may be that they make

more use of freedom to discuss FP with fellow users, or FP workers, or have more mobility to travel to satellite clinics or health centres. Previous studies of the 1989 BFS have found women's mobility and decision making role in the family to be important indicators of use of modern contraceptives in Bangladesh (Kamal & Sloggett, 1993). This result does not contradict the previous study but suggests that greater inter-spousal communication is not a prerequisite for greater use of contraception, and woman's mobility and personal decision making may be more important.

3.6 SUMMARY

This chapter presented a detailed description of an in-depth study conducted in two rural clusters in Bangladesh. The clusters were both chosen by the 1991 CPS survey, and results from that survey found Panchbibi of Rajshahi division to have one of the highest CP in Bangladesh, and Dewanbazar of Chittagong division to have one of the lowest CP. Both the clusters comprised households from two neighbouring villages. In both clusters around seventy-five couples were interviewed simultaneously.

In general, it was felt that causes for low prevalence in Dewanbazar was principally the effect of extreme religiosity and conservatism. It was also compounded by lack of development of roads and highways linking the area to nearby larger cities and public facilities. The absence of a resident FWA was found to be another major cause, as many women were eager to accept contraception and were not doing so because of non-availability. Low prevalence was further aggravated by the lack of an FWC in the union and absence of any FP based NGO. The union is attached to an administrative thana which is thirty miles away and lack of proper communications negate all kinds of development efforts enjoyed elsewhere in rural unions of the same standing. Interviews

revealed that inter-spousal communication regarding childbearing and family planning is not very common and women are daunted by their husbands. Some (fifty percent) women had heard unfavourable reports about FP and some men still considered it a sin. Although one would presuppose that under such circumstances there would be no users, the demand side seemed very encouraging. Private conversations revealed that women were secretly willing to use contraceptives, and even though men might impose religious guilt on them. It was felt that along with other parts of rural Bangladesh, women in Dewanbazar were ready to accept modern methods even if their husbands did not concur.

On the other hand, Panchbibi thana illustrated almost a role model for Bangladesh and other third world countries in similar situations. The village had greeted the FP drive from the very early stages of its ensuance in 1976 and each of the FWAs serving in this union, the FWC staff, satellite clinics, are one success story after the other. The marriage of EPI to FP clinics seemed to have an enormous impact on the CP. One main reason for such ease of legitimisation of FP in the early days and henceforth, may be the lack of any religious opposition from the religious leaders of this community. Remarks from a study by Amin. et. al (1994) 'The fertility decline in Bangladesh has also been facilitated by Bengali Muslim culture, characterized by the absence of a pro-natalistic stand' seemed to be supported in this area.

The roads, highways, post office, telephone, and public television were also very well developed adding to the pace of supply and influx of modern ideas into the otherwise rural and poor society. Similarities in responses between spouses are not remarkably different from Dewanbazar. Overall agreement was slightly better regarding decisions and communications on family planning use. Other responses had poor agreement like Dewanbazar. This is a remarkable finding, in view of the fact that demographers have

posited that good inter-spousal communication facilitates successful contraceptive behaviour, and this study seems to negate the hypothesis. It also suggests that other variables like women's autonomy and mobility may be more important for contraceptive use in rural Bangladesh.

The poverty level in the two clusters was almost identical. This was obtained from socio-economic indicators such as house material, presence of electricity, ownership of tubewell (data not presented here). In both areas the percentage of women reporting wanting no more children was found to be very similar, but the reported ideal family size was somewhat different, being greater by one child in Dewanbazar. However, responses to the reported ideal family size was not thought to be so reliable as a measure of fertility preferences. Perceived disapproval of FP practices seemed almost double in Dewanbazar compared to those in Panchbibi.

This study brought out the possible differences in high use and low use clusters of rural Bangladesh and the variables that were thought to be important may be summarised as follows:

1) Individual level: number of living children, age, education and relationship with bari head.

2) Bari head's characteristics: Age, education, religiosity, use status, attitude towards FP, leadership qualities.

3) Bari level variables: socio-economic, education of bari girls, participation with any NGO.

4) Community level:

a) Access variables : Distance to FWC, FWA's residence.

b) Attributes of FWAs: Her level of education, professional training, marital status,

socio-economic status, influence in society and family support towards the job.

c) Communication variables:

Distance to paved road or railway

Distance to public TV or post office.

A combination of variables obtained from results in Chapter 2 and experiences in Chapter 3, as well as variables from previous studies, formed the basis for selection of variables in the main study which is described in Chapter 4.

CHAPTER 4

CLUSTER SURVEY AND FWA SURVEY

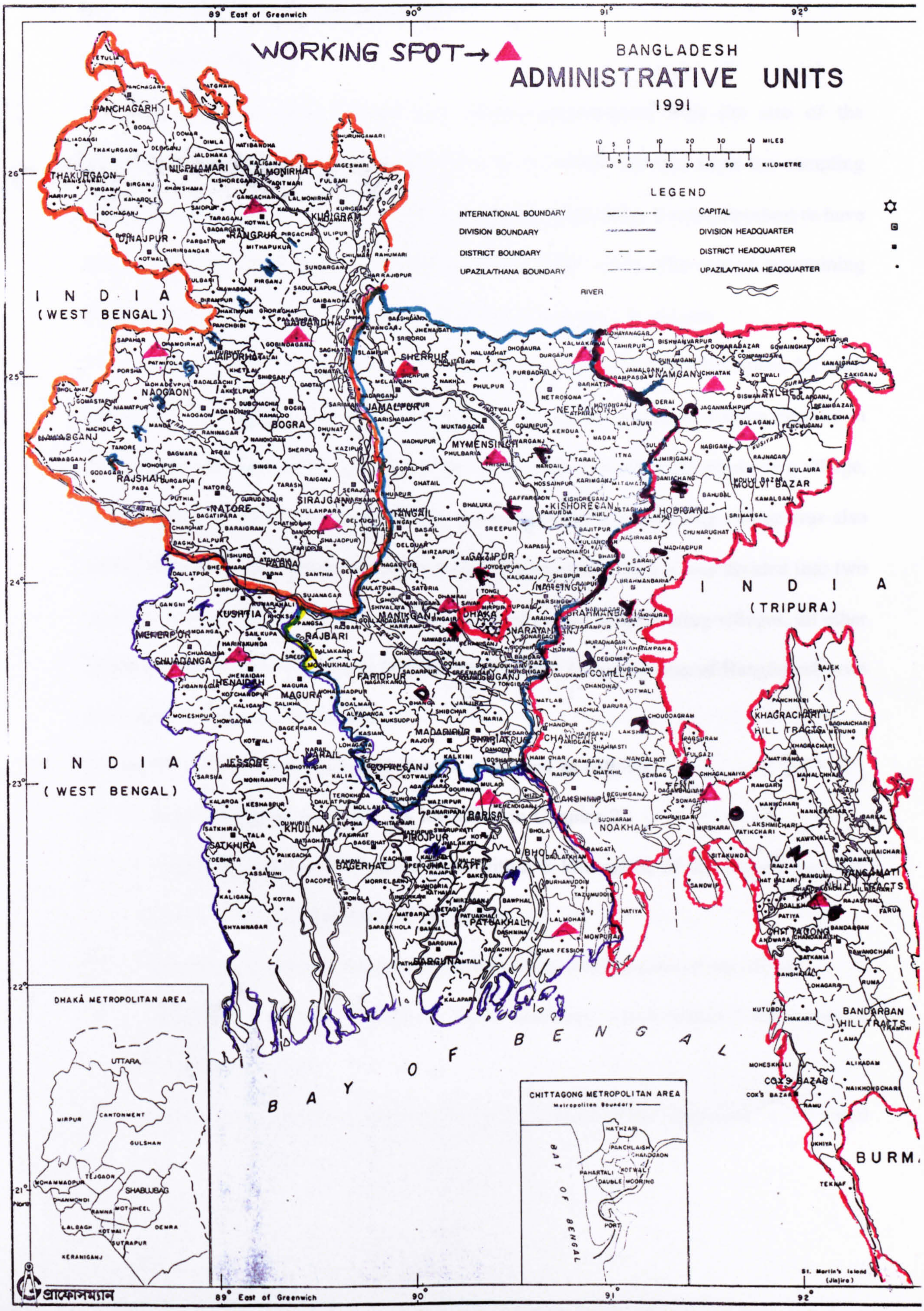
4.1 INTRODUCTION

Experiences presented from the two clusters described in Chapter 3 indicates that the cluster level variation in contraceptive use may be due to cluster-level access variables and indicators of modernity, as well as differences in degree of religiosity of the inhabitants of the cluster. The question arises, are these differences in macro-level access and economic indicator variables, as well as religiosity, persistent in other clusters of Bangladesh? If so, do they contribute to the explanation of areal variations of contraceptive use?

In the next phase of the research, structured questionnaires were used to elicit information on use of modern contraceptives. As described in Chapter 1, this included a cluster survey, bari survey, bari head survey, FWA survey and eligible women survey.

This chapter examines the data obtained from the cluster survey and the FWA survey. The chapter is divided into two sections. The first section describes the sixteen rural clusters observed in this study. The second section analyzes data obtained from the FWA survey, particularly contraceptive prevalence as recorded in FWA registers. The objective of this analysis is to relate personal and professional attributes of FWAs with contraceptive prevalence in their area of activity. These relations will form a basis for multilevel models at a later stage.

Fig 4.1 Map of Bangladesh showing clusters surveyed, 1994.



4.2 METHODS AND MATERIALS

4.2.1. Cluster Survey

In the 1991 CPS, clusters were chosen proportionate with the size of the administrative divisions of Bangladesh (Mitra et al., 1992). For this study the sampling design had to be realistic to remain within budgetary restrictions. It was important to have as many clusters as possible for efficient modelling (Mok, 1995). The cost of maintaining teams in the field allowed a maximum of sixteen clusters to be chosen.

Four clusters were randomly selected from among the 1991 CPS clusters, for each of the four administrative divisions of Bangladesh, making a total of sixteen clusters in all. Each cluster was a collection of 150-500 households. Usually, each cluster is a village, if there were less than 150 households in the village then the adjoining village was also added. Similarly, if a village had more than 500 households then it was divided into two clusters. In this sample, only two clusters consisted of two neighbouring villages, all other fourteen clusters were villages by themselves. Figure 4.1 shows a map of Bangladesh with the sample clusters as dotted marks.

Cluster level information collected may be classified as follows:

1) Communication variables: As identified in Chapter 2.

   Post office, public TV, paved road within 5 kilometres of the cluster, and rail station within 8 kilometres of the cluster.

2) Economic variable: Presence of market within 5 kilometres of the cluster.

3) Educational variable: Presence of girls' secondary school within 5 kilometres of the cluster.

4) Indirect intervention variables: Presence of NGO, FWC, presence of FP retail

outlet within 5 kilometres of the cluster.

5) Direct intervention variables: Proximity to FWA's residence and year recruited.

4.2.2. Variables in Cluster Survey

Communication variables Analysis of the rural BFS 1989 (Chapter 2) found four communication variables to have an influence on cluster-level contraceptive prevalence rates. These four variables viz distance to public TV, post office, paved road and railway, were collected as cluster level communication variables. Prinicpal component analysis of cluster-level information from 170 clusters had found distinct grouping of these variables (Sectioon 2.3.1). Distances to paved road and railway could be considered one factor, while distance to public TV and post office could form another. The justifications of choosing these variables are the same as those in Chapter 2.

Economic variable Chapter 2 also found the distance to a market to be an important correlate of cluster level contraceptive prevalence, especially in the proportion of modern reversible method users.

Educational variable In the analysis of 1989 BFS (Chapter 2), presence of a primary school within 5 km of the cluster was found to be a significant determinant of cluster level contraceptive rates for both modern reversible methods and sterilization. Since 1991 the Government of Bangladesh has encouraged female education especially in rural Bangladesh, and has built numerous primary schools. The presence of a primary school was no longer variable amongst clusters, because each cluster in our sample had numerous primary schools. The government has also made female education free up to grade eight, and many areas where there were girls' secondary schools have benefitted from this policy. In the field work in Panchbibi and Dewanbazar (Chapter 3), it was observed that cluster literacy rates specially those of women, were affected by the proximity to girls'

secondary school. Because secondary school for girls has been made free by the government, those clusters where secondary schools are within 5 kilometres may have benefitted more showing higher literacy rates. In fact, a 22.1 percent contraceptive prevalence amongst girls aged 10-14 has been noticed in the most recent demographic survey of Bangladesh (Mitra et al., 1994). This figure was only 8.1 percent in the 1991 CPS. This steep increase could be due to increased educational opportunities of Bangladeshi women, along with increased FP activities. Researchers have previously found a high correlation of contraceptive use with educational levels in Bangladesh (Cleland et al., 1995). It is possible that free secondary education for girls may have had a positive effect on the CPs of this age group. Hence this variable was included in the study.

Indirect intervention variables

Distance to NGO The importance of the NGO sector in the increased use of FP in Bangladesh has been remarked upon by several researchers (Shahidullah and Chakroborty, 1993). It was also found that non-FP based NGOs also had an effect on higher use of contraceptives in the area (Schuler and Hashemi, 1994; Kamal et al., 1992). In Chapter 2 , the visits by NGO workers were found to have significant association with percentage of sterilization acceptors. Hence, this variable was included in the study.

Distance to FP retail outlets This variable was also found to have a significant association with cluster percentage of use of modern methods of contraception specially those of modern reversible methods. The 1991 CPS found that local shops and pharmacies provide thirteen percent of the modern reversible methods. This was the largest source excluding FWA and static FP clinics (Mitra et al., 1992). Hence, it was included in the survey.

Distance to FWC Since the static health centre is also an important part of the National Family Planning Programme in providing direct services to people, various features of the FWC were collected in the Cluster Survey. These include whether there is an FWC in the cluster and/or union, distance to the FWC, and the year FWC was established.

Direct intervention variables

FWA characteristics Because the doorstep services are provided by FWA workers, it is likely that various characteristics of the FWA will correlate with cluster level CPs. Whether there is an FWA in the cluster, distance to the residence of the FWA, year FWA was recruited in the cluster, were recorded in the Cluster Survey.

4.2.3. FWA Survey

Each cluster in this study is part of a union. All FWAs working in the sixteen unions were interviewed in structured questionnaires resulting in a total of 80 interviews. The interviews were conducted by the author herself, aided by a research assistant who worked as the supervisor for the rest of the field workers. Before visiting each cluster, the Thana Family Planning Officer was notified of the arrival date of the field team along with the author. He was also asked to inform all FWAs to arrive at an assigned venue (usually the FWC, if it exists) in the cluster on an assigned day. On that day, the author took the interviews and had informal discussions with the FWAs of that area. The FWAs also brought with them their register books which carried records of each user, her method, date of commencement, etc.

On each occasion, information collected from the field work on use status of women was matched with that of the FWA registers. The total of sixteen clusters achieved a 99 percent match thus implying high quality of both the field work and reliability of the FWA registers. In subsequent data analysis CPs from the FWA registers were therefore

considered a reliable measure.

4.3. DESCRIPTION OF SIXTEEN RURAL CLUSTERS

In Bangladesh, a village is a distinct geographical area with a name given by local people and used by the census authority and by the civil administration (Rahman, 1986). Although a village is composed of many separate families, it has certain social and economic characteristics which make it a complete social unit (Bertocci, 1969; Mukherjee, 1971). A village provides a common socio-cultural environment for its residents, and facilitates informal communication and interaction. Studies have found village level differences to be significant correlates of fertility (Balk, 1994; Rahman, 1986).

The rural clusters in this study are either one village or two neighbouring villages (only two clusters). Thus clusters have similar connotation and characteristics as villages in as much as they are distinct geographical areas sharing common characteristics like schools, roads, post office etc., as well as socio-cultural attributes.

Table 4.1 presents the average CPs of the four administrative divisions of Bangladesh and the clusters under study, as obtained in the 1991 CPS and the present study in 1994.

4.3.1. Dhaka division

The 1991 CPS found an average of 31 percent CP for Dhaka division. Out of the four sample clusters randomly selected in this study, two (Benua and Bakarkanda) had lower than average CPs and two (Nannar and Dhanikhola) had higher than average CPs found in the 1991 CPS.

Of the two higher than average clusters, **Nannar** is closer to the capital Dhaka, has a FWC, the population is 66 percent Muslim and the rest mainly Hindus. The FWAs

seemed very efficient and the FP drive seemed to have reached everyone. The communications with the capital and the other areas were well developed.

Dhanikhola, with second highest CPs among Dhaka division clusters in the 1991 CPS, is like a model cluster. People are quite educated (male literacy 45 percent in 1994), there are many schools, NGOs, and a FWC, staffed with very enthusiastic FWAs.

Table 4.1 Comparison of CPs of study clusters in 1991 CPS and 1994 Cluster survey,Bangladesh 1994.

Division and name of cluster	Percent Ever User of Modern methods			
	'91 CPS	N	'94 Study	N
Dhaka division				
Nannar	79.8	114	68.0	189
Bakarkanda	60.4	111	56.0	188
Dhanikhola	73.3	105	51.0	212
Benua	38.2	89	25.0	195
Chittagong division				
Abdul Nabi	42.4	125	33.0	222
Dewanbazar	23.8	84	34.0	121
Kadhur Khil	75.9	116	76.0	239
Fakirtilla	70.1	77	60.0	181
Khulna division				
Jalalabad	51.9	106	54.0	209
Charsakina	57.1	119	43.0	338
Kapasdanga	70.9	134	54.0	170
Sura	74.8	123	56.0	210
Rajshahi division				
Jagjibanpur	62.4	85	58.0	172
Uttar Khaleya	55.7	79	42.0	172
Amair	62.1	58	68.0	155
Chandipur	46.9	81	57.0	192

The one with lowest CP (25 percent), **Benua** (a cluster of two villages Benua and Bishnupur) is a remote village in Netrokona, near Chittagong division (known to have low CPs), inaccesible by paved roads, people seemed conservative, there is no FWC and the residence of the FWA is more than 5 kilometres from the cluster.

The cluster **Bakarkanda** too has very poor communications, people are very poor, but the FWAs seemed to be very motivated although they live more than 5 kilometres from the cluster, the CPs are very high.

4.3.2. Chittagong division

Chittagong division has always had lower CPs compared to the three other administrative divisions of Bangladesh (Table 2.1, Chapter 2). In the 1991 CPS the average CP of Chittagong was 20.5 percent, which is 10.8 percent lower than the national average. The sample clusters for this study had two clusters (Sultanpur and Abdul Nabi) with CPs lower than the average CP of Chittagong division in 1991 CPS and two (Kadhur Khil and Fakirtilla) with CPs higher than average.

Fakirtilla deserves special mention because the sample covers a population of cement factory workers, who are not necessarily local residents of Chittagong division. The male literacy rate is 87 percent, almost double compared to 46 percent which is the average male literacy for the sixteen clusters under study. There is a private family planning clinic for the cement factory workers, hence this area has added access to FP apart from government sponsored FWA and FWCs. It must be considered an exceptional case and also explains the unusual difference between clusters in the Chittagong division, especially amongst its neighbouring clusters which show as low as 13 percent CP (Sultanpur).

In **Kadhur Khil** too, the CP is very high. There are efficient FWAs working since the onset of the initial FP drive in 1976. There is also a FWC established in 1979, and The population is 50 percent Muslims and the rest are mainly Hindus, and perceived religious barriers seemed absent.

In **Dewanbazar** (a cluster of two villages Sultanpur and Rasulpur), perceived

religiosity seemed very high, Madrasahs abound and with the absence of a FWC and a FWA with poor education and training the CPs in the 1991 CPS was very low. This area seemed to have increased 'ever use' since 1991. A new FWA has been recruited (since 1991), and methods like injections have gained popularity, although sterilization is still lagging behind.

Similar situations prevail in the cluster called **Abdul Nabi**. Although there are three FWAs working here (a large cluster), perceived conservatism is high. People consider use of contraceptives to be a sin, specially acceptance of sterilization.

4.3.3. Khulna division

Khulna division had 34.6 percent CP in the 1991 CPS. Among the clusters chosen for this study, two clusters (Jalalabad and Charsakina) had lower than average CP while two clusters (Kapasdanga and Sura) had slightly higher than average CP.

The general atmosphere seemed congenial to FP use in **Jalalabad**. Although the FWAs working there did not seem very motivated, there was no perceived conservatism, and people seemed motivated themselves.

The cluster **Charsakina** is in district Bhola, near the Bay of Bengal and most frequently affected by tidal waves, storm and tornadoes. The area is remote and although the FWA seemed highly motivated, perceived religious conservatism seemed to prevail and observed CP was low.

In **Kapasdanga**, the FWA seemed to perform very well and although FWC is 20 kilometres away, the inhabitants seemed motivated themselves. The area is not very developed but the CPs seemed high.

Sura is under Jhenidah district which is known to be less conservative. Historians have commented that in this district Hindus and Muslims have been living in harmony for

many generations (Ahmed, 1981). The FWAs did complain of some initial distrust in contraceptive methods which were more due to the newness of technologies and ideas rather than religious, but they seem to be non-existent at present.

4.3.4. Rajshahi division

Rajshahi division has always exhibited higher than average CPs since 1983 (Chapter 2, Table 2.1). In the 1991 CPS it had a CP of 37.2 percent which is 5.9 percent higher than the national average. All four clusters in this sample had lower CPs compared to the average CP in the 1991 CPS. In this study, clusters Jagjibonpur and Amair show very high CPs while Chandipur is slightly lower and Uttar Khaleya is the lowest.

Uttar Khaleya is in Rangpur district which is economically poor compared to the rest of the country. But compared to other areas of Rangpur, Uttar Khaleya has high CPs. The FWAs here deserve some credit and the people themselves seemed to promote FP amongst themselves, showing a moderate CP .

Chandipur too has the highest CP among its neighbouring clusters. This cluster is in district Gaibandha, which although within Rajshahi division, is more remote than others and has more poverty as well as perceived superstition. In Chandipur however, the wife of an influential man is the FWA and has succeeded in promoting the FP drive, thus achieving a high CP.

In **Jagjibonpur**, efficient FWAs, coupled with FP based NGO activities and a peaceful harmony between equal number of Muslim and Hindu residents has brought about remarkable achievements in the form of high CPs. The Muslims and non-Muslims seemed to have a harmonious relationship in this area.

Cluster **Amair** is in Naogaon district, which is close to the Indian border. The FWAs seemed very efficient. There seemed to be no religious conservatism, and although

there is no FWC, the residents of the village are well covered by FWAs, resulting in high CP (68 percent).

4.3.5. Cluster-level factors

Table 4.2 presents the distribution of the selected cluster level variables obtained for the sixteen clusters under study. More than seventy percent of women in this study have access to a public TV, girls' secondary school and market within five kilometres of their cluster. More than sixty percent of women in this study have FWAs, NGOs and FP retail shop within five kilometres of the cluster. Only forty-five percent of women have FWCs within five kilometres of their cluster. Fifty percent of women have a post office within five kilometres of the cluster. Only one-third of women live within five kilometres away of a paved road or eight kilometres of a railway station.

Table 4.2 Percent of women within 5 kilometres of given facility, Cluster Survey, Bangladesh 1994.

Cluster level variable Present	No of clusters	No of women	Percent
Communications			
Paved Road	5	1062	34
Rail Station	6	1180	37
Public TV	13	2633	83
Post Office	8	1676	53
Economic			
Market	13	2277	72
Educational			
Girls' secondary school	13	2650	84
Indirect intervention			
NGO	10	2003	63
FP retail shop	12	1948	62
Direct intervention			
FWC	7	1421	45
FWA	10	1978	63
N	**16**	**3165**	**100**

4.4. ANALYSIS OF FWA SURVEY

From the experience of the field work, it was perceived that even in the absence of sufficient infrastructure, clusters could achieve high use rates due to good performance by FWAs (eg; Chandipur and Kapasdanga). On the other hand, there were clusters where perceived religiosity was high and even with resident FWAs, CPs were low (Sultanpur, Charsakina). Again there were areas with no resident FWAs yet CPs were high (Dhanikhola, Bakarkanda). The contribution of an FWA to the proportion of contraceptive use in a cluster seemed contingent upon other factors. The totality of infrastructural amenities, conservatism and FWA performance all seemed to be interrelated.

In Bangladesh, doorstep services are offered by Family Welfare Assistants (FWA) and to the majority of couples this is the only exposure to FP services, information and

motivation (Section 2.1). Is it possible that the answer to the differential use between clusters lies in personal and professional attributes of FWAs? Previous studies have correlated couples' contraceptive use with attributes of the FWAs (Rahman, 1986, Koenig, 1992; Koblinsky et al., 1989; Phillips et al., 1993). To investigate this in detail, this section looks at characteristics of 80 FWAs obtained from sixteen unions under study. This study of 80 FWAs serves as a basis for identifying their important attributes correlated with use of modern contraceptives in her area.

As mentioned in Chapter 1, the Government of Bangladesh (GOB) realised the impact of the population problem and took additional measures in 1976 to strengthen the National Family Planning Program by introducing female family planning workers (FWA) at the village level. Since 1991, each female worker has been given a geographical area with an average population of 4,000 couples. She is expected to visit each eligible couple once in every two months. Her job is to motivate women to use modern contraceptive methods, and also to supply those who are current users. The GOB supplies the family welfare assistants with pills and condoms to be distributed free of charge to couples who are willing to use them. The FWAs also motivate couples to accept sterilization. She, therefore, has the role of 'change agent aide'[1] (Rogers, 1973). Sterilizations are performed at the thana health care centre. The couples receive a compensation payment in the form of cash or clothing for accepting a permanent method.

According to Rogers (1973) there are two aspects of the change agent aide that facilitates the acceptance of innovation and new ideas propagated by her. First, is her

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[1] The term change agent aides refers to the grass root level workers of the family planning programmes and is defined by Rogers as ones who are less than fully professional change agents but work intensively with clients to influence their innovation decision (1973:109).

professional experience acquired through knowledge, training and experience. Second is her credibility, her societal standing and her relationship with her clients.

The observations in the field during the in-depth study of two clusters, (Chapter 3) led to the following hypotheses regarding both characteristics of the FWA.

1) FWAs trained to give EPI services are more successful than those who are not.

2) FWAs satisfying the initial educational criteria of completing grade ten have better performance than those for whom the criteria was relaxed.

3) FWAs whose length of service is longer have better performance.

4) Married FWAs have better performance than single FWAs.

5) FWAs from the same village as her catchment area and from higher social background have better success rates.

In this study, 80 FWAs from sixteen unions were interviewed in great detail (Questionnaires in Appendix C). Although the clusters of the present study are covered by sixteen FWAs, the performance of FWAs of neighbouring areas also influence CPs in the vicinity due to diffusion and hence all FWAs from the study unions were interviewed. This analysis (Section 4.5) uses the information of 80 FWAs to identify important characteristics of the FWAs correlated with contraceptive use in her area. Variables identified by this analysis will be used in later models in a multilevel approach to model the contraceptive use of bari heads and individual respondents (Chapter 5 and 6).

Inter-FWA variations in CPs of their catchment areas are presented in Table 4.3. The CPs range from below 20 percent to more than 65 percent, the mode occuring in the interval 50-55 percent.

Table 4.3 Inter-FWA variations in CPs, FWA Survey, Bangladesh 1994.

Contraceptive Prevalence (CP)%	No of FWAs	Percent of FWAs
<20	3	3.8
25-30	1	1.3
30-45	1	1.3
40-45	8	10.0
45-50	11	13.8
50-55	19	23.8
55-60	18	22.5
60-65	10	12.5
65+	9	11.3
N	**80**	**100**

4.4.1. Importance of an FWA in the village society

The cadre' of FWAs is a new addition to the village society. The importance of FWAs in the village community is supported in Table 4.4 where each FWA is asked about the most influential man and woman regarding FP.

Thirty nine (48.8 percent) FWAs considered themselves to be the most influential lady regarding FP. Although in the initial years of FP programme in Bangladesh FWAs were not well received, almost eighteen years later their own assessment is that they are the most influential people in the village society regarding family planning.

The shift in the societal values is also evident from the answers to 'most influential man regarding FP'. The FWAs thought that 'village headmen' (Section 4.4.2) and UC Chairmen (Section 1.1.4) had the most influence regarding FP. Villages in Bangladesh were formerly known to be much influenced by religious leaders and holy men called the 'Pir' (Ahmed, 1981) (Section 5.3.1). This finding accords some evidence of power shift that may have occurred in the village society of Bangladesh. Table 4.4 shows that people may have shifted from relying on religious men to other community leaders who they find

more knowledgable regarding FP.

Table 4.4 Distribution of FWA's responses to most influential man and woman regarding FP, FWA Survey, Bangladesh 1994.

Variable	Category	Frequency	Percent
Most influential Man	Religious leader	4	5.0
	Thana Adminstrative Officer	1	1.3
	Village Headman	17	21.3
	Union Council Chairman	23	28.8
	Others	34	42.5
	None	1	1.3
Most influential lady	Family Welfare Assistant	39	48.8
	W/O Religious Leader	2	2.5
	W/O Union Council Chairman	3	3.8
	Others	36	45.0
N		**80**	100

4.4.2. Definition of variables

EPI As described in Section 3.3.3. It is hypothesized here, that FWAs with EPI training have better performance than those without.

Satellite Clinic These are one day government sponsored mobile FP clinics held in various locations in the villages (Section 3.3.3). It is hypothesized that when FWAs participate regularly in satellite clinics in her cluster, the CPs are high compared to where they do not.

Village Samaj In Bangladesh, every resident of a village belongs to a social group called the village samaj. Samaj has a territorial boundary. Whoever is a resident within that boundary automatically becomes a member of that particular samaj. The samaj pattern is taken as a basic frame of reference for social activities. The samaj has the authority to award punishment if anyone deviates from the established social norms. Thus, every individual is aware of the controlling authority of the samaj (Aziz, 1979). From area to area in Bangladesh, samaj ties may be highly cohesive or loosely informal.

Each FWA therefore, comes from a samaj. Rahman (1986) found that the strength

of the samaj of an FWA is a significant predictor of contraceptive use of women in her catchment area. Sometimes, the FWA is assigned an area where the entire population is part of her samaj. In other cases, an FWA may be serving an area which is partially her samaj and partially not. It is hypothesized that FWAs whose entire catchment area is her village samaj has higher performance than her counterparts.

Village Matabbar A village matabbar (head man) is usually an aged man hailing from the village and someone on whom others have informally bestowed an authority to advise and guide during various socio-cultural events. He may be the son of another matabbar, or some religious man, or a wealthy man, or someone whose wisdom is highly acclaimed. There is no specific definition for the village matabbar except that he is consulted by others for various decisions and also has the (social) authority to impose punishment. FWAs who have the village headman within her own samaj might have better social standing in her catchment area, and hence more influence and better performance in high use of contraceptives.

4.5. BIVARIATE ANALYSIS OF VARIOUS CHARACTERISTICS OF FWAs

In this section, Tables 4.5 through 4.7 are presented to illustrate the differences in CPs due to differentials of the FWAs. Group means of percentage using modern contraception in each category are presented, along with p values for F tests conducted using Analysis of Variance (Steel and Torrie, 1984).

4.5.1 Variations in CPs due to socio-economic and demographic characteristics of FWAs

Table 4.5 presents the data on individual characteristics of 80 FWAs from four administrative divisions of Bangladesh. Although the GOB set a mandatory criteria for the

FWAs to have completed grade ten, this study shows that almost seven and half percent of the sample had not completed more than fifth grade. During the initial recruitment of FWAs in 1976, this criteria had to be relaxed because of non-availability of female candidates (Rahman, 1986). Simple ANOVA tests show that there are significant differences in mean CPs, by education of FWAs in this sample.

Age of FWAs showed significant between group variation in CPs. Younger FWAs (below 24) had lower CPs and so did FWAs above 40, compared to those FWAs between ages 25-40.

A new five point variable 'house' was constructed by summing over affirmatives in five variables. These are: possession of electricity (1 is yes, 0 otherwise), material of house floor, wall and roof (1 if concrete, 0 otherwise). The construction of the variable is explained in Section 5.2 of Chapter 5. It was assumed that these variables are correlated in the same way as those for bari heads. The variable was again recoded into scores three and above and less than three. 'House' here represents socio-economic status. Simple ANOVA tests reveal insignificant variation in group mean CPs for variable 'house'.

'Ownership of tubewell' is considered a single independant socio-economic indicator because of its prominence as a single factor in PCA (Chapter 5). Ownership of land shows relatively small contribution in the second factor and is thus omitted. In ANOVA tests ownership of tubewell shows significant variation in this sample.

Most FWAs (91 percent) in the sample had EPI training, and their CPs are significantly different from those who did not. Ninety-one percent of the sample FWAs were married and also showed significantly high CPs compared to those who were not.

Table 4.5 Variations in mean CPs by selected socio-economic and demographic variables of FWAs, FWA survey, Bangladesh 1994.

Variable	Frequency (Percent)	CP	F test p
Education			
Primary	6 (7.5)	42.9	.02
Higher	56 (92.5)	54.4	
Age			
≤24	19 (23.7)	46.9	.04
25-40	54 (67.5)	55.4	
≥40	7 (26.3)	52.8	
Variable 'House'			
Score < 3	59 (73.7)	51.1	.89
Score ≥ 3	21 (26.3)	52.4	
Own tubewell			
Yes	64 (80.0)	49.3	.05
No	16 (20.0)	39.8	
Marital Status			
Married	73 (91.3)	54.2	.01
Single/Divorced	07 (08.7)	42.3	
N	**80**		

Table 4.6 presents other 'job related' and 'social strength' variables of FWAs. The length of service of FWA is a significant correlate of CP in this sample. But this variable may have a circular relationship with use. Those who are more successful stay longer in the job and vice versa, therefore this variable is not included in future regression models. As explained earlier, in some clusters, satellite clinics (SC) and EPI clinics are held on the same dates in the same venue. It was observed during field work, that when these clinics are held together, the FWAs that serve there have higher prevalences. Table 4.6 also shows that 'Satellite and EPI clinics being held together' is a significant determinant of

Table 4.6 Variations in mean CPs due to selected job related and social strength variables of the FWA, FWA Survey, Bangladesh 1994.

Variable	Frequency (Percent)	CP	F test p
Headman of cluster			
From same bari	16 (20.0)	56.0	.89
Same samaj	37 (46.3)	53.3	
Neither	27 (33.7)	51.4	
FWA residence			
In cluster	61 (76.3)	53.8	.91
Otherwise	19 (23.7)	51.1	
Cluster served			
FWA's samaj	68 (85.0)	53.1	.99
No	12 (15.0)	53.7	
Length of job			
≤ 4 years	20 (25.0)	47.9	.01
> 4 years	15 (18.7)	55.0	
Trained in EPI			
Yes	73 (91.3)	54.3	<.01
No	7 (8.7)	42.1	
Satellite Clinics			
Held	74 (92.5)	53.1	.98
Not held	6 (7.5)	54.4	
Satellite and EPI clinics			
Held together	41 (51.2)	55.8	<.01
Not held together	39 (48.8)	50.5	
N	**80**		

contraceptive prevalence. The social standing of the village samaj, or working within the FWA's own samaj does not seem to be important. Observations in the field suggest that the economic wealth of the FWA is more important than the influence of her village samaj and her societal background. The relative strength of various social blocks seem to have shifted. Rahman (1986) found the village samaj to be a significant predictor of FWA's performance. Since then, the villages have undergone major changes. Family Planning programmes, NGO work, links by satellite television has brought the outside

world closer, even in remote areas of Bangladesh. Eighteen years (since 1976) of the FP programme has also allowed a generation of successful users to set examples for the next generation, and what was unseen, unheard and sinful in the previous generation is much more acceptable in recent years (Simmons et al., 1992).

Table 4.7 presents characteristics of married FWAs only. It is observed in Table 4.7 that FWA's husband's education show significant between group variation (at 5% level), husband's occupation also shows significant between-group variations (at 10% level) but current use by FWA does not.

Table 4.7 Variations in CPs by selected characteristics of married FWAs, FWA Survey, Bangladesh 1994.

Variable	Frequency (Percent)	CP	F test p
Current use By FWA			
Yes	60 (82.2)	53.8	.78
No	13 (17.8)	56.5	
Husband's education			
Primary	2 (2.7)	28.3	<.01
Secondary	21 (28.8)	53.9	
Higher	50 (68.5)	55.4	
Husband's occupation			
Service	25 (34.2)	52.3	.10
School Teacher	14 (19.2)	56.9	
Business	13 (17.8)	55.4	
Unemployed	9 (12.3)	58.6	
Others	12 (15.0)	50.8	
N	**73**		

4.6. MULTIVARIATE REGRESSION ANALYSIS OF RECORDED CONTRACEPTIVE PREVALENCES ON SELECTED FWA CHARACTERISTICS

It is learnt from bivariate analysis, that while some variables do show association with contraceptive prevalences, not all are statistically significant. In this section, the proportion of users of modern contraceptives in each catchment area is modelled on FWA characteristics. The objective of this model is to identify selected characteristics of FWAs correlated with use of modern contraceptives in their cluster. The multiple regression model is as follows:

$$y=a+b_1x_1+b_2x_2+....+\epsilon$$

Where y is the percentage of users of modern method (either reversible or permanent) of contraception in the cluster, a is the constant, b_i is the coefficient of the ith correlate and ε is the error term.

Variables screened by ANOVA tests and found to be significant, and some others, were entered into the model. They are: satellite and EPI held together, FWA's EPI training, marital status, age and education, and whether village headman was related to the FWA. Although the last variable was insignificant in the bivariate analysis, it was included in the model because of our special interest in this variable.

The multiple regression model including all the selected variables is presented in Table 4.8. At 5 percent level of significance FWA's age, marital status, EPI training, and education are the significant predictors of CPs. In the field study it was observed that married FWAs had more economic wealth and mobility compared to unmarried FWAs. Younger FWAs were also found to have lower contraceptive prevalences. Neaz and Banu (1992) found fewer unmarried FWAs in high prevalence areas compared to low

prevalence ones. The importance of EPI training has been discussed earlier, the results support the hypothesis. It was perceived that when FWAs were EPI trained they gained more credibility and popularity in the area. As women volunteer to immunise their children, they receive information on FP as well, and vice versa. This integrated role of the FWA is a correlate of high use in her area. The educational level of the FWA is also a positive correlate of use. FWAs fufilling the criteria set by the Government of Bangladesh (completed 10th grade) have higher CP compared to those for which the criteria was relaxed.

The relationship of the FWA with the village headman is no longer an important predictor of her performance as observed in the earlier study by Rahman (1986). Personal attributes of the FWA such as her EPI training, marital status, education and age seem to be more important.

Table 4.8 Results of multiple regression of CPs from FWA registers on selected FWA variables, FWA Survey, Bangladesh 1994.

Variable	B Coeff	SE	p
Marital status	10.9	4.46	.0173
EPI trained	11.6	5.01	.0237
FWA's education	12.2	5.02	.0171
Age below 24	-6.3	2.98	.0380
Age above 40	4.1	4.76	.3944
Ownership of tubewell	4.5	3.02	.1386
Headman from FWA's bari	2.1	2.69	.4462
Headman from FWA's samaj	-0.8	2.39	.7500
Constant	16.3	7.79	.0400
Adjusted R square= .23 **N=80**			

4.7. SUMMARY

This chapter first describes briefly the sixteen rural clusters under study. In all study clusters, contraceptive use had increased since the 1991 CPS. The increase was mainly due to increases in modern reversible methods.

Characteristics of FWAs serving the study areas were investigated. Instead of only sixteen FWAs from the study areas, all FWAs from the unions of the study clusters were considered. After preliminary bivariate anlysis, multiple regression analysis was conducted. The analysis identified four characteristics of FWAs as important correlates of percentage of contraceptive users in her area: FWA's Marital status, EPI training of FWA and her educational attainment and age. The analysis also showed that the FWA's societal strength (indicated by her relationship with the village headman) is no longer an important predictor of her performance. Earlier studies had linked FWA's societal strength with her performance, but that seems to be no longer important in the present scenario.

The attributes of the FWA which were found to be important predictors of contraceptive use will be utilized in future multilevel models (Chapter 5 and 6).

CHAPTER 5

USE OF MODERN CONTRACEPTIVES BY BARI HEAD.

5.1. INTRODUCTION

This chapter analyzes the data obtained from the Bari head survey and the Bari survey of 936 baris from sixteen study clusters of Bangladesh. The data contains information on individual characteristics of the bari head, as well as socio-economic information common to the bari. Cluster level information on socio-economic indicators are also available for each of the baris from the Cluster Survey (details in Chapter 4). The aim of this chapter is to identify correlates of modern contraceptive use of the bari head (or his wife), and examine the between-cluster variation in use of modern contraception by bari heads.

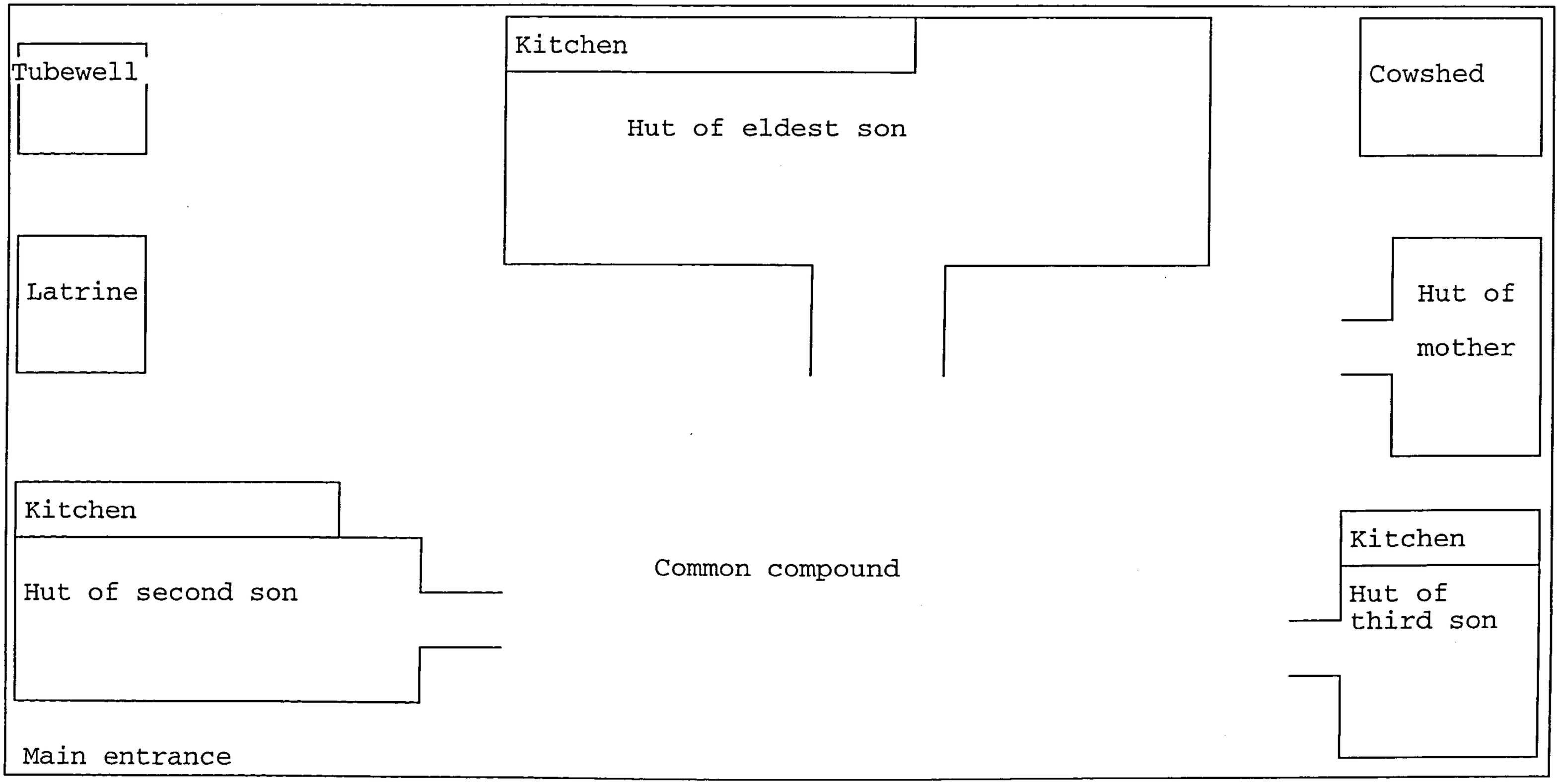
THE BARI In rural Bangladesh, the unit of dwelling is called a 'bari'. Commonly a bari is a patrilineal family home housing one or more households sharing a common compound and within the same boundary wall. If they own a tubewell (source of drinking water), it is usually located within the boundary and shared by all members of the bari. Figure 5.1 presents a diagram of a common bari. An example of a bari would be the aged father and mother along with three or four sons and their wives all having separate kitchens or common kitchen but within the same boundary. Other examples may be two aged brothers with their respective sons and their families etc. Anthropologists have remarked that bari members share common socio-economic and cultural patterns. Usually each bari regards one person as the head of the family commonly called the 'bari head'

and it is perceived that bari heads influence many decisions in the family.

A number of earlier anthropological studies (Aziz, 1979; Islam, 1974; Bertocci, 1969) have emphasized the importance of the bari in the control of all types of social behaviour of its members, including their reproductive behaviour. The most important thing about the bari is that it serves as a building block of all social groups in the village (Bertocci, 1969).

The results of regression analysis in Chapter 4 finds characteristics of FWAs making a significant contribution to differences in contraceptive prevalences (recorded by FWAs) among clusters. Observations from the in-depth couples' studies (Chapter 3) reveal that apart from differences amongst FWAs, other factors also contribute towards cluster-level differences in contraceptive use. Studies by Nahar and Rahman (1995) and Rahman (1986) have identified important bari-level differences in contraceptive use. In this chapter, demographic and socio-economic indicators of the bari head and other bari level and cluster-level factors, are investigated in multilevel models for their contribution in explaining contraceptive use between clusters.

Fig. 5.1. Sketch of a *Bari* with four households, Bangladesh 1994.



5.2. METHODS AND MATERIALS

5.2.1. Bari Head Survey

In the present study, approximately 60 bari heads were interviewed from each cluster chosen as sub-samples of the 1991 CPS in the Cluster Survey (details are given in Chapter 4). 936 bari heads were interviewed from these sixteen clusters in structured interviews. The author and five other field workers resided for about ten days in each cluster. Household lists for this study were obtained from the 1991 CPS. On each day, a couple of field workers (one male and one female) set out in directions already located from the cluster map available from the 1991 CPS. A household was considered a bari if more than one family shared a common compound, and a compound was well demarcated by banana plantations. To study the influence of bari heads, purposive sampling was used to select only those baris which had at least two households. In doing so, approximately 2 percent of the baris were left out (approximation based on experience in the field study). The bari head was interviewed by the male worker, and the eligible female members of the bari were interviewed by the female field worker. When the bari head was absent, alternative visits were made to interview him, failing which the next important member of the bari was interviewed. At the end of each working day, questionnaires were matched, and any errors in the data were corrected the following day. Bari-level information on whether girls attend school, participate in NGO activities, number of households in the bari, number of family members were also obtained from either the bari head or some other member of the bari. When sixty bari heads were interviewed, the team moved to the next cluster.

5.3. VARIABLES USED

5.3.1 Religiosity

In the bari survey, five questions were posed to each bari head about his religious commitment. The questions and its categories are presented in Table 5.1

The followers of Islam observe five basic rituals:

i) The belief in oneness of God.

ii) Praying five times a day.

iii) Fasting for one month during Ramadan.

iv) Going for Hajj or pilgrimage to Mecca, Saudi Arabia.

v) Giving 'zakat' (two and half percent of savings) to charity during the religious festival Eid.

Table 5.1. Questions on religiosity asked in Bari Survey, rural Bangladesh 1994.

Question	Categories
Do you pray regularly?	Yes Sometimes Not at all
Do you fast during Ramadan/ Upobash?	Yes Sometimes Not at all
Do you follow a Pir (holy man)?	Yes No
Have you performed Hajj?/Have you made Pilgrimage?	Yes No
Do you give zakat/alms?	Yes Sometimes NA

To measure religiosity, respondents were asked if they prayed five times a day, fasted during Ramadan, gave zakat, and had performed Hajj or pilgrimage (Appendix C).

Other religions having similar rituals, similar questions were posed to non-Muslim bari heads. For example, in Hinduism, prayers are offered everyday and frequency of prayers were taken into account. Fasting, visiting holy places for pilgrimage and the ritual of alms was also common in other religions.

Apart from these religious rituals, in Bangladesh, people believe in some pious men called 'Pir'. In the original concept, Pirs were messengers of Islam. They were said to have some miraculous faculties and also had considerable personal aura and power (Abecassis, 1990). Present day Pirs tend to continue the tradition. Aziz (1979) has described how charms and water blessed by the Pir are used as a cure for many diseases. He is believed to have some special power over human and natural fertility. In the absence of doctors and modern health care, most villagers believed in the Pir's unusual powers to cure them. He is likely to be a strong charismatic leader, and although he will be a spiritual guide, he need not have much formal or any religious education; some Pirs are actually illiterate (Abecassis, 1990). The followers of a Pir form a brotherhood. Women can also be followers of Pirs, and unlike the mosque (Islamic venue of congregation) where women cannot visit in rural Bangladesh, they are able to visit the Pir's *khankaah* (where he lives and performs miraculous events). Non-Muslims also follow Pirs in rural Bangladesh. This allegiance to a Pir is considered strict religiosity in this context and was included as a question in the bari survey.

In primary investigations of the bari survey, it was found that the variables Hajj and zakat (charity) did not have considerable variation. These two religious customs are applicable mainly for people who are affluent and because respondents in our areas of study were very poor, almost ninety-eight percent replied negatively. Hence, these two variables were excluded from the analysis.

In initial investigations of the other three variables on religiosity, only the variable 'frequency of praying' was found to have any significant variation between groups. Hence, this variable was retained as a measure of religiosity.

5.3.2. Socio-economic variables

House In rural Bangladesh, a majority of houses are made of *katcha* (mud or woven bamboo) (Mitra et al., 1993). Very few have a tin or concrete roof, wall or floor. On the basis of that, housing materials have been classified into two categories (1 if concrete or tin, 0 otherwise).

Tubewells predominate as the source of drinking water in both rural and urban Bangladesh (Mitra et al., 1993), and only affluent homes possess a tubewell to themselves, hence this is also considered as a socio-economic indicator variable. However, because of collinearity of these five variables (house wall, floor and roof; possession of tubewell and electricity, land holding), they were investigated by prinicpal component analysis. The results (not presented here) showed that the three variables on housing and the variable 'possession of electricity' contributed highly to the first factor; and variable 'ownership of tubewell' and 'land holding' contributed substantially to the second factor.

PCA factors showed that the housing variables and electricity carried almost equal weights. Hence, a new five-point score called 'House' was constructed by summing across affirmatives (coded 1 if in best category and 0 otherwise) for house floor, house wall, house roof and electricity, to indicate socio-economic status. The reliability of this index was tested using Chronbach's alpha (Chronbach, 1951) giving a reliability of .7 which is considered moderate (Nunnally, 1978).

Out of the two economic variables 'Ownership of tubewell' (1 if yes, 0 otherwise)

and 'land holding' (coded 1 if above the average value of this sample 198 decimals, 0 otherwise) 'tubewell' had more contribution to the second factor. Hence, only 'ownership of tubewell' was chosen as an economic control in the subsequent analyses.

Religion During the fieldwork it was observed that non-Muslim baris seemed to have higher use of modern contraceptives compared to Muslim baris. Previous studies have also supported this observation (Shahidullah & Chakroborty, 1993). It is possible that Muslims perceive that use of modern contraception is contradictory with their practice of religion, and this variable was included in the study.

In Table 5.2, results of simple ANOVA tests are presented for individual variables of the bari heads and socio-economic variables of the bari, for both users of modern reversible methods and sterilization.

Among users of modern reversible methods, use varies significantly due to age, number of living children, education, religion, frequency of prayers, ownership of tubewell and the variable 'house'. For acceptors of sterilization, use varies significantly for age, number of living children, number of living sons and frequency of prayers and religion.

Table 5.2 Distribution of selected socio-economic and demographic variables of the Bari Head, Bari survey, Bangladesh 1994.

Variable	Modern reversible method users			Sterilization acceptors		
	Frequency	% User	F test P	Frequency	% User	F test P
Age						
≤45	284	64	<.01	142	32	<.01
46-55	198	42		166	29	
56-65	190	18		177	14	
≥66	124	4		130	11	
Number of living children						
Two or less	145	49	<.01	88	15	<.01
Three or four	210	47		167	33	
Five or six	232	41		191	28	
Seven or above	209	28		169	11	
Number of living sons						
One	201	46	<.01	134	19	<.01
Two	203	48		157	33	
Three	174	36		144	23	
Four or more	218	31		180	16	
Education						
None	414	34	<.01	357	23	.73
Primary or above	382	47		258	22	
Praying						
None or irregular	323	51	<.01	220	28	.02
Regular	473	33		395	20	
Ownership of Tubewell						
Yes	427	45	.01	301	22	.49
No	369	35		314	24	
Variable 'House'						
Score ≤1	387	36	.04	323	24	.40
Score 2	220	41		171	24	
Score ≥3	189	47		121	18	
Religion						
Muslim	722	39	.04	549	15	<.01
Others	74	51		66	32	
N	**796**			**615**		

5.3.3. Bari-level variables

Three bari-level variables were included in this survey

Number of households in the bari During field work it was observed that baris with fewer number of households seemed to have higher probability of use. It was hypothesized that baris with smaller number of households might be highly cohesive in their behaviour and might have higher use of modern methods compared to baris with higher number of households.

Sanction of bari girls' education This question was asked of the bari head. The question that was asked is: Do/did any bari girls ever attend school? In this study, the variable 'Sanction of bari girls' education was taken as an indicator of the progressive attitude of the bari head. In rural Bangladesh, girls' education has been made free by the Government of Bangladesh since 1992. This does not mean that all bari girls attend school. In a conservative, traditional, patriarchal society like Bangladesh, female education is a major indicator of progressive behaviour. When bari heads do not allow anyone from the bari to attend school, it shows his adherance to strict conservatism. If he does permit, but some girls have dropped out from school or do not attend for some other reason, in this context it is still considered progressive behaviour.

Participation of bari members with NGO

There are many non-government organisations working in the rural areas of Bangladesh. They involve projects like irrigation, cottage industry, immunization, self sufficiency, maternal & child health care and family planning. In the cluster survey, information was collected on the existence of NGO main offices near the cluster. In this survey, each bari head is asked: 'Does any member from the bari participate with any NGO?'. It was observed in Chapter 3 (Section 3.3.3), that members from one bari usually participate with

the same NGO, cross-classifications were therefore not taken into account. It has been found that any participation in such activities results in higher use of modern contraceptives due to motivation and enlightenment, even when the NGOs are not FP based (Schuler & Hashemi, 1994). It is hypothesized that those baris with members participating with NGOs might have higher use of modern contraceptives.

Table 5.3 Distribution of users of modern reversible methods or sterilization according to bari-level variables, Bari Survey, Bangladesh 1994.

Variable	Modern reversible method users			Sterilization acceptors		
	Frequency	% User	P	Frequency	% User	P
Number of households in the bari						
Two	180	49	<.01	138	26	<.01
Three	219	41		167	17	
Four	159	40		121	13	
Five	106	42		76	17	
Six or more	132	27		113	15	
Sanction of bari girls' education						
Yes	598	45	<.01	430	24	.51
No	198	26		185	21	
Bari members participate with NGO						
Yes	220	39	.54	179	22	.49
No	576	41		436	25	
N	**796**			**615**		

These bari-level variables are presented in Table 5.3. For ever users of modern reversible methods the variables number of members in the bari and sanction of bari girls' education are significant (5% level of significance). Among sterilization acceptors, only number of households in the bari is significant.

5.3.4. Cluster-level variables

Cluster-level variables and the characteristics of FWAs are investigated in Table 5.4 using simple ANOVA tests. For ever users of modern reversible methods, variables distance to either road or railway, distance to girls' secondary school, FP retail shops, distance to FWA's residence, her EPI training and her education are significant.

For sterilization, distance to paved road or railway and presence of girls' secondary school, FP retail shop and level of FWA's education are significant.

Region of residence could be considered another level, but for this study there were not enough observations from each region to allow the use of another level. It was introduced as a covariate in the model.

Bari with four households, rural Bangladesh.

One family living in the bari, rural Bangladesh.

Table 5.4 Distribution of users of modern reversible methods and sterilization according to cluster-level variables, Bari and Cluster Survey, Bangladesh 1994.

Variable	Modern Reversible methods			Sterilization acceptors		
	Frequency	% Users	F test P	Frequency	% Users	F test P
TV/Post office						
≤5 km	664	41	.22	502	22	.57
>5 km	132	39		113	24	
Road/Railway						
≤5 km	496	43	.01	379	26	<.01
>5 km	300	36		256	17	
Distance to NGO						
≤5 km	495	41	.61	384	24	.36
>5 km	301	39		231	20	
Presence of girls' Secondary School						
≤5 km	648	42	.04	504	25	<.01
>5 km	148	33		111	11	
Distance to market						
≤5 km	611	40	.92	503	23	.91
>5 km	185	40		112	22	
Distance to FWC						
≤5 km	345	40	.86	271	24	.65
>5 km	451	40		344	22	
Distance to FP retail shop						
≤5 km	611	48	.05	474	21	.02
>5 km	185	38		141	29	
Residence of FWA						
≤5 km	491	45	.04	395	23	.70
>5 km	305	37		220	22	
FWA trained in EPI						
Yes	700	42	.05	535	24	.22
No	96	31		80	17	
Marital status of FWA						
Married	747	40	.94	575	22	.46
Single	47	41		40	28	
Age of FWA						
≤24	47	38	.77	42	31	.19
>24	749	40		573	22	
Education of FWA						
Primary	143	27	<.01	120	14	<.01
Higher	653	43		495	25	
Region of residence						
Dhaka	191	44	<.01	156	31	<.01
Chittagong	192	30		146	18	
Khulna	207	36		176	17	
Rajshahi	206	50		137	24	

5.4 MULTIVARIATE ANALYSIS

To investigate the correlates of use of modern methods of contraception by bari heads obtained from this study, multilevel logistic regression analysis was used (Goldstein, 1987). Analysis using a simple logistic regression model for binary response data produces smaller standard errors making some covariates falsely significant, hence a multilevel model is utilized. In this study a relatively new software called 'MLn' is used for estimating multilevel models (Woodhouse & Rasbach, 1994). The procedure for the estimation of non-linear multilevel models involves using a linearisation and then applying the iterative generalised least squares (IGLS) algorithm (Goldstein, 1991). The estimation of multilevel models for binary response data used by MLn has recently been improved to give more accurate estimates of the random effects (Rodriquez and Goldman, 1995; Goldstein, 1994) and these new techniques have been used in the following two-level models, as well as those presented in Chapter 6.

Two models were constructed, one for users of modern reversible methods excluding sterilization acceptors, and the other for acceptors of sterilization excluding users of modern reversible methods. Modern reversible methods include pill, condom, IUD, foam and injection. Sterilization includes both male and female sterilization. Earlier studies have found that the two methods have a different set of predictors and hence the need for separate models (Kamal, 1994; Kamal & Sloggett, 1993). Ever use was preferred over current use because the variables chosen for this study were thought to have a stronger relationship with ever use. For example religiosity has stonger association with ever use than with current use. Similarly, to study the assoiciations of variables religion, participation in NGO and sanctioning school attendance for bari girls etc, ever use was thought to be more appropriate.

Variables pertaining to the bari were included at level one, while cluster-level variables like distance to FWC, girls' secondary school within five kilometres of the bari were treated at the second level.

Let y_{ij} be the binary response of use or non-use by the ith bari head from the jth cluster, where y_{ij} =1 for being a user and 0 otherwise, and let p_{ij}= Pr(y_{ij} =1). Then the two level random coefficient logistic model can be written as follows:

logit p_{ij} =log (p_{ij} /1-p_{ij}) = H_{ij}

Where H_{ij}= **X** β+ **W**u_j.

and

$$p_{ij}=\frac{\exp(X\beta+Wu_j)}{1+\exp(X\beta+Wu_j)}+e_{ij}$$

where H_{ij} is the linear predictor. **X** and **W** are design matrices containing covariates which may be defined at any of the two levels in the model. β is the associated vector of parameter estimates and these are known to be the fixed effects. Variation at the bari-level is represented by e_{ij} which is assumed to have a binomial distribution, while u_j is the level two (cluster) error term. This u_j is assumed to follow a normal distribution with mean zero and variance/covariance matrix Ω_1.

5.5. RESULTS

5.5.1. Modern reversible methods

Out of 796 bari heads in this model, 341 (43 percent) were ever users of modern reversible methods. All variables found to be significant in the bivariate analysis (at the 5% level) were entered into the model in the multivariate analysis. The final parsimonious model is presented in Table 5.5. The results are presented in odds ratios instead of

coefficients. The odds ratios are the odds of use with reference to a base category. For example, in Table 5.5, compared to bari heads aged over sixty-five, those aged between fifty-five to sixty-four have 4.22 times higher odds of use. This can be translated into probabilities; for the same categories the probability is 0.6 and 0.22 respectively.

In this model bari head's age, number of living children, religiosity and bari girls' education are significant predictors of ever use of modern reversible methods.

Age of bari head is the most powerful predictor of use of modern methods. Younger men are more likely to be users of modern reversible methods, and there is a clear gradient in use as age increases. In this model use of modern contraceptives decreases significantly with increase in age. Bari heads below 45 are most likely to be users, the probability of being a user at this age is the most significant predictor in the model. This indicates that the younger generation of bari heads have more acceptance of modern FP methods compared to the older generation.

Use of modern reversible methods is positively associated with number of living children. Use increases as number of living children increases and is highest for those with five or more living children.

Religiosity, indicated by frequency of prayers, is a significant predictor of use of modern reversible methods of bari heads. Those who do not pray or do so less regularly have a higher probability of being users of modern reversible methods, compared to those who pray five times a day, everyday. Earlier results from the 1989 BFS used 'self professed religiosity' as a predictor of modern methods use, and although similar association was found between higher and lower religiosity groups, the effect had become unimportant when the model controlled for other variables. Other researchers like Bernhaart (1992) and Ahmed et al. (1994) have commented on perceived religiosity, but

have not presented conclusive results. Using the 1989 BFS, Amin et al., (1995) found district level aggregate religiosity of women to explain between-district variances. Al-Sabir (1993), using Bangladeshi data, found an 'index of religiosity' to be monotonically correlated with lower use of modern contraceptives. That is, as religiosity increases use decreases. Results in Table 5.5 are also in the same direction.

In earlier models it was found that religiosity had random variation between clusters. In their use of contraception less religious bari heads had more between-cluster variation compared to religious bari heads. This suggests that the more religious bari heads have similar outlooks and exhibit similar behaviour towards use of modern methods. Among less religious groups, bari heads appear to differ in degree of modernism. However, this random variation was not significant at the five percent level of significance and was not included in the model.

In earlier models, number of households in the bari was a significant predictor of use, use was low for those baris which had higher number of households. However, this variable became unimportant when age of bari head entered the model.

In those baris where school attendance by girls is sanctioned, odds of use of modern reversible methods by the bari head is 2.18 times more compared to when those with no attendance. This variable is considered an indicator of modernism of the bari head. If he is progressive and modern, bari girls can attend school and in such baris, results show that the bari head himself is also more likely to be a user of a modern reversible method of contraception. Another effect of this variable may be that when girls from bari attend school, they are more exposed to information on FP and may be able to influence their mothers (who may be the wives of bari head) into being users.

Education of the bari head was significant in previous models, bari heads with

some education had higher probability of use compared to those having none. However, this effect became unimportant when the model was controlled for age.

Table 5.5 Logistic regression of bari head's use of modern reversible methods on selected bari and cluster-level variables, Bari Survey, Bangladesh 1994.

Variable	Odds ratio	95% Confidence Interval
Fixed Effects		
Age of Bari head		
≤44	26.57	11.20 - 53.73
45-54	11.35	5.39 - 23.97
55-64	4.22	1.96 - 9.06
≥65	1.00	-
Number of living children		
Less than Two	1.00	-
Three or Four	1.47	1.08 - 2.36
Five or more	1.91	1.18 - 3.03
Frequency of bari head's prayers		
Irregular or none	1.63	1.15 - 2.32
Regular	1.00	-
Sanction of bari girls' education		
Yes	2.18	1.42 - 3.35
No	1.00	-
Random effects		
Estimate of	Estimate	Standard Error
Between-cluster variance	.4700	.2042
N=796		

-2Log-likelihood=784.543

Socio-economic status indicated by ownership of tubewell was not significant as a predictor, neither was the variable 'house' or religion of the bari head. The administrative region of residence was also an insignificant predictor of use.

The cluster-level variables which had significant bivariate relationship with bari heads' use of modern reversible methods were entered into the model. None of them were significant. They are: distances to the static health centre FWC, road and railway, presence of girls' secondary school and FP retail shop. The attributes of the FWA such

as the distance to her residence, her EPI training and her education were also insignificant predictors of use of modern reversible methods by bari heads. This is an important finding that none of the attributes of the FWA correlate with use of modern methods by bari heads (or wife). Using the 1989 BFS the author found the visit of an FWA to a cluster to be a signficant predictor of contraceptive use (Kamal, 1994). In this study, all clusters have been visited by an FWA, hence other attributes of the FWA were considered and found to be insignificant predictors of use of modern reversible methods by bari heads (or wives). This finding implies that the use of modern reversible methods by bari heads (wives) has no association with the attributes of the FWA such as the distance to her residence, her age, her education or EPI training. One possible explanation for finding no association of the FWA's EPI training with use by this group is that bari heads and their wives are a select group of older clients. They may have passed those ages where new-born children need to be immunised and the significance of the first contact with an EPI trained FWA is not applicable in this context.

This study also finds that the distance to a static health centre in the cluster has no effect on use of modern reversible methods which was also observed in earlier studies (Kamal, 1994; Koenig et al., 1993). The most recent survey called the Bangladesh Demographic Health Survey (BDHS) found that twelve percent of users were obtaining modern reversible methods from the FWC (Mitra et al., 1994). Hence, it is not surprising that FWC has no effect on the use of modern reversible methods by bari heads. These findings have important policy implications which will be discussed later (Chapter 7).

5.5.2. Sterilization

In this model, 140 bari heads (wife), i.e. 29 percent are acceptors of sterilization. All variables found to have significance (at the five percent level) in the simple ANOVA tests, were included as explanatory variables in the model. The final model presented in Table 5.6 shows that age, number of living sons and religion are the significant predictors of sterilization.

Age is the strongest predictor of acceptance of sterilization in this model. Younger bari heads aged under 55 are more likely to accept sterilization compared to those above 55. This age group also represents the younger generation who have had more exposure and familiarity with modern methods of contraception in rural Bangladesh. Also, many bari heads above fifty-five may have reached a state in their reproductive lives where terminal contraception is no longer neccessary.

Acceptance of sterilization varies significantly with number of living sons. Bari heads with two living sons are most likely to accept sterilization, compared to those having one or none. But bari heads heads with three or higher number of living sons have no significant difference in use compared to those with one or none. One possibility is that those with three or higher number of living sons belong to an older generation and are less likely to accept modern methods. In addition, they may be believers of large families. Previous studies have found number of living sons to be a stronger predictor of use of sterilization compared to number of living children (Kamal & Sloggett, 1993). Studies have also found that use of any modern method is strongly correlated with the sex composition of the living children (Chowdhury et al., 1993). This result supports the previous findings.

Religion is found to be a significant predictor of acceptance of sterilization over and above all socio-economic and demographic as well as cluster-level factors used in this model. Compared to Muslim bari heads, non-Muslim bari heads are 2.6 times more likely to accept sterilization. This supports the observations in the field that non-Muslim areas have higher contraceptive use. The presence of girls' secondary school loses its predictive power when religion is introduced into the model. This implies that religion is a stronger predictor than the presence of girls' secondary school near the cluster, which is an indicator of female education and progressiveness in the area. It is possible that Muslims perceive a contradiction of Islamic beliefs with use of modern methods. This feeling seems to be more pronounced towards sterilization as against other reversible methods. In the earlier days of the introduction of sterilization into the FP programme in Bangladesh, there were extreme instances where women were denied burial because of being sterilized. These beliefs and superstitions were also found to be very prominent in Dewanbazar (the area with low contraceptive prevalence described in Chapter 3). In this model, it is observed that after controlling for various demographic attributes as well as access variables, religion continues to be a strong predictor of use of sterilization in rural Bangladesh.

Number of households in the bari had a negative association with acceptance of sterilization in earlier models. Baris with higher number of households had lower probability of use. It may be explained by the fact that baris with higher number of households may be more traditional and may have more senior members who may be opposed to acceptance of FP. However, this effect attenuated as age of bari head entered the model.

Education had a negative effect on use of sterilization, the more educated were less

likely to be users. However, this effect became unimportant as the model was controlled for the number of living sons.

The ownership of tubewell (socio-economic indicator) showed a negative association with sterilization in previous models. Previous studies have also found that women from lower socio-economic status are more likely to use sterilization (Kamal, 1994; Kamal & Sloggett, 1993). This effect became unimportant as number of living sons entered the model.

Table 5.6 Logistic regression of bari head's (wife) acceptance of sterilization on selected bari and cluster-level variables, Bari Survey, Bangladesh 1994.

Variable	Odds ratio	95% Confidence Interval
Fixed Effects		
Age of Bari Head		
< 55	3.32	2.16 - 5.08
≥ 55	1.00	-
Number of living sons		
One or none	1.00	-
Two	2.13	1.23 - 3.70
Three or more	1.29	0.76 - 2.19
Religion		
Non-Muslim	2.60	1.32 - 5.14
Muslim	1.00	-
Random Effects		
Estimate of	Estimate	Standard Error
Between-cluster variance	.415	.204
N=615		

-2Log-likelihood=526.494

Frequency of praying was also a significant predictor of sterilization in earlier models. Bari heads who professed to pray irregularly or did not pray at all had higher probability of accepting sterilization, compared to those who professed to pray regularly. This effect became unimportant when the model controlled for age of the bari head.

Region of residence was found to be an insignificant predictor of acceptance of sterilization. Earlier studies have found region of residence to be an important predictor of use (Kamal & Sloggett, 1993; Rashid & Huq, 1993; Shahidullah and Chakroborty, 1993). Chittagong division has always shown lower use compared to Dhaka division, Rajshahi had higher use compared to Dhaka division while Khulna did not differ from Dhaka division. Demographers have commented that sterilization rates in Bangladesh have levelled off because of fulfillment of the immediate demand (Islam & Islam, 1993). Mitra et al., (1994) found that overall sterilization rates have fallen since 1993. Hence, it is possible that divisional differences in sterilization are no longer present in rural Bangladesh.

Other cluster-level factors such as distance to FWA's residence, her age, education, EPI training, distance to static health centre FWC, shop, road and railways are insignificant predictors of sterilization. The insignificance of the FWC as a predictor of sterilization matches earlier findings using the 1989 BFS (Kamal, 1994).

5.5.3. Estimated probabilities

Using the two multilevel models presented in Tables 5.5 and 5.6, estimated probabilites of use were constructed for various values of characteristics of the bari head. For the modern reversible methods model, the most favourable circumstances would be when bari heads are not so religious and bari girls' school attendance is sanctioned. Reduced religiosity has a stronger effect on use of modern reversible methods than sanction of bari girls' education. This implies that if all bari heads in the sixteen clusters were less religious the probability of ever use of modern reversible methods would rise to 0.50 instead of the average 0.43 that is observed from the model.

For the model on sterilization, it is found that areas with full non-Muslim population will have a probability of 0.64 of being an acceptor compared to 0.41 in a full Muslim population, when other demographic variables are set to their average values.

Table 5.7 Estimated probabilities of ever use of Modern Reversible Methods by Selected Characteristics of Bari Heads, Bari Survey, Bangladesh 1994.

Age of bari head	
≤44	.64
45-54	.43
55-64	.21
≥65	.06
Number of living children	
Less than two	.33
Three or four	.54
Five or more	.49
Frequency of prayers	
Irregular	.50
Regular	.38
Sanction of bari girls' education	
Yes	.48
No	.30
N	**796**

Table 5.8. Estimated probabilities of acceptance of Sterilization by Selected Characteristics of Bari Heads, Bari survey, Bangladesh 1994.

Age of bari head	
<55	.43
≥55	.18
Number of living sons	
One or none	.26
Two	.43
Three or more	.30
Religion	
Others	.64
Muslim	.41
N	**615**

5.6 SUMMARY

A number of factors relating to the bari head and the bari were found to be significant predictors of both use of modern reversible methods and sterilization in rural Bangladesh. For modern reversible methods apart from age and number of living children, religiosity and sanction of bari girls' education were found to be significant.

For sterilization, apart from age and number of living sons, religion was found to be a significant predictor. Between-cluster variances remained significant, despite these explanatory variables. A larger sample of female respondents will be investigated in the next chapter to further explore the areal variations of contraceptive use among eligible women in rural Bangladesh.

CHAPTER 6

USE OF MODERN CONTRACEPTIVES BY ELIGIBLE COUPLES.

6.1 INTRODUCTION

This chapter presents the final models of the dissertation. The use of modern methods of contraception of rural women of Bangladesh is modelled using multilevel logistic regression analysis. At level one, the models use individual level socio-economic and demographic variables of the female respondents obtained from the Eligible Women Survey (Chapter 1). Level two consists of important bari variables obtained from the Bari Head Survey and Bari Survey; and level three includes cluster variables from the Cluster Survey, as well as important characteristics of the FWA obtained from the analysis of the FWA Survey (Chapter 4).

6.2 METHODS AND MATERIALS

ELIGIBLE WOMEN SURVEY The Cluster Survey was conducted in sixteen clusters from the 1991 CPS chosen at random from each of four administrative divisions of Bangladesh. The Bari Survey was conducted in 936 baris, approximately 60 baris from each of the clusters. In each bari, each eligible ever married woman (between ages 15 to 49) was interviewed by female field workers. A brief questionnaire (Appendix C) involved basic demographic and contraceptive use related questions. This survey resulted in a total of 3165 women from rural Bangladesh. The survey started in November 1993 and ended in March 1994. It includes women from all four divisions of Bangladesh and although cannot be claimed to be precisely nationally representative, nevertheless it covers a wide area of variation in rural Bangladesh.

The data obtained from the Eligible Women Survey is analysed in this chapter

using multilevel logistic regression analysis. Two models are constructed, one for 'ever use of reversible modern methods' and the other for 'acceptance of sterilization'. Since sterilization is a permanent method, the predictors may be different from those for reversible methods, as has been witnessed in other analyses (Kamal, 1994; Kamal & Sloggett, 1993), and hence the need for two separate models. Modern reversible methods considered here include pills, condom, IUD, foam and injection. Sterilization acceptors are excluded in this model, and vice versa.

6.3. VARIABLES USED

Apart from age, number of living children, education, ever use status, which method(s) used and status of pregnancy, two other variables were collected at the individual level. They are:

Relationship with bari head This variable gives the specific relationship of the woman with the bari head, e.g., wife, sister-in-law, daughter-in-law or some other relative. During the initial fieldwork it was observed that use is associated with this relationship. It is hypothesized that wives of bari heads are more likely to be users, compared to other relatives of the bari head, because access by the FWA is likely to be restricted for 'junior' female members of the bari. This phenomenon has been noticed in other studies (Blanchet, 1991; Steele et al.,1995)

Experience of child mortality Several studies (Chowdhury et al.,1992; Shahidullah & Chakroborty, 1993) have found experience of child mortality to be negatively correlated with contraceptive use, hence its inclusion. Experience of child mortality was counted positive if one or more children of the woman had died before the age of five and zero otherwise.

Table 6.1 presents the distribution of 'ever use' status of the eligible women from this survey. Forty-seven percent women in this study were found to be ever users of any modern reversible method, while ten percent were found to be sterilization acceptors. The corresponding figures in the Bangladesh Demographic and Health Survey (BDHS) 1993-1994 are 56.4 and 9.3 respectively (Mitra et al., 1994).

Ever use was preferred over current use because the variables considered in this study were thought to have stronger association with the former. For example, it was felt that in studying associations of bari head's characteristics with use of modern contraception, ever use would be a better outcome than current use which might underestimate the association. For example, the attitude of the bari head might have allowed one of the members to be a user in the past, although she is not a current user for some reason. However, the 'current use ' of modern reversible methods was found to be 40 percent for this study and the directions of the results were not significantly different.

Table 6.1 Distribution of women according to their ever use, Eligible Women Survey, Bangladesh 1994.

Use status	**Modern reversible methods**		**Sterilization acceptors**	
	Freq-uency	Percent	Freq-uency	Percent
User	1354	47	304	17
Non-User	1507	53	1507	83
N	**2861**	**100**	**1811**	**100**

Table 6.2 presents the distributions of individual-level variables and simple ANOVA tests for the two models: modern reversible methods and sterilization. All the individual level variables except 'experience of child mortality' show significant between-group variation in the model for users of modern reversible methods. For sterilization

acceptors, all individual level variables in Table 6.2 show significant between-group variation.

Table 6.2 Distribution of users of modern reversible methods and sterilization according to selected individual level variables, Eligible Women Survey, Bangladesh 1994.

Variable	**Modern reversible method users**			**Sterilization acceptors**		
	Frequency	Percent User	F test p	Frequency	Percent User	F test p
Age of woman						
≤19	216	23	<.01	228	00	<.01
20-24	779	39		436	02	
25-29	712	53		370	09	
30-34	448	60		244	27	
35-39	312	60		193	35	
40-44	216	50		175	38	
≥45	178	41		165	36	
Number of living children						
None or one	1029	28	<.01	750	02	<.01
Two or three	1025	59		548	23	
Four or more	807	55		513	30	
Number of living sons						
None	892	29	<.01	653	03	<.01
One	916	54		497	15	
Two	596	58		365	32	
Three	257	59		166	38	
Four or more	200	50		130	22	
Education						
None	1928	43	<.01	1360	19	<.01
Literate	933	57		451	11	
Child mortality						
Yes	298	49	.32	654	22	<.01
No	1867	47		1157	14	
Relationship with bari head						
Wife	536	58	<.01	350	36	<.01
Daughter-in-law	662	44		399	07	
Sister-in-law	675	49		413	15	
Others	988	43		649	12	
N	**2861**			**1811**		

Child mortality was found to be significantly higher for those who accepted sterilization. This may be confounded with the fact that sterilization acceptors were usually the poorer and older couples with worst health facilities and suffering higher child mortality than others.

Table 6.3 presents the distribution of bari-level variables and simple ANOVA tests for both models. Among bari-level variables, for users of modern reversible methods: ownership of tubewell, variable 'house', bari head's age, education, religion of bari, number of households in the bari, sanction of bari girls' education and participation of any bari member with NGO show significant between-group variation at the 5 percent level of significance.

Among acceptors of sterilization, ownership of tubewell, religion of bari, frequency of praying of bari head, number of households in the bari, sanction of bari girls' education and participation of bari members with any NGO have significant between-group variation at the 5 percent level.

Table 6.3 Distribution of bari-level variables for ever users of modern reversible method and sterilization, Eligible women Survey, Bangladesh 1994.

Variable	Modern reversible method users			Sterilization acceptors		
	Frequency	% User	F test p	Frequency	% User	F test p
Age of bari head						
≤44	940	52	<.01	548	17	.11
45-54	743	48		478	19	
55-64	700	41		482	14	
≥65	478	46		303	16	
Education of bari head						
None	1525	42	<.01	1069	17	.95
Primary or above	1336	54		742	17	
Variable 'House'						
Score<3	2230	45	<.01	1477	17	.14
Score≥3	631	54		334	14	
Ownership of tubewell						
Yes	1551	53	<.01	872	18	.35
No	1310	41		939	16	
Praying						
Irregular	1206	46	.23	801	19	.05
Regular	1655	48		1010	15	
Religion						
Islam	2568	45	<.01	1668	15	<.01
Others	293	66		143	32	
Number of households in the bari						
Two	385	53	<.01	241	26	<.01
Three	593	51		355	17	
Four	572	45		363	13	
Five	441	48		275	17	
Six or more	870	44		577	15	
Sanction of bari girls' education						
Yes	2142	52	<.01	1277	19	<.01
No	719	34		534	11	
Bari member participate with NGO						
Yes	880	46	.20	611	22	<.01
No	1981	48		1200	14	
N	**2861**			**1811**		

Cluster-level variables and region of residence are presented in Table 6.4. ANOVA tests show that for ever users of modern reversible methods almost all cluster-level variables show significant between-group variation. In clusters where more than one FWA was assigned, the characteristics of the FWA with longest length of service was chosen. The significant predictors of use of modern reversible methods are: distance to public TV and post office, distance to paved road and railway within 5 km of cluster, presence of

girls' secondary school, FWA's residence, her education and EPI training. For sterilization, the cluster-level variables showing significant between-group variation are distance to paved road & railway, presence of girls' secondary school within 5 km of the cluster, and FWA's education. The reverse direction of the FWA's age and acceptance of sterilization may be explained by the fact that younger FWAs is confounded with their recent employment in the cluster. In such clusters it is likely that due to no FWAs being present women found sterilization to be an easier option, compared to areas where FWAs are older (indicating they have been employed for longer periods) where other methods could be pursued because of regular replenishments. For users of modern reversible methods there are significant differences between administrative region of residence. However, for users of sterilization this difference is not significant at the 5 percent level.

Table 6.4 Distribution of users of modern reversible methods and sterilization according to cluster-level variables and region of residence, Eligible Women Survey, Bangladesh 1994.

Variable	Modern reversible method users			Sterilization acceptors		
	Frequency	% Users	F test p	Frequency	% Users	F test p
TV/Post office						
≤5 km	2382	49	<.01	1471	17	.51
>5 km	479	40		340	16	
Road/Railway						
≤5 km	1850	51	<.01	1124	12	<.01
>5 km	1011	40		627	20	
Girls' Secondary School						
≤5 km	1525	48	.52	316	18	<.01
>5 km	1336	47		1495	09	
FP retail shop						
≤5 km	2158	48	.53	1371	17	.64
>5 km	703	47		440	16	
Distance to NGO				1152	38	
≤5 km	1800	47	.66	659	36	.21
>5 km	1061	47				
Distance to market						
≤5 km	2266	46	.04	1465	17	.51
>5 km	595	51		346	15	
Family Welfare Centre						
≤5 km	1320	48	.71	833	18	.11
>5 km	1541	47		978	15	
FWA's residence						
≤5 km	1782	51	<.01	1175	17	.87
>5 km	1079	45		636	17	
Education of FWA						
Primary	483	37	<.01	334	09	<.01
Higher	2378	49		1477	19	
Marital status of FWA						
Married	2706	47	.54	1718	17	.86
Not married	155	49		93	16	
Age of FWA						
≤ 24	180	42	.16	136	24	.02
> 24	2681	48		1675	16	
EPI training of FWA						
Yes	2565	48	<.01	1591	17	.99
No	296	38		220	17	
Region of residence						
Dhaka	688	44	<.01	485	17	.10
Chittagong	713	43		352	13	
Khulna	632	49		422	17	
Rajshahi	828	54		552	19	
N	**2861**			**1811**		

6.4 MULTIVARIATE ANALYSIS

In this section multilevel logistic regression is used to model use of modern contraceptives on selected individual, bari and cluster-level variables including the FWA's characteristics in a three level model. Let y_{ijk} be the binary response of the ith individual in the j^{th} bari in the k^{th} cluster, where y_{ijk} =1 for being a user and 0 otherwise, and let p_{ijk} =Pr(y_{ijk} =1). Then the three level random coefficients logistic model can be written as follows:

logit p_{ijk} =log(p_{ijk} /1-p_{ijk})= H_{ijk}

where H_{ijk}=**X** β +u_{jk} γ +w_k η.

and

$$p_{ijk}=\frac{\exp(X\beta+u_{jk}\gamma+w_k\eta)}{1+\exp(X\beta+u_{jk}\gamma+w_k\eta)}+e_{ijk}$$

where H_{ijk} is the linear predictor. **X**, γ and η are design matrices containing covariates which may be defined at any of the three levels in the model. These may be characteristics of the woman such as her age, education, or socio-economic characteristics of the bari or variables acting at the cluster-level. β is the associated vector of parameter estimates and these are known as 'fixed effects'. In a multilevel model the variation not explained by the observed covariates is split into components corresponding to each level in the hierarchy, with a separate error term for each level. Variation at the woman level is represented by e_{ijk} which is assumed to have a binomial distribution, while u_{jk} and w_k are the level two and three error terms respectively. These are assumed to follow normal distributions with zero means and respective variance/covariance matrices Ω_2, Ω_3.

6.4.1 RESULTS

6.4.2 Modern reversible methods model

The final results of multilevel logistic regression analysis of 2861 women are presented in Table 6.4.1. All variables found to have significant between group variation in simple ANOVA tests were entered into the final model as explanatory variables. The final parsimonious model finds number of living children, age, education, relationship with bari head, religion and socio-economic status of the bari, and the FWA's education to be significant predictors of use of modern reversible methods in rural Bangladesh.

Number of living children is the strongest predictor of use in this model. Odds of use increases 3.44 times as number of living children exceeds one. The highest use is found for women with four or more living children.

Age is a significant predictor of use of modern reversible methods. This factor has a curvilinear relationship with use; it increases with age, reaches a peak and declines. Here the peak ages for use of modern reversible methods are between ages twenty and thirty-nine. Women aged above forty have lower use than women below twenty in this model.

Educated women are more likely to use modern reversible methods, previous analysis has also found similar results (Cleland et al., 1995). In this model, the odds of use for an educated woman is 1.66 compared to an uneducated woman.

Relationship of the woman with the bari head is a predictor of use in the model. Women who were daughter-in-laws, sister-in-laws, or other relatives of the bari head were found to have lower use compared to wives. This fact was apparent even during the field work and our initial hypothesis was that wives of bari heads, being in positions of power,

in some way restricted access of the FWA to younger women in the bari. However, in further analysis of models involving interaction of 'relationship with bari head', and 'bari heads' opinion on FP', some interesting associations were found which cast doubt on this hypothesis. When the bari head was favourable towards contraception, use by relatives other than his wife was indeed reduced, and the mechanism may be as suggested. But when the opinion of bari head was unfavourable the use by relatives other than his wife was in fact greater. This would suggest that denial of access to younger women of the bari is not an inevitable mechanism. However, the variable 'opinion of bari head on FP' was confounded with the use of the wife, and there were very small numbers of observations in some categories of the analysis, hence this result was not included in the final model. The question of 'access restriction' is one that deserves further investigation.

Among bari head's characteristics, both his education and age were found to be significant predictors of use in previous models. Women from older bari heads were less likely to be users; this effect became unimportant when religion was controlled in the model. Women from baris with educated bari heads were found to have higher probability of use compared to those from baris with uneducated bari heads, but this factor became unimportant when age of woman was controlled in the model.

Religion of the bari was found to be an important predictor variable. Women from non-Muslim baris had higher probability of use compared to those from Muslim baris. This is in the expected direction. Other studies and field observations found that Muslim respondents perceived a religious opposition to the use of modern FP methods. Although Islam does not forbid use of modern contraception, the messages may not be clear to the common people and compared to those from other faiths; they seem to have a significantly different attitude towards use of modern FP. In religiously homogeneous

(Islamic) areas this attitude was found to be more prominent compared to religiously diverse areas (Balk, 1994). However, in this model, no interaction term was significant between the area and religion.

There is higher probability of use among more affluent baris, indicated by those owning a tubewell. Odds increase 1.36 times when the bari owns a tubewell. Similar directions have also been found in previous studies where women from higher socio-economic status were more likely to be users of modern reversible methods (Kamal & Sloggett, 1993).

Bari-level socio-economic variable 'house' and number of households in the bari were found to be insignificant predictors of ever use of modern reversible methods in this model.

Sanction of education of bari girls is an important variable until the variable 'education of the FWA' is controlled in the model. This shows that FWA's education has greater explanatory power than the education of the bari girls.

In this model educational levels of the FWA was found to be a significant predictor of use. Women served by FWAs having only primary education have lower probabilities of being a user compared to those served by FWAs with more than primary education. This is a remarkable finding. Neaz and Banu (1992) and Rahman (1986) remarked that educational criteria for FWAs was relaxed only in areas where qualified applicants were not found, implying that the areas had lower educational levels for women and lower status compared to other areas. However, these variables have been controlled in this model, and the results show that the education of the FWA is a signficant predictor of use.

Table 6.4.1 Results of multilevel logistic regression of users of modern reversible methods on selected individual, bari and cluster-level variables, Eligible Women Survey, Bangladesh 1994.

Variables	Odds ratio	95% Confidence Interval
Fixed effects		
Individual level variables		
Number of living children		
One or none	1.00	-
Two or three	3.44	2.82 - 4.18
Four or more	4.20	3.29 - 5.38
Age of the woman		
≤19	1.00	-
20-39	1.64	1.20 - 2.26
≥40	0.72	0.48 - 0.91
Education of woman		
None	1.00	-
Primary or higher	1.66	1.37 - 2.04
Relationship with bari head		
Wife	1.00	-
Daughter/ sister-in-law	0.77	0.61 - 0.97
Others	0.72	0.56 - 0.90
Bari-level variables		
Religion of bari		
Muslim	1.00	-
Non-Muslim	1.53	1.05 - 2.23
Ownership of tubewell by bari		
No	1.00	-
Yes	1.38	1.13 - 1.67
Cluster-level variables		
Education of FWA		
Primary	1.00	-
Higher	1.89	1.05 - 3.41
Random effects		
Estimate of	Estimate	Standard error
Between-cluster variance	.1965	.0806
Between-bari variance	.2440	.0772
N=2861		

-2Log-likelihood=3553.93

The presence of road and railways near the cluster was an important predictor of modern reversible methods until the model was controlled for education of the FWA. All other cluster-level variables such as distance to FWA's residence, FWC, girls' secondary school, public TV, FP retail shop and market were found to be insignificant predictors of use of modern reversible methods. The findings from this model indicate that the distance to the FWC is not a significant predictor of use of modern methods. Although this matches previous findings from the 1989 BFS (Kamal, 1994), one would expect that after the increase in the number of FWCs and FWAs in 1991, the effect of these two cluster-level variables would be increased. But that is not the case in this analysis, which finds neither distance to FWA's residence nor to the FWC to be associated with higher use of modern reversible methods. In a more recent study, Mitra et al.(1994) found that among users of modern methods, only 13 percent mentioned the FWC as their source of FP, while 42 percent mentioned the FWA. Although this result supports the finding that proximity of an FWC may not be an important predictor of use of modern reversible methods, it does not explain the insignificance of the distance to FWA's residence. One possible explanation may be the definition of this variable as it is used in this study. Perhaps the number of visits to the individual woman is a better predictor of use compared to the distance to the residence of the FWA. Visits to the individual woman, as well as visit to the cluster by the FWA were found to be highly predictive of use in previous models using the 1989 BFS (Kamal, 1994; Kamal & Sloggett, 1993; Phillips et al., 1993). In this study, all clusters had an FWA who visited the cluster (so it was not considered a variable), and visits to women by an FWA was not included in the model because of its circular relationship with known users. However, the finding that

educational level of the FWA has an association with use of modern reversible methods has probably captured the variation previously due to FWA visits, observed in other models.

There were no significant differences among the administrative regions in this model. This is an important finding indicating that divisional effects found in earlier studies may no longer be significant when the model specification is correct with assigned levels of variation (Kamal & Sloggett, 1993; Shahidullah & Chakroborty, 1993; Amin et al., 1994).

All possible combinations of first degree interaction terms were investigated and none of them showed any significance in this model.

Random effects

None of the variables included in this study were found to have any significant random variation, ie variation at a level above that to which they belong. The variables 'participation of bari member/s with any NGO' and the 'frequency of prayers' of the bari head did show some random variance at the cluster-level. But these variations were not significant (at the 5% level). The random variations indicated that those baris participating with an NGO had more variation between them in use of modern reversible methods, compared to those not participating. This may be related to the fact that not all NGOs mentioned in this study are FP based. There might be distinct differences in the population involved in FP based NGOs and those in non-FP based NGOs. However, the random variation was not significant and was removed from the final model.

Similarly, baris with religious bari heads (indicated by frequency of praying), had less variation between clusters than baris with less religious heads. However, this random variation was also not significant and was not included in the final model.

The variable 'education of FWA' displayed some random variation in earlier models. It was found that among clusters with FWA's educated beyond primary level, there was less variation in use of modern reversible methods, compared to clusters with FWA's educated up to primary level only. One possible reason may be that when the FWAs are educated beyond primary they are expected to perform in a similar fashion making cluster-level differences small. When they are educated only up to primary level there may be greater differences in their performance arising from other unobserved factors like her personality, ability to motivate, her mobility, her FP training and influence etc. However, this random variation was not significant at the 5 percent level and was not included in the final model.

Random variation between clusters is still significant and explains 13 percent of the total variation instead of 18 percent found in the initial variance component model. However, when two clusters with lowest CPs Benua and Uttar Khaleya were excluded from the model, the between-cluster variance was no longer significant. This indicates that these two clusters have major contribution to the between-cluster variance observed in the model presented in Table 6.4.1.

In short, apart from basic predictors, education of the FWA is the most influential predictor of use of modern reversible methods in rural Bangladesh. Religion and socio-economic status of the bari are also important predictors, so are maternal education and position within the bari. Between-bari and between-cluster variance remain significant, but between-cluster variance is largely accounted for by two rather atypical clusters.

6.4.3. Model for sterilization acceptors

The final model presented in Table 6.4.2 finds maternal age, education, relationship with bari head, number of living sons, religion of bari, bari girls' education and

participation of bari members with any NGO to be significant predictors of sterilization. Age of the woman is found to be the most significant predictor of sterilization in this model. Women older than thirty years have an odds ratio of 5.53 of accepting sterilization. The odds increase slightly as women are aged over forty. The results are in the expected direction because women in Bangladesh are very unlikely to accept permanent methods during their early childbearing ages, because they have to prove their worth as the mother of a male child (Jehan, 1975).

Woman's education was found to have a negative association with sterilization. Women who had some education were less likely to be users of sterilization. Results match previous studies (Kamal & Sloggett, 1993). In rural Bangladesh, sterilization was very popular during the late seventies and was mainly accepted by rural, uneducated women in older age groups (Amin et al., 1994). The preference for sterilization by uneducated women could be due to the single visit required to the Thana Health Centre for its adoption. Uneducated women probably find it convenient that no calculations or cautious monitoring, or repeated visits to the health centre are required. In addition, cash compensation acted as an incentive to be an acceptor particularly among poorer, less educated couples (Cleland and Mauldin, 1989).

In this model, number of living sons is a stronger predictor than number of living children. Sterilization being a permanent method, couples are more likely to take decisions based on the gender composition of their living children. The models using number of living children as an explanatory variable had higher log-likelihood compared to those using the number of living sons. Previous studies have also supported this finding (Cleland et al.,1994;Chowdhury et al., 1993; Kamal & Sloggett, 1993). As number of living son increases from none to higher, there is a monotonic increase in the probability

of accepting sterilization.

Relationship with bari head is a significant predictor in this model. Compared to wives of bari heads, daughter-in-law, sister-in-law and other relatives have significantly lower probabilities of accepting sterilization. In Bangladesh, at the initial onset of the FP drive, rural women were given very few choices in FP methods: either pills or sterilization. Since use of pills needed comprehension and cautious monitoring, sterilization gained popularity in the late 1970s (Amin et al., 1994). One explanation for higher use by bari head's wife may be that when the bari head (or his wife) chose sterilization, fewer options were available to the couple. By the time the other members of the bari became eligible for FP use, many more reversible methods had been introduced into the programme, and sterilization has been sparingly accepted by this younger generation of daughter and sister in-laws of the bari head.

As mentioned earlier in the model on use of modern reversible methods, the power structure of the bari might be the other reason for low use by non-wives of the bari head. Daughter/sister-in-laws seem to have lower status in the family and this might affect their decision to be an acceptor of sterilization. However, further investigation of this result with the 'opinion of bari head on FP' found exactly similar results as the model on modern reversible methods. When the bari head is unfavourable to FP, the other relatives have higher probability of use compared to the wife. These directions were not clear from the investigations because of the circular relationship between use of bari head's wife and his opinion on FP. Future research might study the influence of bari heads' opinion on FP on other junior members of the bari.

Among bari characteristics religion, participation with NGO and sanction of bari girls' education are significant predictors of sterilization. Non-Muslim baris have more

than double odds of accepting sterilization compared to Muslim baris. This illustrates the perceived conflict of modern FP with Islamic beliefs that was encountered during the fieldwork. Strong conservatism seemed to be more prominent against sterilization compared to other reversible methods. In addition, it is possible for a woman in rural Bangladesh to use modern reversible methods without the knowledge of other bari members, but to accept sterilization she would need full approval of her husband and the rest of the family. This is because sterilization is performed in the Thana Health Centre where the woman cannot travel on her own or spend one night unaccountably. Hence, the general atmosphere of the bari is more relevant in the sterilization model compared to use of modern reversible methods. The model also supports this observation.

Table 6.4.2 Results of multilevel logistic regression of acceptors of sterilization on selected individual, bari and cluster-level variables, Eligible Women Survey, Bangladesh 1994.

Variables	Odds ratio	95% Confidence Interval
Fixed Effects		
Individual level variables		
Number of living sons		
None	1.00	-
One	4.05	2.33 - 7.02
Two or more	5.20	3.06 - 8.83
Age of woman		
≤29	1.00	-
30-44	5.53	3.52 - 8.22
≥45	5.69	3.63 - 8.93
Education of woman		
None	1.00	-
Primary or higher	0.63	0.41 - 0.96
Relationship with bari head		
Wife	1.00	-
Daughter/sister-in-law	0.56	0.39 - 0.82
Others	0.50	0.34 - 0.72
Bari-level variables		
Religion		
Muslim	1.00	-
Non-Muslim	2.10	1.20 - 3.62
Bari girls' education		
No	1.00	-
Yes	1.85	1.34 - 2.74
Participation of bari member with an NGO		
No	1.00	-
Yes	1.84	1.30 - 2.61
Random effects		
Estimate of	Estimate	Standard Error
Between-cluster variance		
Constant	.0436	.0557
Education/Constant	.2423	.0830
Between-bari variance		
Constant	.8306	.2240
N=1811		

-2Log-likelihood=-108.226

The socio-economic indicator 'ownership of tubewell' showed negative association with use of sterilization in earlier models. Women from higher socio-economic status had lower probability of use. Similar results were observed by Kamal and Sloggett (1993), However, the effect of education of the woman had greater explanatory power than the socio-economic status.

Number of households in the bari showed negative association with acceptance of sterilzation in earlier models. Women from baris with more than two households had lower probability of use, compared to women from baris with two households. It is possible that women from baris with higher number of households have more inpediments compared to those who come from only two households. They may have to consider opinions of elder brothers/uncles and other relatives (living in the bari) before taking this major step. However, this effect attenuated when age of woman was controlled in the model.

Variable 'house' was found to have no association with acceptance of sterilization.

When girls' education is sanctioned by the bari head there is higher odds of use of sterilization compared to when they are not. It is important here to distinguish between the variable 'maternal education' and 'bari girls' education'. In this model 'bari girls' education has been taken to be an indicator of modern behaviour on the part of the bari head. When the bari head is progressive bari girls' school attendance is sanctioned and vice versa. In this model we find that when girls from bari attend school there is higher probability of use of sterilization. This implies that progressive bari heads will allow bari women to use sterilization. This finding has no precedence in the demographic literature. It implies that targeting bari heads in future might be fruitful towards increasing use of sterilization in rural Bangladesh.

Participation of bari member with any NGO is a significant predictor of sterilization. Odds of use increase by 1.84 when a member of the bari participates in some NGO activities. Other studies have also found that use of modern methods increases with participation in NGO, but the relationship of NGO participation with sterilization is unique to this study. This finding has important policy implication about the future role of NGOs in Bangladesh which will be discussed later in Chapter 7.

None of the cluster-level variables included in the study were significant at the 5 percent level of significance. The education of the FWA showed positive association with use of sterilization in earlier models, but this effect became insignificant as 'participation with NGO' entered the model. The education of the FWA had a marginal effect in the first place which was attenuated by the variable 'participation with an NGO'. This implies that involvement with an NGO by bari member enhances the probability of being an user and has much more explanantory power than the level of education of the FWA. It is likely that participation in the NGO provides enhanced motivation and support in adopting sterilization, and the educational level of the FWA is no longer important.

Distances to roads and railways also showed positive association with sterilization. That too becomes unimportant when 'participation with NGO' was introduced in the model. Presence of girls' secondary school in the cluster showed positive association with sterilization, this variable became unimportant after controlling for bari girls' education.

All other cluster-level variables such as distance to FWA's residence, her EPI training, distance to FWC, market, shop, public TV and post office are insignificant predictors of use of sterilization in this model. The fact that static health centres do not play any role in the prediction of sterilization rates is noteworthy. This finding matches earlier findings by the author, where data from the 1989 BFS found that static FWC's had

no effect on sterilization by women of rural Bangladesh (Kamal, 1994). Since sterilizations are performed at the Thana Health Centre and not the FWC, this relationship is quite justified.

The model also finds that differences between administrative divisions of residence are not significant. Earlier models found significant differences between administrative divisions (Rashid & Huq, 1993, Kamal & Sloggett, 1993).

Random effects

The random variation in this model is presented in Table 6.4.2. The model finds that between-cluster variance is significantly different between educated and uneducated women. The model shows that the between-cluster variance for uneducated women is smaller than that of educated women. It is possible that uneducated women find sterilization much easier and safer to use and this behaviour is common between all clusters. On the other hand, educated women have a wide range of choices. In some clusters where access is favourable, educated women would be more likely to use modern reversible methods compared to sterilization and hence the difference between them. In this model, the between-cluster variance for educated women is significant while that for uneducated women is not.

In earlier models, both religion and frequency of prayers showed random variation at the cluster-level. Non-Muslim baris showed less between-cluster variation compared to Muslim baris. Less religious baris also showed less between-cluster variation compared to religious baris. However, these random variations were insignificant at the 5 percent level and were not included in the final model presented in Table 6.4.2.

None of the other variables included in this model explained any random variation between baris.

In short, apart from age and number of living sons, religion is the most significant predictor of use of sterilization in rural Bangladesh. Bari member/s participation with NGO, and progressive behaviour of the bari head and education of the woman are also important predictors of use of sterilization. Educated women have more differences between clusters compared to uneducated women who seem to exhibit similar patterns between clusters.

6.4.4 Estimated probabilities

To calculate the estimated probabilites from the models, the probabilites are calculated for various characteristics setting the others to their average values. Table 6.4.3 and Table 6.4.4 presents the estimated probabilities for various characteristics of the two models.

This model suggests that improving educational opportunities for women is likely to increase use of modern reversible methods in rural Bangladesh. It also suggests that employing better educated FWAs will result in higher use of modern reversible methods in future.

Table 6.4.3 Estimated probabilites of ever use of Modern Reversible Methods by Selected Characteristics, Bangladesh 1994.

Age of woman	
≤19	.48
20-39	.69
≥40	.40
Number of living children	
One or none	.31
Two or three	.69
Four or more	.65
Relationship with bari head	
Wife	.65
Daughter/sister-in-law	.60
Others	.58
Education of woman	
None	.56
Literate	.68
Ownership of tubewell	
No	.65
Yes	.72
Religion	
Muslim	.59
Non-Muslim	.69
FWA's education	
Primary	.47
Higher	.63

Table 6.4.4 Estimated probabilities of acceptance of Sterilization by Selected Characteristics, Bangladesh 1994.

Age of woman	
≤29	.08
30-44	.32
≥45	.31
Number of living sons	
None	.07
One	.23
Two or more	.31
Education of woman	
None	.33
Primary or higher	.29
Relationship with bari head	
Wife	.44
Daughter/sister-in-law	.31
Others	.28
Religion	
Muslim	.30
Non-Muslim	.48
Bari girls' education	
No	.30
Yes	.38
Participation of bari member with an NGO	
No	.27
Yes	.40

In the model on sterilization two variables deserve special mention for their possible contribution to increased usage of sterilization in future. The first is the participation of bari members with an NGO, and the other is sanction of school attendance for bari girls. Both exhibit progressive behavioural pattern by the bari head and are conducive to the acceptance of sterilization. More FP based NGOs may also be helpful

in promoting use of modern methods of contraception.

6.5. Bari effects

One way of examining the implications of the variability in use across baris is to use an approach employed by Curtis et al. (1993) which involves estimating the probabilites of use of any method for different values of the bari random effect u_{jk}, for women with a specific combination of characteristics. Values of u_{jk} between $-2\sigma_u$ and $+2\sigma_u$ are considered, u_{jk} =0 corresponding to the mean value. The probability that a woman with a certain set of characteristics will be a user will lie between the probabilites corresponding to $u_{jk} = -2\sigma_u$ and $u_{jk} = +2\sigma_u$ for about 95 percent of women. Negative values of the bari effect would correspond to baris which have below average likelihoods of having an ever user, while positive values correspond to above-average likelihoods on the unobserved bari-level factors.

Figures 6.1 and 6.2 show the estimated probabilites of ever use for different values of the bari effect u_{jk} and for three sets of characteristics. These characteristics are least favourable, average, and most favourable. Most favourable characteristics are for those where all values of the covariates are at the maximum. Average characteristics are when all covariates are held at their average proportions. In the least favourable model all covariates are held at the most unfavourable values, but age of woman and number of living children are fixed at average values.[1] In all three models the cluster effect is held equal to zero.

In Figure 6.1 there are indications of unobserved heterogeneity existing among baris in the ever use of modern reversible methods. On average the probability of use is

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[1]For modern reversible methods age is fixed between 20-39 and number of living children is is two or three. For sterilization age is fixed between 30-44 and one living son.

higher for women with average characteristics compared to women with least favourable characteristics. However, when the random effect is high for least favourable women (such as $1\sigma_u$) the probability may be higher than that for a woman with average characterisitics and random effect $=-2\sigma_u$. Similar situations are observed for women with average characteristics and those with most favourable characteristics.

In Figure 6.2 there are clear signs of large unobserved heterogeneity. Women in least favourable circumstances can have probabilites ranging from around .01 if $u_{jk} =-2\sigma_u$ to .40 if $u_{jk} =+2\sigma_u$, and the corresponding range for most favourable characteristics is from .34 to .95. On average women with average level of characteristics have higher probability of accepting sterilization compared to those with least favourable characteristics. However, if the random effect is considered, it is possible that a woman with least favourable characteristics, but with a high value on the random effect, actually has a higher chance of accepting sterlization than a woman with average characteristics, but with a small random effect. For example, when u_{jk} is greater than $1.3\sigma_u$ then they have a greater probability of being sterilized than a woman with average characteristics and $u_{jk}=-2\sigma_u$. Similar arguments hold for women with average characteristics when compared to those with most favourable characteristics. This indicates that even after controlling for observed covariates the model on sterilization shows large unobserved random effects at the bari-level.

Figure 6.1: Bari-level variation in ever use of Modern Reversible Methods, rural Bangladesh 1994

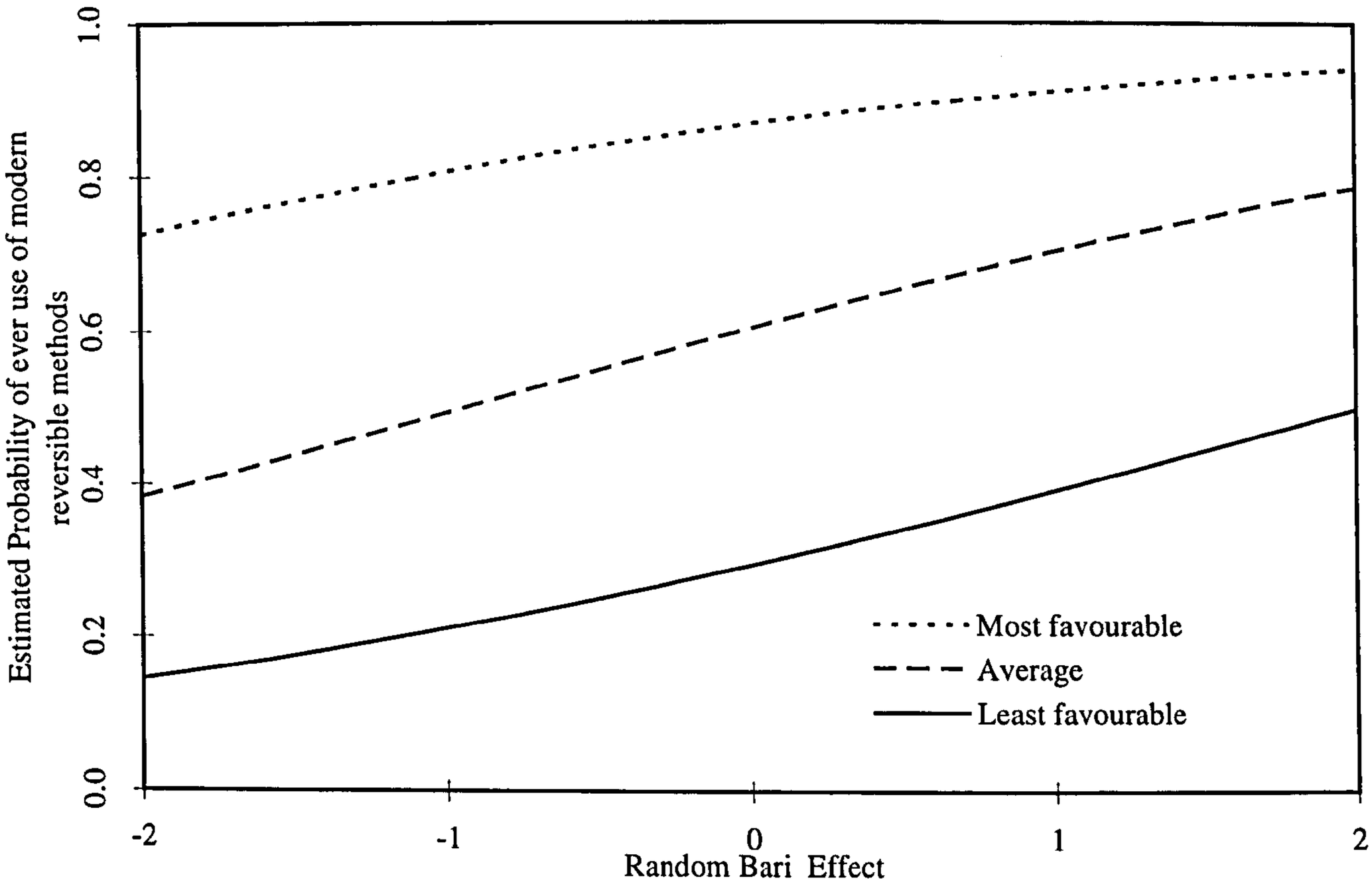
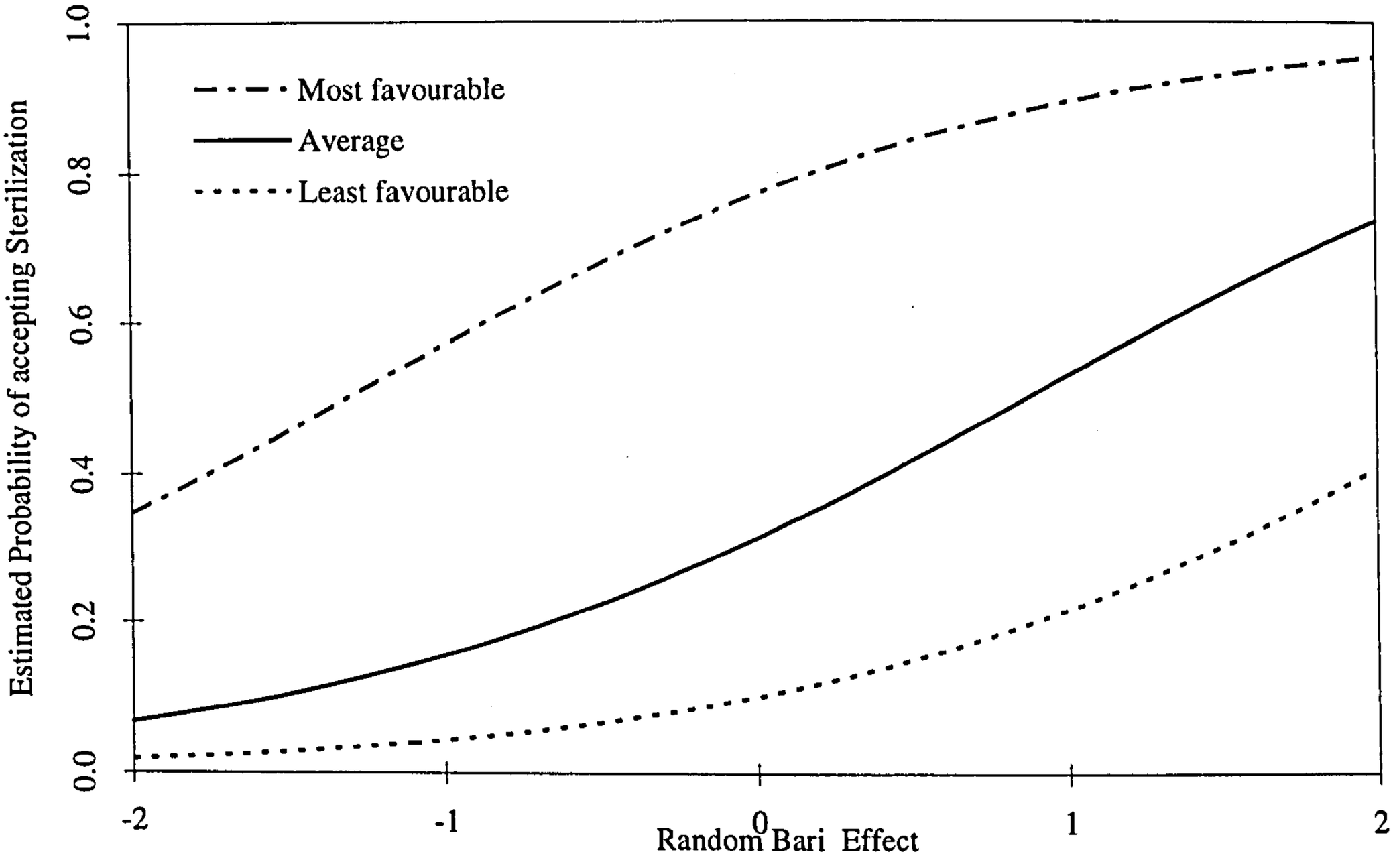


Figure 6.2: Bari-level variation in acceptance of Sterilization, rural Bangladesh 1994



6.6. Cluster effects

The estimates of the level three residuals $\hat{w}_k$ can be used to predict 'cluster effects', that is the contextual effect of the cluster in which the woman lives on her probability of being a user (either modern reversible method or sterilization).

Confidence intervals can be constructed for each cluster-level residual to illustrate differences in use of either modern reversible methods or sterilization between clusters. Goldstein and Healy (1995) have proposed a procedure for the construction of simultaneous confidence intervals to test for differences between any pair of villages where the significance level averaged over all possible pairs is equal to the required value. Simultaneous confidence intervals are determined such that any overlap at all suggests a non-significant difference between groups. If they do not overlap, the differences are statistically significant at the chosen level.

To describe this approach briefly, suppose there are K independently normally distributed estimates of cluster-level residuals $\hat{w}_{j,}$, k=1,2,....,K with known standard errors σ_k. Suppose we wish to compare a pair of clusters k and l, with estimated residuals $\hat{w}_k$ and $\hat{w}_l$ respectively and standard errors σ_k and σ_l. The standard 95 percent confidence interval for the k^{th} cluster residual w_k is given by

$\hat{w}_k \pm 1.96\sigma_k$.

The simultaneous 95 percent confidence interval is

$\hat{w}_k \pm z\sigma_k$

where z is selected so that the average significance level over all pairs of contrasts (k,l) is 5 percent. An approximation to z is the average of $1.96\ \sigma_{kl}/(\sigma_k + \sigma_l)$ over all pairs of clusters (k,l), where $\sigma_{kl}^2 = Var(\hat{w}_k - \hat{w}_l) = \sigma_k^2 + \sigma_l^2$.

If there are k clusters there are ½ K (K-1) possible pairwise contrasts. Therefore

$$z \approx \frac{2}{K(K-1)} \sum \frac{\sigma_{kl}}{\sigma_k + \sigma_l}$$

where k<l. The calculated value of z in this study is 1.44 for the modern reversible methods model.

In Bangladesh, acceptance of sterilization has fallen since 1991 (Mitra et al., 1994) and demographers have posited that the immediate needs for this method has been met (Islam & Islam,1993). In our field work it was observed that the sterilization cases that were documented had happened in the past, but use of modern reversible methods was more like the current story. In this study we found very close figures for ever use of modern reversible methods (47 percent) and current use (40 percent). Therefore it was thought that future interest lies in the use of modern reversible methods in Bangladesh.

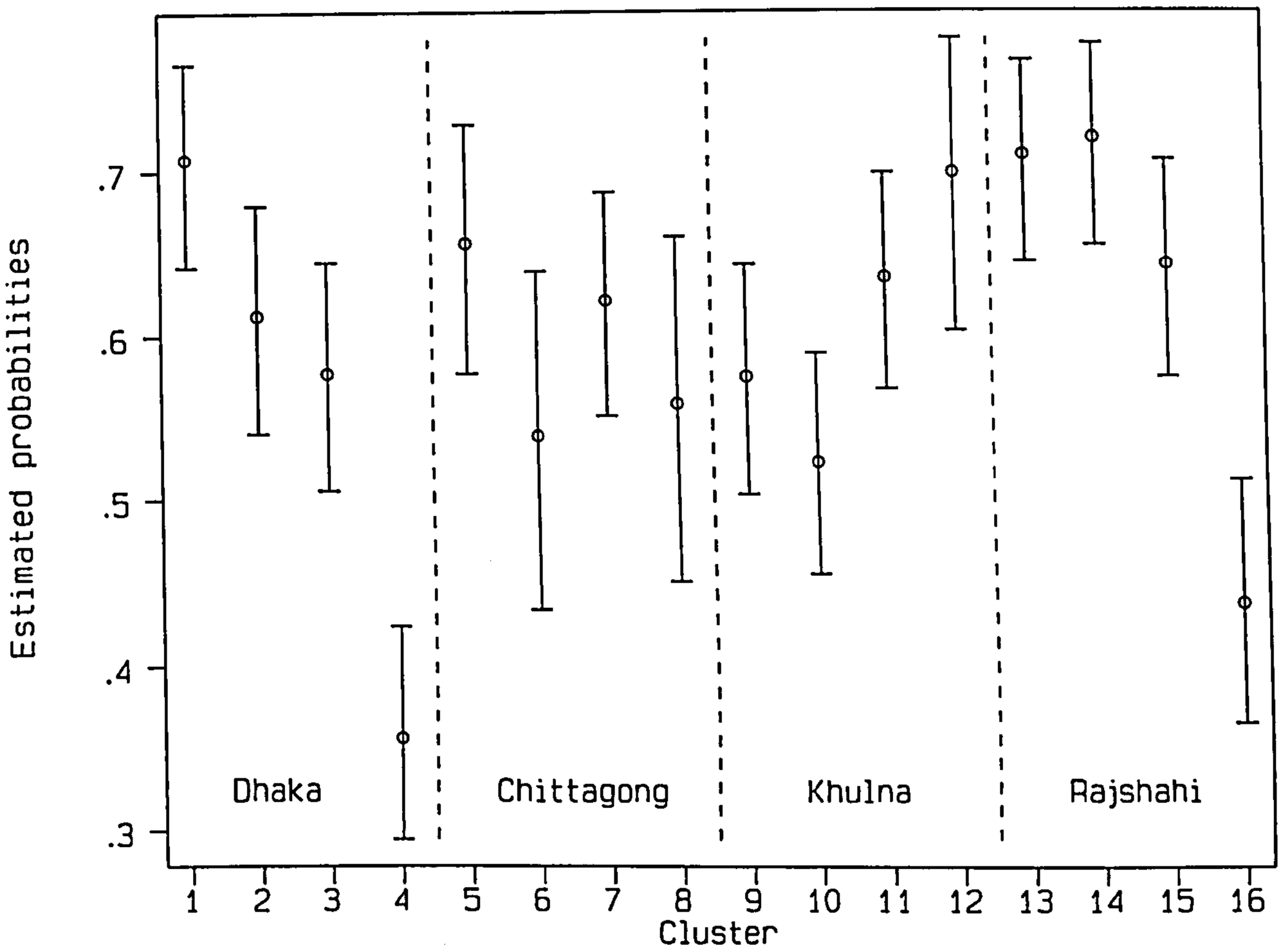
To study the cluster effects the model on modern reversible methods was chosen. Figure 6.3 shows the adjusted rankings of clusters according to their rates of ever use of modern reversible methods for each cluster with approximate 95 percent simultaneous confidence intervals for the cluster effects. These probabilities have been calculated for each cluster while holding all other covariates at their average value and the random bari-level effect u_{jk} at zero. The adjusted rankings of the clusters are almost identical to the raw rankings shown in Table 6.5.

Figure 6.3. shows that the simultaneous confidence intervals overlap for most clusters in this study with possible exception of clusters Benua and Uttar Khaleya. This shows that the model has accounted for most of the cluster-level variation in this study and most most clusters are not significantly different from each other in their ever use of

modern reversible methods. However, there are pockets which show lower than average probability. Benua in Dhaka division and Uttar Khaleya in Rajshahi division show low probability of ever use of modern reversible methods. Both these clusters are economically poor clusters, Benua is particularly poor compared to other clusters in Dhaka division and Uttar Khaleya is poor compared to other clusters in Rajshahi division. Similarly poor clusters were found in other divisions as well. But one possible explanation for low use in these clusters may be that the FP programmes in other divisions have geared themselves up for poor economic situations. Whereas in Dhaka and Rajshahi division, which are more developed generally, these two clusters have not received appropriate attention by the FP programme.

Confidence intervals of the probability of use in Benua only overlaps with those of Uttar Khaleya, and also shows significantly low probability of use. This may be also because a renowned religious leader resides in Benua and prevents women from being users by spreading contradictory sermons in the mosques. Balk (1994) has remarked that in religiously homogenous villages, a Muslim woman's status is lower than that in a religiously diverse village. This may be a possible reason for significantly low use in Benua.

Figure 6.3 Estimated Average Probabilites of ever use of Modern Reversible Methods by Cluster with Approximate Simultaneous 95% Confidence Intervals for Cluster Effects.



Note: Age of woman set to 20-39 and number of living children two or three. All other covariates are set to average values and bari effect u_{jk} set to 0.
Cluster key.
Dhaka division:1. Nannar 2. Bakarkanda 3. Dhanikhola 4. Benua
Chittagong division: 5. Kadhur Khil 6. Abdul Nabi 7. Fakirtilla 8. Dewanbazar
Khulna division: 9. Jalalabad 10. Charsakina 11. Kapasdanga 12. Sura
Rajshahi division: 13. Jagjibonpur 14. Amair 15. Chandipur 16. Uttar Khaleya

Table 6.5 Observed probabilites of being an ever user of modern reversible methods, Cluster Survey, rural Bangladesh 1994.

Cluster	% user	N
Dhaka division		
Nannar	48	189
Bakarkanda	47	188
Dhanikhola	36	212
Benua	21	195
Chittagong division		
Kadhur Khil	62	239
Abdul Nabi	28	222
Fakirtilla	53	181
Dewanbazar	30	121
Khulna division		
Jalalabad	43	209
Charsakina	32	338
Sura	45	210
Kapasdanga	45	170
Rajshahi division		
Jagjibanpur	56	172
Amair	61	155
Chandipur	52	192
Uttar Khaleya	27	172

6.7. SUMMARY

This chapter presented the final models of this study. For ever users of modern reversible methods the model found that apart from woman's age and number of living children, the educational level of the FWA is the most useful predictor. Use increases when the assigned FWA is educated beyond primary level. Other significant predictors are relationship with bari head, education, socio-economic status and religion of the woman.

For the model on sterilization, apart from woman's age and number of living sons, religion is the most significant predictor. Non-Muslims are more likely to be users of sterilization compared to Muslims. From a policy viewpoint this finding is not particularly useful. Other significant predictors of use are the woman's position within the bari, her education, attitude of bari head towards female education and participation of bari member with any NGO.

Bari-level random variation was found to be significant for both ever users of modern reversible methods and sterilization. In both cases the bari-level random effect was high even after controlling for the observed variations. There is scope for further research into possible reasons for these significant but, as yet unexplained, bari-level variations.

A graphical representation of the cluster effect of the modern reversible methods model found that after controlling for the variables used in this analysis, there are no significant differences in use between most of the study clusters, except for Benua and Uttar Khaleya. The between-cluster variance was found to be significant in the model, but exclusion of the two clusters found that the remaining between-cluster variance was no

longer significant (at the 5 percent level).

The two clusters Uttar Khaleya and Benua, did show very low probabilities of use. Both are known to be economically poor and backward compared to other clusters from their respective divisions. The presence of an important fundamentalist religious leader may also be a cause for remarkably low use in Benua.

For sterilization users, the between cluster variation was very small and educated women seemed to have more between-cluster variation compared to uneducated women.

CHAPTER 7

SUMMARY OF FINDINGS AND POLICY RECOMMENDATIONS

7.1 SUMMARY OF FINDINGS

The findings of this dissertation are that areal variations in use of modern contraceptives in rural Bangladesh are largely due to a few key bari-level and community-level factors, in addition to basic socio-economic and demographic characteristics of the woman. In other words, the study finds that a significant portion of the areal variations in contraceptive use of rural women in Bangladesh is attributable to factors pertaining to the bari and bari head, and also to the community-level socio-economic variables, and characteristics of the FWA, as hypothesized in Chapter 1.

In Chapter 2, the average use of modern methods in each cluster was modelled for 170 rural clusters from the 1989 BFS, using multiple regression analysis. For users of modern reversible methods, three cluster level variables were found to be significant: visits to the cluster by NGO workers, presence of primary school and presence of a market within three miles of the cluster. For cluster level proportion of acceptors of sterilization, only 'presence of primary school within three miles of the cluster' was significant.

Two clusters of extreme contraceptive prevalence were chosen for a qualitative in-depth study to investigate the possible causes for between-cluster use of modern contraception. Chapter 3 presents the detailed findings from these two clusters. The high prevalence cluster 'Panchbibi' is both economically well developed and has good access

to markets, town etc., compared to the low prevalence cluster 'Dewanbazar'. People in Panchbibi seemed much less conservative and progressive compared to people in Dewanbazar, who seemed more religiously inclined. A comparison of inter-spousal communications from the two clusters could not find any significant difference between the two areas. Questions on inter-spousal communications were, therefore, not included in the main study whose results follow in the subsequent chapters.

Chapter 4 describes the sixteen clusters selected for the main study. Also in this chapter, the contraceptive prevalences in the catchment areas of FWAs were modelled on selected characteristics of eighty FWAs from the sixteen unions of the study. Factors found to be significant correlates of contraceptive use were: the FWA's marital status, her professional training in EPI services, her age and education. Cluster-level socio-economic factors and FWA related factors were considered to be at the same level, i.e. the cluster level in this study (level three). Bari (common family dwelling) level factors were considered as level two, and individual factors of the woman were considered level one.

In Chapter 5, results from the bari survey are presented. Two multilevel logistic regression models were constructed on the ever use of modern contraceptives by the bari head. Very few studies have targeted men as their respondents, especially regarding their use of modern FP methods in Bangladesh. This analysis, therefore, presents a unique result. For the modern reversible methods model, apart from age and number of living children, religiosity and 'sanction of bari girls to attend school' were found to be significant predictors of use. The variable 'sanction of bari girls to attend school' has never been used as a predictor of contraceptive use of bari head, and its significance implies the importance of progressive behaviour by the bari head (details in Chapter 5). None of the cluster-level variables were significant as predictors of use of modern

reversible methods by bari heads. However, cluster-level unexplained variance was significant even after controlling for the explanatory variables.

Apart from age and number of living sons, religion was the only significant predictor in this study of acceptance of sterilization by the wife of the bari head. Non-Muslim bari heads had higher probability of use compared to Muslim bari heads.

In Chapter 6 the final models of the study are presented. For reversible modern methods, apart from maternal age and number of living children, the educational level of the FWA was the strongest predictor of use. Other significant predictors were education of the woman and her relationship within the family hierarchy, and socio-economic status and religion of the bari. Random variation across baris was found to be significant, indicating the presence of unobserved factors at the bari-level. However, the analysis found that, after controlling for the explanatory variables in this study, between-cluster variance in ever use of modern reversible methods remained significant. In a graphical representation, most clusters had overlapping confidence intervals of use of modern reversible methods, except for two clusters which showed very low probabilities compared to the others. These clusters are economically very poor are well as conservative and the FP programmes may not be geared to cope towards them as they do in other divisions where all clusters have similar poverty and conservatism. Presence of a very charismatic religious leader might be the cause of extremely low prevalence in one of the clusters with lowest confidence intervals. Exclusion of the two low prevalence clusters produced a model with no between-cluster variation (at the 5 percent level of significance), indicating that these two clusters had contributed mainly to the observed between-cluster variation.

For sterilization, apart from age and number of living sons, religion of bari was

found to be the most influential predictor of use. Education of the woman and her position within the family were also significant determinants of use. Woman's education had a negative effect on use, indicating that uneducated women opt for sterilization. However, when girls from the bari are allowed to attend school, there is higher probability of use. The sanction of bari girls' school attendance was taken as a measure of progressiveness by the bari head and the results occur in the expected direction. It is also noteworthy that most of the sterilizations have occurred in the past whereas sanction of girls' attendance of school may be more recent. These two factors have a time-lag between them. A plausible explanation would be that a progressive bari head allowed his wife (or himself) to be sterilized and is, more presently, sanctioning the bari girls to attend school. Participation of bari members with any NGO was also found to be associated with use of sterilization.

After controlling for the chosen explanatory variables, the bari-level random variation was still found to have significant variation. A woman with least favourable characteristics had a greater chance of being a user when she was living within a bari with favourable indicators, compared to a woman with average characteristics but living within a bari with unfavourable indicators. This implies that some unobserved bari-level factors are still operating and causing this variation. The final model also found that although between-cluster variation is very small, educated women have higher between-cluster variation compared to uneducated women. This suggests that education alone does not always release the woman from social norms of behaviour. It perhaps allows her more informed choice but she does not always choose as expected.

7.2. RELEVANCE OF FINDINGS TO THE EXPLANATION OF FERTILITY DECLINE

According to a comprehensive account of fertility decline in Bangladesh published by the World Bank, Bangladesh is the only country among the twenty poorest countries of the world where fertility decline has commenced (Cleland et al., 1994). The authors conclude from their analyses that the fertility decline probably started in the late 1970s when the total fertility rate (TFR) was about 7 births per woman, and fell by 30 percent to a TFR well below 5 by 1990. This report concluded that 'High fertility in Bangladesh (unlike high fertility in Africa) has never reflected emphatic pronatalism but was more a response to high child mortality; that although the decline in mortality eroded the justification for high fertility, it remained high because the population was conservative in its attitudes towards innovations which went to the heart of family life and sexuality; that these conservative attitudes were vulnerable to a vigorous and sustained family planning programme, and that it was the implementation of such a programme that has brought about the fertility decline.'(Cleland et al., 1994;pp 148)

Results of a more recent analysis showed that all socio-economic groups participated in the fertility decline, although the magnitude of decline differed by different groups (Amin et al., 1994). Analysing the 1991 CPS, the authors found significant differences in TFR between educational levels and urban or rural residence. They remarked that 'The positive effects of these variables are consistent with the pre-transitional stage of Bangladesh'. These authors have embarked upon a study of another important aspect of the success of family planning in rural Bangladesh, and that is the

identity of the rural Bangladeshis as members of an Islamic community. They remark that 'Fertility decline in Bangladesh has also been facilitated by Bengali Muslim culture.' In this context they quote Roy (1993): 'Islam in Bangladesh is a syncretistic adoption of a new religion and many of the original elements of Hindu, Buddhist and 'animist' ideas and practices of Bengal, with no scriptural prohibitions against contraception, were assimilated into newly converted Muslim communities in Bangladesh'. The authors remark that 'Major shifts to non-agricultural occupations, breakdown and reorganisation of traditional patron-client relationships, monetisation of the economy and gradual penetration of remote areas by modern communication media and organisations, were intensified in the 1980s. Some changes in aspirations, tastes and attitudes that are incompatible with high fertility norms may have begun'(Amin et al., 1994). The authors conclude that: 'The common elements that have facilitated rapid reproductive changes throughout Bangladesh are the general receptivity of Bangladeshi people to contraception in the face of mounting Malthusian pressure, the existence of national level comprehensive and large scale family planning programmes with strong governmental commitment, and a recent expansion of an integrated health and family planning programme, especially efforts to base many services at the village and at the doorstep of the people.'

Some of the findings of this study are relevant to this subject of fertility decline. First, the experiences from the two in-depth studies of two clusters of extreme prevalence matches observations from both set of authors. In Panchbibi, an ideal example of the 'new Muslim community' incorporating 'animist' ideas is found to achieve high contraceptive use and low fertility. In Dewanbazar, conservatism and religiosity are being eroded by a strong family planning programme. Further strengthening of the programme, especially replacing less qualified FWAs with ones having higher levels of training, education and

residing locally, may lead to higher use rates by the couples who are already diluting their strong religiosity.

The study found that education of women was associated with her use of modern contraceptives. When women had some education they were more likely to be users of modern reversible methods, for sterilization the direction was reversed. As explained earlier in Chapter 6, this may be because sterilization was an attractive method for poor uneducated couples who also benefitted from cash compensation. Cleland and Wilson (1987) commented that 'The fact that, in most countries, a few years of schooling appear sufficient for a shift in reproductive behaviour is more likely to reflect change in perceptions, ideas and aspirations than changes in objective micro-economic realities'. This study finds similar results in the use of modern reversible methods in rural Bangladesh. A few years of schooling changes the reproductive perceptions of a rural Bangladeshi woman, although other economic opportunities like working for payment, enhanced status of women, are not directly implied by the educational attainment.

This study shows that non-Muslim women have higher probabilities of being users. It also throws light on the observation that in areas with high non-Muslim population, there is higher contraceptive prevalence, although the non-Muslims only constitute a small fraction of the entire population. This observation lends support to the remarks by Amin et al.(1994).

No previous study has looked at the determinants of modern contraceptive use among bari heads in rural Bangladeshi population. This study analyses the determinants of contraceptive use of bari heads and finds religiosity to be an important predictor of use apart from other socio-economic and demographic variables. In this study, less religious bari heads are more likely to be users of modern reversible methods, which also matches

analysis from an earlier study (Kamal & Sloggett, 1993) and has been remarked upon by Cleland et al. (1992). However, in the final models for all women, the effect of bari head's religiosity was no longer significant. Rahman's (1986) study had identified bari head's education and religiosity as important predictors of use by bari women. In this study, bari heads' education and religiosity were found to be unimportant because of the inclusion of the variable 'education of the FWA'. This finding implies that even when bari heads are religious and women are impeded by their religiosity, or lack of education, the presence of an effective FWA might alter the perceptions and increase the chances of a woman to use modern reversible methods. This lends support to the remarks that 'Rise in use of modern contraception may be attributed to the success of a strong FP programme in Bangladesh' (Amin et al., 1994; Cleland et al., 1992).

The importance of the variable 'sanction of bari girls to attend school' as a predictor of modern reversible methods by the bari head also supports the relationship of modernism and changed tastes and attitudes with higher contraceptive use and lower fertility (Amin et al., 1994). As donor agencies have focused on female education, the Government of Bangladesh has responded positively. Since 1991, secondary education has been made free for girls up to grade eight. But in rural Bangladesh, which is characterized by a strong patriarchal society, the availability of free education does not necessarily mean that all girls from the locality attend school. This decision is dependant on the attitude, modernity and education of the bari head and has been reflected in the results of this study. It is assumed here, that bari heads who sanction the attendance are more progressive and modern than their counterparts. These bari heads are also likely to have allowed their wives to accept sterilization in the past. As explained earlier, sterilization in most baris has occurred in the past, and these bari heads are presently allowing the

younger girls to attend school, although those who were sterilized were not necessarily educated. The correlation of bari girls' attendance of school with increased acceptance of sterilization adds a new dimension to the explanation of the relationship of modernism and changed aspirations and tastes, with contraceptive use and fertility decline.

The study by Rahman (1986) found the FWA's social influence to be positively related with levels of use in her area. This study finds a different set of variables correlated with the FWA's performance. FWA's age, marital status, her professional EPI training, and level of education are highly predictive of her success in this study. Educational levels of FWA were also found to have significant predictive powers on use of modern reversible methods. Presumably these factors affect her credibility, in the eyes of her clients, and, therefore, her effectiveness. Women served by FWAs who failed to meet the initial criteria of completing secondary education were found to have lower probabilities of use of modern reversible methods. The acknowledgement that 'The introduction of educated, young FWAs has brought about this radical change in CPRs in Bangladesh' (Koenig et al., 1992) is supported by the present study.

Several studies found that a woman's participation with an NGO increases her probability of being a user even when the NGO is not FP based. These results were documented for laudable NGOs such as the Grameen Bank and BRAC (Kamal et al., 1992; Schuler and Hashemi, 1994, Rahman and De Vanzo, 1995). NGOs facilitate the diffusion of new ideas on the legitimisation of small families. Results from this study support the previous findings.

7.3 POLICY IMPLICATIONS

This study has several policy implications and recommendations. The FWAs offer doorstep services to the rural women and are found to be important agents of contraceptive use in earlier studies (Kamal, 1994; Kamal and Sloggett, 1993), as well as the present study. However in some clusters FWAs had been recruited by relaxing the educational criteria to include women with primary education only. This was necessary because during the recruitment of FWAs (in 1978) candidates fulfilling the educational criteria were not available (Neaz and Banu, 1992). This study finds that women in areas where FWAs have only primary education have lower probabilities of use of modern reversible methods. This study strongly recommends that the government criteria of FWA selection should never be relaxed in future. However, this factor is also confounded with the fact that educational levels for FWAs was relaxed only in areas where qualified applicants were unavailable. Non-availability of applicants in most areas was due to low educational levels of women generally in that area, which may again be confounded with low status of women in that cluster as a result of high conservatism or economic backwardness (Balk, 1994). This study finds that educational levels of the FWA are important predictors of ever use of modern reversible methods, even after controlling for other factors such as the attitude of the bari heads and community factors at the cluster level. This indicates that replacing existing FWAs with qualified FWAs might lead to higher use. It follows from field observation that although residential FWAs with adequate educational criteria were not available during the late 1970's, they may be available now. Since 1978 the FP drive has intensified in rural Bangladesh and the role of the FWA has changed from an 'immoral woman speaking about private matters' to someone

'knowledgeable and respected' (Simmons et al., 1992). Compared to the late 1970's it might be easier to find qualified women who are willing to work as an FWA. It is also recommended that the future selection criteria of FWAs should include married FWAs aged between twenty-four and forty. It would appear that these various criteria all help to provide respect for the FWA amongst her clients, a view supported by fieldwork experience.

Religion was found to be a significant predictor of use of all modern methods (modern reversible and sterilization). A non-Muslim woman was more likely to be a user compared to a Muslim woman. One major recommendation from this study would be to identify very conservative and backward areas and target these areas as future sites of an intensive FP programme. In these areas, it is recommended that emphasis should be put on targeting the male segment of the population, specially the bari heads. Field observations suggested that in very conservative Muslim areas, the bari heads have more influence on the reproductive decisions compared to other areas. The future FP programmes are recommended to hold activities like father's club, bari heads' club, and also involve religious leaders and local community leaders in discussions and seminars on FP use. It is recommended that these club activities should include forums to clarify the position of contraception in Islam. Contraception is not *haram* or forbidden in Islam. A group of Islamic scholars named the Qiyas have reached this decision (Sachedina, 1990), but it is not well known to the common people or the religious leaders in Bangladesh. One possible way to remove religious conflicts in common people would be to recruit religious leaders to deliver sermons in favour of contraception and clarify its position. To achieve this, religious leaders need to be convinced first. Successful models of synchronising Islam and FP practice may be cited and followed (e.g., Egypt and

Indonesia). Another suggestion would be to broadcast audio-visual messages on the mass media like radio and TV, clarifying the common conflicts regarding Islam and FP. At present the government broadcasts skits and short musicals to promote FP use, the same may include clarification of Islam and contraception.

The aim of this study was to suggest possible ways in which low prevalence may be improved. Participation with an NGO was found to be a significant predictor of acceptance of sterilization. It is recommended that laudable NGOs like BRAC, Grameen Bank and Proshikha may be encouraged to have more branches to recruit more members. This study finds that participation with an NGO is more important compared to factors: such as distance to roads and railways, or education of the FWA. It is, therefore, recommended that in low prevalence areas with poor communications, such as Dewanbazar, Benua, Uttar Khaleya, establishing NGO programmes may be given priority in order to achieve higher contraceptive prevalence. Although the results in this analysis found NGO participation to be associated with acceptance of sterilization only, other studies have shown that use of all modern methods increases with NGO participation (Kamal et al., 1992, Schuler and Hashemi, 1994; Rahman and De Vanzo, 1995). Establishing NGOs, specially FP based ones is recommended for raising acceptance of modern contraception in future.

Although the presence of paved roads and railways was not significant in the final model, it was found to have positive association with use in previous models. Absence of proper communications impedes both the FWA and the clients to reach desired level of contraceptive prevalence. Alternate arrangements can be made to assign someone to stock pills and condoms for quick replenishment within the local area. They are called 'Depo holders' and may be a possible recommendation to remedy this situation. In

addition, vending machines selling condoms and pills may be introduced. They are known to have been successful in some other countries, and might ultimately be able to attenuate the load of work for the FWAs.

Education of women is positively correlated with use of contraceptives. Primary education has already been made free by the GOB. However, girls' secondary schools are not always available within close proximity of the cluster, and the presence of such schools explains significant between-cluster variation. One recommendation in this respect would obviously be to encourage female education and emancipation. Some baris find it difficult to send bari girls to school because of other incidental costs involved in educating them. Another recommendation would be to introduce some stipends to subsidize costs of travel, books and clothes for girls.

The factor 'sanction of bari girls' school attendance' was found to be an important predictor of acceptance of sterilization. It was also an important predictor of ever use of modern reversible methods by bari heads. This variable was included in the study as an indicator of modernism of the bari head. Its significant role as a predictor of use of sterilization implies that bari heads and their attitudes are important. This study recommends that bari heads should be included in the FP programme as future target groups, so that the barrier for the bari woman is made easier before she is able to adopt sterilization.

Both models found that women who were daughters or sister-in-laws of bari heads, or other relatives, have lower probabilities of use compared to the wife. However, when the bari heads' opinion on FP was included in the model, the directions changed such that the wife of a bari head holding unfavourable views was actually less likely to be a user than the other relatives. This indicates that other women from the bari can be users even

when the bari head is unfavourable. Future research on 'access restrictions' and 'opinion of bari head on FP' are recommended. Future research is also suggested to look at possible reasons for heterogeneity in the random bari-level effects, which was observed in this study.

In summary, to increase use of modern contraception in rural Bangladesh, this study strongly recommends that FWAs with only primary education should be replaced and future FWAs should be selected to fulfil the Government educational criteria of completing secondary education. Family planning based NGOs should be encouraged to establish branches, in low-use areas to improve the acceptance of modern methods of contraception. In fact activities of reputable NGOs of all types appear beneficial and should be encouraged, probably because their activities 'open up' previously secluded areas. Bari heads, especially in low use predominantly Muslim areas, may be made target groups by the existing FP program. The position of contraception in Islam has to be further clarified by audio-visual broadcasts in the mass media. Other recommendations include promoting female education and emancipation generally by establishing more schools and grants for female students. Improving communications with remote areas would also be generally beneficial, as well as positive targeting of especially deprived areas.

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APPENDIX A

NOTE ON QUALITY OF DATA

The purpose of this Appendix is to provide an initial view of the general quality of the data from the main study. This includes the cluster, bari, FWA and eligible women survey. The surveys were conducted from November 1993 to March 1994. During the surveys/spot checks were made on a regular basis to control field worker performance and maintain high standards. Consistency checks were performed on the raw data every night, after the interviews, and missing information or inconsistencies were corrected in the field the following day. After the data was entered into the computer, consistency checks were made by using the software 'dBase IV'.

Age reporting and completeness of reporting

The data from the bari survey and the eligible women survey show a preference for reporting ages that end in zeros and fives (age heaping) that is commonly found in countries where births are not registered. The age distributions were not worse than those obtained in the Bangladesh Demographic and Health Survey (BDHS) or previous fertility surveys such as 1989 BFS, 1991 CPS. In fact, the calculated Whipples' Index is 291 which is 'very rough' according to the UN scale, but better than 316 obtained for the 1974 Bangladesh census data (Newell, 1988), and only slightly worse than 247 obtained for the 1989 BFS.

The field workers were trained to probe into questions on age and make estimates by linking the time of birth or marriage of the respondent to an events calendar. This events calendar, for example- (the year of liberation, big flood etc.) was developed by the Matlab Demographic Centre in the International Centre for Diarrhoeal Diseases, Dhaka, Bangladesh. The field workers in this study were obtained from an agency who

trained and supplied field workers, and were well trained in the technique of age determination.

Fertility

The average parity for each age group was calculated from the Eligible Women Survey data. Table 1 gives the distribution of average parity as obtained from the present study and the 1993-1994 BDHS.

Table 1 Distribution of children ever born according to age, Eligible Women Survey 1994, BDHS,1993-1994.

Age	Number of women	Children ever born	Average parity	
			Eligible Women Survey 1994	BDHS 1993-1994
15-19	295	157	.53	.34
20-24	707	1004	1.42	1.62
25-29	748	1965	2.63	2.91
30-34	515	1910	3.71	4.09
35-39	379	1724	4.54	5.16
40-44	283	1442	5.09	6.36
45-49	237	1293	5.45	6.86

Average family size
Eligible Women Survey, 1994=3.00
BDHS,1993-94=2.95

Although the average family size is almost equal for the two surveys, we certainly notice under-reporting in the present study. Specially in the older age groups there seems to be significant under-reporting. However, the data in this study was not used to analyse fertility trends. In fact, information on number of living children was used in the analysis as a broadly grouped variable.

Contraception

Most of the other variables considered in this survey could be expected to have

low potential for recall bias because exact length of use of any method, year of sterilization, etc was not asked. The data on use of contraception was matched with that obtained from the FWA, thereby double checking both the respondent's response and the FWA registers. In 99 percent of the cases the FWA registers matched the data obtained from the study. The contraception use rates were also matched with the 1991 CPS and found to be similar.

Cluster-level factors

The information on the distance to FWC and presence of FWA, year FWA was assigned to the cluster, year FWC was built etc., were matched with government registers found at the Thana level Family Planning Office where the field workers resided. Information on presence of girls' secondary school, market, shop etc. were asked of knowledgeable informants and also checked by the field work supervisor. Presence of NGO and NGO participation by bari members was also matched with NGO registers.

APPENDIX B

QUESTIONNAIRE FOR IN-DEPTH SURVEY OF PANCHBIBI AND DEWANBAZAR (MALE AND FEMALE RESPONDENTS),BANGLADESH 1993.

A. Name of Cluster----------

B. Name of Village----------

C. Serial No.----------

D. Name of respondent-------

E. Name of interviewer------

F. Date of interview--------

1(a)	Do you work in exchange of money?	Yes No	1 2
1(b)	Are you involved with any NGO?	Grameen bank BRAC Swanirvor Mother's Club Others (Specify)	1 2 3 4 5
2(a)	What is your current marital status?	Married Widowed Divorced Separated Others(specify)	1 2 3 4 5
2(b)	Does your spouse usually live here?	Yes No Sometimes	1 2 3
2(c)	Do you have any children?	Yes No	1 2(Skip to 2j)
2(d)	Do you have any children who are presently living with you?	-------Boys -------Girls	
2(e)	Do you have any children who live away from you?	-------Boys -------Girls	
2(f)	Do you have any children who was born alive but died later?	-------Boys -------Girls	
2(g)	Add 2d to 2f and write the no of living children.	-------Children	
2(h)	What is your total number of living children?	-------Boys -------Girls	
2(i)	Are you/wife pregnant now?	Yes No Don't Know	1 2 3
3(a)	Have you heard of Family Planning Methods?	Yes No Don't know	1 2 3
3(b)	From whom did you first hear?	Spouse Relative Bari member FP worker Doctor Radio TV Others (specify)	1 2 3 4 5 6(Skip to 3e)) 7(Skip to 3e) 8

3(c)	Village of 3b	Own bari 1 Same village 2 Same Union 3 Wife's parental village 4 Unknown 5 Others(specify) 6
3(d)	Motivation of discussion of FP with 3b?	FP worker said voluntarily 1 Sought(active) 2 Sought(passive) 3
3(e)	Did anyone advise you against FP?	Yes 1 No 2(Skip to 3g) Don't Know 3(Skip to 3g)
3(f)	Against which method?	Pill 01 Condom 02 Foam 03 Injection 04 IUD 05 Female ster 06 Male ster 07 Others 11
3(g)	Are you using any modern method now?	Yes 1 No 2(Skip to 3r)
3(h)	Which method first?	Pill 01 Condom 02 Foam 03 Injection 04 IUD 05 Female ster 06 Male ster 07 Others 11
3(i)	Which method now?	Pill 01 Condom 02 Foam 03 Injection 04 IUD 05 Female ster 06 Male ster 07 Others 11
3(j)	For how long did you use the first method?	---------Years ---------Months
3(k)	For how long have you been using the current method?	---------Years ---------Months
3(l)	Since when did you start using the current method?	Before first child 1 After first child 2 Before second child 3 After second child 4 Before third child 5 After third child 6 Others (specify) 7
3(m)	Did you discusss with your spouse before using the first method?	No 1(Skip to 3o) Yes, before use 2 Yes, after use 3
3(n)	When you first discussed was he/she favourable to FP? If no, what made him/her change the mind?	Yes 0 Seeing other users 1 Desire of spouse 2 Realising the need him/herself 3 Watching TV/ Radio 4 Influenced by FP worker 5

3(o)	Why did you not discuss?	Fear of disapproval 1 Subject is never discussed 2 Afraid of mother-in-law 3 Not necessary 4 Want more children 5 Others (specify) 6
3(p)	Before using FP method did you discuss with other satisfied users? If yes, did it help?	Yes,it helped 1 Yes, it did'nt help 2 No 3
3(q)	Is there someone in your bari who is a user? If yes, did he/she help you regarding your decision on FP?	Yes,it helped 1 Yes,it did'nt help 2 No 3
3(r)	Do you know anyone who disapproves of FP?	Yes 1 No 2(Skip to 3u)
3(s)	For what reasons does he/she disapprove FP?	Bad for health 1 Religious reasons 2 Side effects 3 Others(specify) 4
3(t)	Who are the people who disapprove FP?	Spouse 1 Relative 2 Bari member 3 Neighbour 4 Father-in-law 5 Mother-in-law 6 Others(specify) 7
3(u)	Is there someone in your bari who uses modern FP?	Yes 1 No 2 Don't know 3
3(v)	Have you ever discussed about FP with him/her?	Yes 1(Skip to 3x) No 2
3(w)	Why did you not discuss?	Want more children 1 Shy to discuss 2 I do not like FP 3
3(x)	Did the FWA approach you to use modern methods? (for sterilized couples, go to 4e)	No 0 Yes 1(skip to 4a)
	Non-users only	
3(y)	Why are you not using any form of modern FP?	Want more children 1 Spouse disapproves 2 Mother-in-law disapproves 3 Father-in-law disapproves 4 FP inaccessible 5 Afraid of side effects 6 Afraid of sinning 7 Currently pregnant 8 Others(specify) 9
3(z)	Do you want to use a modern FP method in future? If yes, which method?	None 00 Pill 01 Condom 02 Foam 03 Injection 04 IUD 05 Female ster 06 Male ster 07 Others 11
3(α)	Did you ever discuss about FP with your spouse?	Yes 1(skip to 4a) No 2

3 (B)	Why did you not discuss with your spouse?	Fear of disapproval Subject is never discussed Afraid of mother-in-law Not necessary Want more children Others (specify)	1 2 3 4 5 6

	FOR ALL RESPONDENTS		
4(a)	Did you ever discuss with your spouse about having anymore children?	Yes No	1 2
4(b)	Do you want to have anymore children in future?	Yes No Undecided	1 2 3
4(c)	Did you ever discuss family size with your spouse?	Yes No	1 2
4(d)	What is your desired family size?	--------Boys --------Girls	
5(a)	Did the FWA visit you in the last 3 months? If yes, did she discuss FP?	No Yes,did not discuss Yes, discussed	1(skip to 6a) 2 3
6(a)	Do you ever visit the FWA for FP?	Yes No Sometimes	1 2 3
6(b)	If yes, how do the staff behave there?	Good Bad In-between	1 2 3
6(c)	Why do you not visit the FWC?	Too far Cannot go alone Medicine not given Often closed Doctor absent They charge fees Do not listen to us Others(specify)	1 2 3 4 5 6 7 8
7(a)	Who lives with you?	Spouse + children Parents Other relatives	1 2 3**(Multiple answer)**
7(b)	Number of members in the household?	---------Adults ---------Children	
8(a)	Who is the most influential person in your area regarding FP?	Headman Chairman Bari head Religious leader FWA Others(specify)	1 2 3 4 5 6
8(b)	Does he/she approve FP?	Yes No Don't know	1 2 3

APPENDIX C

FWA SURVEY, BANGLADESH 1994.

QUESTIONNAIRE FOR FAMILY WELFARE ASSISTANTS (FWA)s

A. Division----------
B. District----------
C. Thana----------
D. Union----------
E. Village----------
F. Name of FWA----------
G. Serial No.----------
H. Name of interviewer----------
I. Date of interview----------

1(a)	Age in completed years	---------years
1(b)	No. of years of schooling	---------years
1(c)	Present marital status	Married 1 Widowed 2 Divorced 3 Separated 4 Single 5
2(a)	If married, what is husband's age	---------years
2(b)	His education?	Class 9 orless 1 Completed grade 10 exam 2 Completed grade 12 exam 3 NA 9
2(c)	His occupation?	Service 1 School teacher 2 Business 3 Other 4 Unemployed 5 NA 9
2(d)	What is his opinion about your job as an FWA?	Favourable 1 Non-favourable 2 NA 9
2(e)	Do you discuss job related problems with him?	Never 1 sometimes 2 Always 3 NA 9
3(a)	Do you have any children? If yes, how many?	None 00 NA 99 ---------Children
3(b)	What is the age of your last child?	---------years
3(c)	Do you breastfeed your last child?	Yes 1 No 2 NA 9

3(d)	Do you have your mother-in-law living with you?	Yes No NA	1 2 9
4(a)	What is the strength of your samaj where you work as FWA?	< .5 population .5 population > .5 population None	1 2 3 4
5(a)	Are you from this village?	Yes No	1(skip to 5e) 2
5(b)	If no, which village?	Same Union Same Thana Same District	1 2 3
5(c)	Do you aways live here?	Yes No	1 2
5(d)	When did you move here?	Before joining as FWA After joining as FWA NA	1 2 9
5(e)	How long have you lived in your village of catchment?	---------years	
6.	Number of eligible women in your area?	---------women	
7(a)	have you/spouse ever used a modern contraceptive method?	No Pills IUD Injection Foam Condom Female ster Male ster NA	00 01 02 03 04 05 06 07 99
7(b)	For how long ?	---------years	
7(c)	Are you a current user?	Yes No	1(skip to 9) 2
8.	If no, why?	Want more children Spouse disapproves Mother-in-law disapproves Father-in-law disapproves Afraid of side effects Afraid of sinning Currently pregnant Others(specify)	1 2 3 4 6 7 8 9
9(a).	How long have you been in this job?	---------years	
9(b).	Have you worked in a paid job before?	Yes No	1 2
9(c)	Do you enjoy this job?	Yes No	1 2
9(d)	Did you enjoy when you first joined?	Yes No	1 2
9(e)	Did you get any resistance from people when you first started?	Yes No	1 2

9(f)	Who are the people who resisted FP in your area?	Islamic Priest Mullah Elderly men Elderly women Others NA	1 2 3 4 5 9
9(g)	What doing think are the reasons?	Religious reasons Side effects Fear of being ostracized in society People can afford more children in this area Others(specify) NA	1 2 3 4 5 9
9(h)	Who do you think is the most influential man in this area regarding FP?	Religious leader Adminstrative Officer Headman Chaiman FP worker Others(specify) NA	1 2 3 4 5 6 9
9(i)	Who is the most influential lady regarding FP who might set an example to others?	None Religious leader's wife Chairman's wife FP worker Others(specify)	0 1 2 3 4
10(a)	Does your family own land?	Yes No	1 2
10(b)	If yes, how many acres	---------acres NA	 9
11(a)	Is your Union Council Member from the same	Bari Samaj None	1 2 3
11(b)	Is your village headman from the same	Bari Samaj None	1 2 3
11(c)	Does your bari head approve of your job?	Yes No	1 2
12	What is the average CP for your area in last 12 months?	---------percent	
13(a)	Are Satellite Clincs held in your area?	Yes No	1 2
13(b)	How many clincs are held in a month?	---------clinics NA	 99
13(c)	Are EPI and FP clinics held together?	Yes No Sometimes	1 2 3
13(d)	Do you have EPI training?	Yes No	1 2
14	How many couples will continue using modern FP if your job is discontinued?	100 percent 50 percent 20-50 percent < 20 percent Others(specify)	1 2 3 4 5

15(a)	Does your house have electricity?	Yes No	1 2
15(b)	What is your house roof made of?	Concrete Tin Bamboo Mud	1 2 3 4
15(c)	What is your house wall made of?	Concrete Tin Bamboo Mud	1 2 3 4
15(d)	What is your house floor made of?	Concrete Mud	1 2
15(e)	Does your house have tubewell?	Yes No	1 2

BARI HEAD SURVEY, BANGLADESH 1994.

QUESTIONNAIRE FOR BARI HEADS

A. Division----------
B. District----------
C. Thana----------
D. Cluster----------
E. Name of respondent----------
F. Bari serial no.----------
G. Name of interviewer----------
H. Date of interview----------

1(a)	Age in completed years	---------years
1(b)	Education?	None 1 Primary 2 Secondary 3 Higher 4
2.	Number of houses in the bari	---------houses
3	Occupation	Professional, Adminstrative 1 Sales/Service 2 Production worker 3 Non-agricultural labourer 4 Cultivators with >1 acre land 5 Cultivators with < 1 acre land 6 Share croppers 7 Agricultural labourer 8 Others 9
4.	Number of living children?	---------Boys ---------Girls
5.	Have you ever used any modern method? If yes, which method?	None 00 Pills 01 IUD 02 Injection 03 Foam 04 Condom 05 Female ster 06 Male ster 07 Others 08 NA 99
6.	If not, why not?	Sinful 12 Side effects 3 Not available 4 Want more children 5 Others(specify) 6
7	What is your religion?	Islam 1 Hindu 2 Christian 3 Buddhist 4
8(a)	Do you pray everyday?	Yes 1 Sometimes 2 No 3

BARI HEAD SURVEY, BANGLADESH 1994.

QUESTIONNAIRE FOR BARI HEADS

A. Division----------
B. District----------
C. Thana----------
D. Cluster----------
E. Name of respondent----------
F. Bari serial no.----------
G. Name of interviewer----------
H. Date of interview----------

1(a)	Age in completed years	---------years
1(b)	Education?	None 1 Primary 2 Secondary 3 Higher 4
2.	Number of houses in the bari	---------houses
3	Occupation	Professional, Adminstrative 1 Sales/Service 2 Production worker 3 Non-agricultural labourer 4 Cultivators with >1 acre land 5 Cultivators with < 1 acre land 6 Share croppers 7 Agricultural labourer 8 Others 9
4.	Number of living children?	---------Boys ---------Girls
5.	Have you ever used any modern method? If yes, which method?	None 00 Pills 01 IUD 02 Injection 03 Foam 04 Condom 05 Female ster 06 Male ster 07 Others 08 NA 99
6.	If not, why not?	Sinful 12 Side effects 3 Not available 4 Want more children 5 Others(specify) 6
7	What is your religion?	Islam 1 Hindu 2 Christian 3 Buddhist 4
8(a)	Do you pray everyday?	Yes 1 Sometimes 2 No 3

8(b)	Do you fast?	Yes Sometimes No	1 2 3
8(c)	Do you give alms (zakat)?	Yes No	1 2
8(d)	Would you like to go for pilgrimage?	Yes No	1 2
8(e)	Do you believe in any Holy Man (PIR)?	Yes No	1 2
9	Do you think that your religion conflicts with FP?	Yes No	1 2
10(a)	Who do you think is the most influential man in this village?	Chairman Religious leader Headman Others(specify)	1 2 3 4
10(b)	Does he approve of FP?	Yes No Don't know	1 2 3
10(c)	(For non-users only) Would you use a modern method if he were using?	Yes No NA	1 2 9
11	How many acres of land do you own?	---------acres	
12.	Are you	Union Council Member Village headman Religious leader None Others	1 2 3 4 5

ELIGIBLE WOMEN SURVEY, BANGLADESH 1994

QUESTIONNAIRE FOR ELIGIBLE WOMEN

A. Division----------
B. District----------
C. Thana----------
D. Union----------
E. Cluster----------
F. Name of respondent----------
G. Bari serial no.----------
H. Woman serial no.----------
I. Name of interviewer----------
J. Date of interview----------

1	Age of woman in completed years	---------years
2.	Education	None 0 Primary 1 Higher 2
3.	Current marital status	Married 1 Widowed 2 Divorced 3 Separated 4
4.	Number of living children	---------children
5.	Currently pregnant	Yes 1 No 2 Don't know 3
6.	Ever used modern contraception?	Yes 1 No 2 (skip to 9)
7.	If yes, which method?	None 00 Pills 01 IUD 02 Injection 03 Foam 04 Condom 05 Female ster 06 Male ster 07 Others 08 NA 99
8.	Current user	Yes 1 No 2 NA 9
9.	Relationship with bari head	Wife 1 Daughter-in-law 2 Sister-in-law 3 Daughter 4 Others 5
10.	Experience death of child before age 5?	Yes 1 No 2
11.	How many chidren dead before age 5?	---------children

APPENDIX D

BARI SURVEY, BANGLADESH 1994.

A. Division----------
B. District----------
C. Thana----------
D. Cluster----------
E. Bari serial no.----------

1.	Number of households in bari	---------households
2.	Type of household	Nuclear 1 Extended 2 Both 3
3.	Number of eligible women	---------women
4.	Number of women currently pregnant	---------women
5.	Number of women currently using a modern contraceptive	---------women
6.	House have electricity?	Yes 1 No 2
7.	House floor?	Mud 0 Cement 1
8.	House roof?	Mud 0 Bamboo 1 Tin 2 Cement 3
9.	House wall?	Mud 0 Bamboo 1 Tin 2 Cement 3
10.	Own tubewell?	Yes 1 No 2
11.	Leadership quality of bari head	Village headman 1 Union Council Chairman 2 Religious Leader 3 Other 4 None 5
12.	Whether any bari member participates in any NGO	Yes 1 No 2
13.	Number of adults in bari	---------adults
14.	Number of children in bari	---------children
15.	Do girls from bari attend school?	Yes 1 No 2

CLUSTER SURVEY, BANGLADESH 1994.

A. Division----------
B. District----------
C. Thana----------
D. Cluster No----------

1	Family Welfare Assistant (FWA) present in cluster	Yes No	1 2
2.	FWA visited cluster in last two months	Yes No NA	1 2 9
3.	Distance to residence of FWA	---------km	
3.	Year FWA in cluster	---------year	
5.	Family welfare Centre(FWC) present in cluster	Yes no	1 2
6.	FWC present in Union	Yes No	1 2
7.	Distance to nearest FWC	---------km	
8.	Year FWC	---------year	
9.	Year Family Planning Assistant(FPA) in cluster	---------year	
10.	Whether FPA visited cluster in last 3 months	Yes No	1 2
11.	Distance to FPA	---------km	
12.	Number of baris in village	---------baris	
13.	Distance to nearest railway station	---------km	
14.	Distance to nearest post office	---------km	
15.	Whether Non-government organisation (NGO) present in cluster	Yes No	1 2
16.	Distance to NGO head office from cluster	---------km	
17.	Year NGO in cluster	---------year	
18.	Girls' secondary school present in cluster	Yes No	1 2
19.	Distance to girls' secondary school	---------km	
20.	Distance to nearest paved road	---------km	
21.	Distance to nearest market	---------km	
22.	Whether FP retail shop in cluster	Yes No	1 2
23.	Distance to FP retail shop	---------km	1 2
24.	Distance to nearest qualified doctor	---------km	