Trends in Family Size Preferences and Contraceptive Use in Matlab, Bangladesh

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In the nearly ten years of its existence, the Matlab Family Planning and Health Services Project has been characterized by a remarkable rise in contraceptive use and a corresponding decline in fertility. This study examines available evidence on trends in family size preferences in the Matlab area from 1977 to 1984 and their relationship to contraceptive use. Within the Matlab treatment area, the most significant factor behind the increase in contraceptive use has been a sharp rise in the practice of contraception for spacing births. There also appears to have been a more modest increase in the proportion of women wanting no additional children. Family size preferences in the treatment and comparison areas were roughly comparable, suggesting—to the extent that such preferences have changed over time—change may have occurred throughout the Matlab study area. The findings are evaluated in terms of their implications for the current debate on the contribution of family planning programs to fertility decline in developing countries.

In the ten years since its inception in 1977, the experimental family planning and maternal and child health project in Matlab, Bangladesh has achieved remarkable success in the area of family planning, attaining a current contraceptive prevalence rate of over 40 percent. Such an achievement demonstrates that family planning can be successful not only in the short run, but can achieve high and sustained levels of contraceptive use in a setting where low levels of socioeconomic development have led many observers to conclude that such results are not possible. While both the Matlab service program and its initial demographic impact have been extensively described and documented elsewhere, much remains unknown about the underlying demographic dynamics associated with this rise in contraception.

In this paper, we examine changes in family size preferences in Matlab since 1977, and their relationship to contraceptive use. After an initial description of the service project and data sources, evidence is presented on trends in family size preferences in Matlab and their relationship to selected demographic characteristics. Subsequently, trends in contraceptive use are examined in relation to family size preferences. The paper concludes with a discussion of the broader theoretical questions raised by these findings.

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Setting and Data

In October 1977, the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) introduced a maternal and child health (MCH) and family planning program in rural Matlab, to test the hypothesis that an appropriate service delivery system can induce and sustain fertility decline in a setting such as rural Bangladesh. The design of this study stipulated that half of the villages in the study area were to receive intensive services, while the other half were provided with the usual government services.[1] This project, termed the Matlab Family Planning Health Services Project (FPHSP), was developed from lessons learned from an earlier, less successful attempt at delivering family planning services.[2] The FPHSP is characterized by an intensive service outreach program by female community health workers (CHWs), a system of extensive back-up by female paramedical and medical staff, a well-defined system of management and supervision, and an emphasis upon the provision of a wide range of contraceptive methods to individual women in the most accessible and convenient manner possible.[3]

While initially only family planning and limited MCH services were provided, additional MCH components have been gradually and carefully phased in over time.[4]

One limitation in assessing the impact of the ICDDR,B service program is that during this period, while only the Matlab treatment area was served by the ICDDR,B program, families in both the treatment and comparison areas continued to receive those services provided by the usual, much less intensive government service program.[5] Within the treatment area, it is not possible to isolate the effects of the ICDDR,B from the government service program. Comparisons between the two areas, however, reflect the differential between the effect of the government program and the much more intensive ICDDR,B service program.

One immediate and well-documented result of the introduction of the ICDDR,B program was a sharp rise in contraceptive use, with prevalence rising from 5 to 33 percent within 18 months of the start of the program.[6] Fertility rates correspondingly declined, with the total fertility rate estimated to have declined by 25 percent in the treatment area by 1980,[7] while remaining fairly constant in the comparison area. By 1980, treatment and comparison area differentials were substantial: 4.6 versus 6.4 in the treatment and comparison areas, respectively. After a plateau that lasted several years, contraceptive prevalence began to steadily rise again in 1982, reaching above 40 percent by the end of 1985.[8]

Several sources of data are used to explore trends in family size preferences in Matlab and their relationship to the rise in contraceptive use (see Table 1). A primary source of data in the present study is a survey of 6,214 women carried out in the Matlab study area during May to December 1984. This survey consisted of a random cluster sample of women in the reproductive ages in 37 villages in the treatment area and 40 villages in the comparison area.[9] In addition to detailed birth histories, extensive information was collected about respondents' knowledge, attitudes, and practice (KAP) of family planning. Due to differences in age structure between the 1977 and 1984 surveys, whereby younger women may be underrepresented in the 1984 survey—due in part to a steady rise in age at marriage in the Matlab study area during this period[10] and in part to sampling procedures that may have underrepresented newly married women—analysis of all data sets in the current paper is confined to women aged 20–44 years. In the 1984 survey, this reduces the sample size of currently married, fecund women to 2,840 in the treatment area and 1,790 in the comparison area.

In December of 1977, an enumeration of all currently married, fecund women was conducted in the treatment area, as a baseline for a record-keeping system (RKS) for the delivery of health and family planning services. Although the information collected in this enumeration was limited in scope, information on demographic characteristics, practice of contraception, and reproductive intentions was collected for a total of 15,672 women. To achieve comparability with the 1984 sample, analysis is restricted to only currently married, fecund women in the 1977 enumeration aged 20–44 who resided in the same villages included in the 1984 treatment area sample, reducing the 1977 study population to 6,356 women. No similar baseline survey or enumeration was carried out at that time for the comparison area.

Table 1 Summary of Matlab data sources: 1975, 1977, and 1984

Year	Description	
	Treatment area	Comparison area
1975		
Data source	CDP[a] baseline survey	CDP[a] baseline survey
Sample size for analysis	269 women	238 women
Preference measure	Ideal family size	Ideal family size
1977		
Data source	RKS[b] baseline enumeration	—
Sample size for analysis	6,356 women	—
Preference measure	Additional children desired	—
1984		
Data source	Matlab in-depth survey	Matlab in-depth survey
Sample size for analysis	2,840 women	1,790 women
Preference measure	Additional children desired; desired family size	Additional children desired; desired family size

[a]Contraceptive Distribution Project. [b]Record-keeping system.

The third source of data comes from the Contraceptive Distribution Project (CDP), introduced in 150 villages in the Matlab study area in 1975. This project, fielded as a test of latent demand for family planning in rural Bangladesh, involved the delivery of pills and condoms to rural villagers by illiterate, untrained village midwives.[11] Although initially successful in raising levels of contraceptive use, this project ultimately had limited impact.[12] As part of the CDP, a two-stage cluster sample survey of 1,077 eligible women was fielded in 1975 to provide baseline KAP information for the intervention.[13] By stratifying these women according to residence in the treatment and comparison areas, it is possible to obtain a picture of reproductive preferences and behavior in these areas prior to the start of the intervention. Restriction of the analysis to women aged 20–44 years reduces the sample size to 873 women—269 women in the treatment area, 238 women in the comparison area, and an additional 366 women who resided in the area excluded when the Matlab study area was reduced from 233 to 149 villages in 1978. These latter women are not considered in the present analysis.

Family Size Preferences

An important limitation of the three data sets analyzed here is that each survey asked different questions on family size preferences (see Table 1). In the 1975 CDP survey, the only preference measure obtained was ideal family size, based upon the following question: "If you were just getting married, how many children would you most like to have when you are through having children?" In contrast, women in the 1977 enumeration were asked only whether or not additional children were desired. In the 1984 survey, women were asked about the specific number of additional children desired. Thus, our ability to compare trends in family size preferences over time or between areas is limited because the 1977 comparison area data are absent and the 1975 CDP baseline survey and the 1977 enumeration included no question on the number of additional children desired.

Table 2 shows mean ideal family size preferences for the treatment and comparison areas in 1975 prior to the start of the intervention. Although sample sizes are small, it is apparent that family size preferences among women in the comparison area were extremely similar to those in the treatment area. In both areas, women expressed a mean ideal family size of roughly 4.5 children and 2.7 sons. A higher percentage of women in the comparison area believed family size to be "up to God," a difference that was statistically significant. With this exception, reproductive preferences in the two areas appeared to be quite consonant in the period prior to the introduction of the ICDDR,B service program.

Table 3 presents data on preferences for additional children in the treatment area for 1977 and 1984 and comparison area for 1984 by selected demographic char-

Table 2 Family size preferences, Matlab treatment and comparison areas, 1975

	Value	
Preference measure	1975 Treatment area (N = 269)	1975 Comparison area (N = 238)
Mean ideal number of children*	4.4	4.5
Mean ideal number of sons*	2.7	2.6
Percent stating family size "up to God"	17.1	27.1

*Excludes non-numerical responses.

Table 3 Percent wanting no additional children by selected demographic characteristics, Matlab treatment area and comparison area, 1977 and 1984

	1977		1984					
	Treatment area		Treatment area		Comparison area		Difference in percentage points between*	
Variable	%	(N)	%	(N)	%	(N)	1977T & 1984T	1984T & 1984C
Total	43.3	(6,186)	55.4	(2,830)	60.0	(1,784)	+ 12.1	+ 4.6
Maternal age (years)								
20–24	12.6	(1,716)	16.1	(783)	17.3	(452)	+ 3.5	+ 1.2
25–29	34.7	(1,508)	42.1	(610)	50.1	(405)	+ 7.4	+ 8.0
30–34	59.6	(1,430)	68.8	(571)	74.5	(361)	+ 9.2	+ 5.7
35–39	88.9	(1,104)	88.1	(471)	89.5	(313)	+ 19.2	+ 1.4
40+	76.2	(428)	95.4	(395)	94.9	(253)	+ 19.2	− 0.5
No. of living children								
0	1.8	(330)	8.9	(124)	4.2	(72)	+ 7.1	− 4.7
1	3.7	(647)	10.7	(393)	8.2	(243)	+ 7.0	− 2.5
2	13.8	(1,069)	25.2	(507)	27.6	(290)	+ 11.4	+ 2.4
3	33.1	(1,102)	52.9	(505)	59.5	(301)	+ 19.8	+ 6.6
4	58.2	(1,036)	77.1	(512)	81.1	(275)	+ 18.9	+ 4.0
5	70.1	(864)	87.7	(358)	88.8	(241)	+ 17.6	+ 1.1
6	76.9	(571)	92.5	(239)	96.0	(201)	+ 15.6	+ 3.5
7+	86.1	(567)	99.0	(192)	98.1	(161)	+ 12.9	− 0.9
No. of living sons								
0	6.0	(1,086)	10.5	(493)	9.8	(305)	+ 4.5	− 0.7
1	24.7	(1,664)	35.4	(813)	40.6	(498)	+ 10.7	+ 5.2
2	54.3	(1,642)	73.9	(775)	79.0	(447)	+ 19.6	+ 5.1
3	70.0	(1,020)	85.5	(421)	88.5	(286)	+ 15.5	+ 3.0
4	74.8	(496)	87.2	(211)	94.3	(158)	+ 12.4	+ 7.1
5+	80.9	(278)	94.9	(117)	92.2	(90)	+ 14.0	− 2.7

Note: Cases with missing data or non-numerical responses on dependent or independent variables are excluded.
*T = treatment area; C = comparison area.

acteristics. Data from the 1984 survey are collapsed to the dichotomy collected in the 1977 enumeration (want *vs.* don't want additional children) to provide a basis for comparison. The results in Table 3 indicate a moderate shift in family size preferences among women in the treatment area between 1977 and 1984. Whereas only 43 percent of all women wanted no more children in 1977, this percentage rose to 55 percent by 1984. While this change occurred among all demographic subgroups, changes in preferences were most evident among older women (35 years and above) and women of demonstrated fertility (three or more living children or two or more living sons). Changes in reproductive preferences were least evident among younger women (20–24 years) and lower parity women (less than two living children or no living sons). The desire for a minimum of two children and one son thus appears to have remained almost universal among women in the Matlab treatment area.

Since no baseline data were collected in 1977 for the comparison area, it is not possible to assess the magnitude of changes in family size preferences within this area during the period covered here. It is apparent from Table 3, however, that reproductive preferences among women in the treatment and comparison areas were very similar among all strata in 1984. In fact, a slightly higher percentage of all women in the comparison area expressed a desire for no more children (60 *vs.* 55 percent).

Consideration of desired family size preferences—the sum of the number of living children plus the number of additional children desired—also suggests a very high level of congruence between areas in 1984. In both areas, women expressed preferences for a mean desired family size of approximately 4.3 children and 2.3 sons.[4] It is noteworthy that women in both areas close to the start of their reproductive careers (aged 20–24 years) expressed a desire for a completed family size of only 3.3 children and 1.5 sons.

One factor that might account for the observed changes in reproductive motives is extensive socioeconomic development in the Matlab treatment area. Examination of one important indicator of socioeconomic status—the level of educational attainment among women in our study—reveals that, in fact, educational levels have risen somewhat among women aged 20–44 in the Matlab treatment area, and that the treatment area is characterized by slightly higher levels of maternal education than the comparison area in 1984 (see Table 4). While 30 percent of women in the 1977 treatment area reported at least some formal education, by 1984 this percentage had increased to almost one-half. Almost all of this increase was concentrated among women with one to five years of schooling, as the percentage of women with six or more years of education changed only slightly. The percentage of women with at least some education in the 1984 comparison area (38 percent), while higher than the 1977 treatment area, was slightly lower than in the 1984 treatment area. No data are available on changes in female educational levels in the comparison area during the 1977–84 period, although some increase would be expected.

Table 4 Level of education among women in rural Bangladesh, Matlab treatment area, 1977 and 1984, and comparison area, 1984

Level of education	Percent of women		
	Treatment area		Comparison area (1984)
	1977	1984	
No education	70.1	52.5	61.8
1–5 years	24.5	39.4	32.4
6+ years	5.3	8.1	5.8
Total	100.0	100.0	100.0

Note: Total may not add to 100 because of rounding.

Thus, while it appears that there has been some increase in maternal education in the treatment area, it is apparent from Table 5 that changes in reproductive preferences have occurred among all educational strata and family size levels, with the largest shifts occurring among uneducated women. While no differences in preferences by education were evident in the treatment area in 1977, by 1984 a somewhat higher proportion of uneducated than educated married women in the treatment area expressed a desire for no more children, in part a reflection of the somewhat greater concentration of uneducated women in higher parities. Within each educational subgroup, the noted changes in reproductive preferences were more marked among women of parity three and above. Table 5 also shows that among all educational strata, family size preferences were roughly similar for women in the 1984 treatment and comparison areas. This similarity generally remains when more detailed breakdowns by number of living children are considered.

It is apparent, then, that family size preferences were similar in the Matlab treatment and comparison areas in 1984, and that these preferences appear to have declined somewhat in the treatment area between the two time periods. Moreover, while educational levels in the treatment area increased significantly between 1977 and 1984, and were somewhat higher than in the comparison area in 1984, the noted changes in family size preferences appeared largely independent of educational attainment. We now examine levels of contraceptive use from 1975 to 1984 and their relationship to reproductive preferences.

Current Contraceptive Use

The 1975 CDP Survey provides evidence on the level of contraceptive use in the treatment and comparison areas prior to the start of the ICDDR,B service program. Contraceptive use in 1975 was slightly higher in the treatment area (7.8 percent) than in the comparison area (4.7 percent). Use of modern contraceptives was very low in the

Table 5 Percent wanting no additional children by maternal education and number of living children, Matlab treatment area, 1977 and 1984, and comparison area, 1984

Maternal education/ no. of living children	1977 Treatment area		1984 Treatment area		1984 Comparison area		Change in percentage points between:[a]	
	%	(N)	%	(N)	%	(N)	1977T & 1984T	1984T & 1984C
Total	43.7	(6,001)	55.4	(2,620)	60.0	(1,784)	+ 11.7	+ 4.6
No education	43.2	(4,202)	57.6	(1,482)	63.0	(1,102)	+ 14.4	+ 5.4
Number of living children								
0	1.4	(217)	8.7	(69)	2.8	(36)	+ 7.3	− 5.9
1	3.9	(412)	10.0	(190)	9.9	(131)	+ 6.1	− 0.1
2	12.7	(686)	27.3	(231)	26.6	(184)	+ 14.6	− 0.7
3	32.1	(748)	55.1	(276)	65.1	(172)	+ 23.0	+ 10.0
4	56.9	(706)	76.7	(288)	81.2	(186)	+ 19.8	+ 4.5
5	68.9	(628)	88.7	(186)	89.2	(148)	+ 19.8	+ 0.5
6+	78.9	(805)	94.2	(242)	96.3	(245)	+ 15.3	+ 2.1
1–5 years education	45.2	(1,475)	54.3	(1,117)	57.8	(580)	+ 9.1	+ 3.5
Number of living children								
0	1.5	(66)	6.5	(46)	7.7	(26)	+ 5.0	+ 1.2
1	2.1	(143)	12.9	(163)	8.4	(83)	+ 10.8	− 4.5
2	15.4	(273)	22.4	(210)	29.9	(67)	+ 7.0	+ 7.5
3	32.5	(268)	50.0	(188)	51.8	(112)	+ 17.5	+ 1.8
4	59.5	(259)	77.4	(190)	76.3	(79)	+ 17.9	+ 1.1
5	71.1	(194)	85.4	(151)	87.1	(85)	+ 14.3	+ 1.7
6+	89.0	(272)	97.6	(169)	98.1	(108)	+ 8.6	+ 0.5
6+ years education	42.3	(324)	46.8	(231)	40.2	(102)	+ 4.5	− 6.6
Number of living children								
0	7.7	(26)	—	(9)	—	(10)	—	—
1	6.0	(50)	5.0	(40)	0.0	(29)	− 1.0	− 5.0
2	15.4	(65)	27.3	(66)	—	(19)	+ 11.9	—
3	45.9	(61)	51.2	(41)	—	(17)	+ 5.3	—
4	66.7	(42)	79.4	(34)	—	(10)	+ 12.7	—
5	82.4	(34)	—	(21)	—	(8)	—	—
6+	86.6	(46)	—	(20)	—	(9)	—	—

Note: Cases with missing data or non-numerical responses on dependent or independent variables are excluded.
[a]Percentages not shown for cells <25 cases. [b]T = treatment area; C = comparison area.

treatment area (4.9 percent) and largely absent in the comparison area (0.4 percent). Overall, the data from this survey indicate that although slightly higher levels of contraceptive use were evident in the treatment area, use was extremely low in both areas prior to the start of the intervention.

Table 6 presents data on levels of current contraceptive use among respondents in 1977 and 1984. At the time of the 1977 treatment area baseline enumeration, 24 percent of all women aged 20–44 were using a method of contraception. It should be noted that the 1977 enumeration does not represent a true "baseline," since the MCH and family planning service program actually began in October of 1977, while this survey was not carried out until December of that year. The data presented thus reflect to a considerable degree the rapid uptake of contraception during the initial months of the program. At the time of the 1984 survey, 39 percent of eligible women in the treatment area were currently practicing contraception, a figure slightly lower than that reported for these women by the separate ICDDR,B service record-keeping system during the same period.[14] Injectable contraception was the most popular method among women in the treatment area, accounting for 37 percent of all current use, followed by tubectomy (24 percent) and the IUD (20 percent).[15]

In the comparison area, in contrast, only 16 percent of the women were current users in 1984. Although sample differences prevent definitive conclusions, as Table 7 shows, contraceptive use levels in the Matlab comparison area in 1975 and 1984 were not higher, and may in fact have been slightly lower, than the reported national averages during this period.[17] In the Matlab comparison area in 1984, tubectomy was by far the leading method of contraception, accounting for 50 percent of all current use.[15]

Table 6 Current practice of contraception by desire for additional children, Matlab, 1977 and 1984

	1977		1984			
	Treatment area		Treatment area		Comparison area	
Variable	%	(N)	%	(N)	%	(N)
All women	23.6	(6,180)	38.9	(2,630)	16.5	(1,784)
Women who:						
Do not want more children	45.6	(2,674)	49.0	(1,568)	24.4	(1,070)
Want more children	6.8	(3,506)	26.3	(1,262)	4.6	(714)

Note: Cases with missing data or non-numerical responses on dependent or independent variables are excluded.

Table 7 Current contraceptive use levels in Matlab comparison area, 1975 and 1984, and in other rural national samples

	Current contraceptive use (%)					
Current use	1975 Matlab comparison area	(1) 1975 BFS	(2) 1979 CPS	(3) 1983 CPS	1984 Matlab comparison area	(4) 1985 CPS
Any method	4.7	8.5	11.2	17.3	16.5	23.1
Modern method	0.4	NA	8.2	12.1	12.5	16.3

Note: NA = not available.

Source: For (1), Bangladesh Fertility Survey, 1975; (2) Bangladesh Contraceptive Prevalence Survey, 1981; (3) Bangladesh Contraceptive Prevalence Survey, 1983; (4) Bangladesh Contraceptive Prevalence Survey, 1985.

Women who are practicing contraception but who desire more children are generally practicing contraception to space births. Women who are practicing contraception but who desire no more children, in contrast, can be largely presumed to be practicing contraception to limit their family size. Table 6 reveals interesting differences across the three groups of respondents in contraceptive use patterns according to reproductive intentions. At the start of the program in 1977, contraceptive users were almost exclusively women who wished to curtail childbearing. Almost one-half (46 percent) of the women who wanted no more children, as opposed to only 7 percent of the women who wanted more children, were practicing contraception at the time of the baseline enumeration. By 1984, the profile of contraceptive users in the treatment area had changed substantially. Forty-nine percent of all women who wanted no more children were practicing contraception, a level only slightly higher than in 1977. It is interesting to note that even after almost a decade of exposure to the intensive service delivery program in the Matlab treatment area, one-half of the women expressing a desire for no more children were not currently practicing contraception. This so-called "KAP gap" is currently the subject of more detailed investigation.[19]

Table 6 also shows a marked change within the treatment area in the practice of contraception for the purpose of spacing, with 26 percent of women who wanted more children in 1984 practicing contraception, in contrast to only 7 percent earlier. The decomposition of the relative contribution of changes in family size preferences and birth spacing to the increase in contraceptive use in the treatment area between 1977 and 1984 is presented in Table 8.[20] It is apparent that the rise in contraceptive use in the treatment area is primarily attributable to the increased use for spacing, with this component accounting for 57 percent of the overall increase in contraceptive use among women in the treatment area. Shifts in family size preferences, as reflected in an increased percentage of women who express a desire for no more children, account for a much smaller proportion of the increase (18 percent), while increased contraceptive use among women who want no more children explains only 12 percent of the rise. The interaction between changes in the distribution of family size preferences and in levels of contraceptive use among these subgroups accounts for the residual 13 percent of the increase between 1977 and 1984.

Table 9 presents levels of current contraceptive use by selected demographic characteristics. Consistent relationships are generally evident, with increasing levels of contraceptive use with increasing maternal age, number of living children, and number of living sons in all

Table 8 Decomposition of the components of the increase in contraceptive use in Matlab treatment area, 1977 and 1984

	1977		1984	
Desire for additional children	Proportion using	Proportion of all women	Proportion using	Proportion of all women
Want no more	.456 (r11)	.433 (p11)	.490 (r12)	.554 (p12)
Want more	.068 (r21)	.567 (p21)	.263 (r22)	.446 (p22)
Total	.236	1.000	.389	1.000

Decomposition	Percentage points	Percent of total change
(1) Component due to increase in proportion of women who want no more children: $\sum_i r_{i2}(p_{i1} - p_{i2}) =$	2.7	17.6%
(2) Component due to increase in contraceptive use among women who want more children: $p_{22}(r_{21} - r_{22}) =$	8.7	56.9%
(3) Component due to increase in contraceptive use among women who want no more children: $p_{12}(r_{11} - r_{12}) =$	1.9	12.4%
(4) Interaction $\sum_i (r_{i1} - r_{i2})(p_{i1} - p_{i2}) =$	2.0	13.1%
TOTAL	15.3	100.0%

Table 9 Percent currently practicing contraception by selected demographic variables, Matlab treatment area, 1977 and 1984, and comparison area, 1984

Variable	1977 Treatment area		1984 Treatment area		1984 Comparison area		Change in percentage points between:*	
	%	(N)	%	(N)	%	(N)	1977T & 1984T	1984C & 1984T
Total	23.0	(6,338)	38.8	(2,840)	16.5	(1,790)	+15.8	+22.3
Age (years)								
20–24	12.3	(1,720)	26.7	(787)	6.0	(452)	+14.4	+20.7
25–29	21.0	(1,542)	35.2	(611)	15.7	(408)	+14.2	+19.5
30–34	25.4	(1,468)	43.6	(573)	21.0	(362)	+18.2	+22.6
35–39	33.3	(1,159)	50.2	(474)	23.5	(315)	+16.9	+26.7
40+	36.7	(449)	47.8	(395)	21.3	(253)	+11.1	+26.5
No. of living children								
0	3.3	(329)	4.0	(124)	0.0	(72)	+ 0.7	+ 4.0
1	8.3	(647)	20.8	(395)	3.7	(243)	+12.5	+17.1
2	13.8	(1,076)	32.4	(510)	10.0	(291)	+18.6	+22.4
3	21.2	(1,127)	41.8	(505)	15.3	(301)	+20.6	+26.5
4	26.2	(1,070)	50.2	(512)	23.0	(278)	+24.0	+27.2
5	31.6	(692)	48.1	(362)	26.6	(241)	+16.5	+21.5
6	34.9	(608)	51.0	(239)	24.8	(202)	+16.1	+26.2
7+	39.6	(589)	44.6	(193)	20.4	(162)	+ 5.0	+24.2
No. of living sons								
0	7.2	(1,087)	17.2	(494)	3.3	(305)	+10.0	+13.9
1	17.4	(1,692)	34.4	(817)	12.0	(499)	+17.0	+22.4
2	27.2	(1,699)	49.8	(777)	20.3	(448)	+22.6	+29.5
3	33.1	(1,051)	48.6	(422)	25.3	(289)	+15.5	+23.3
4+	34.4	(809)	43.6	(330)	24.5	(249)	+ 9.2	+19.1

Note: Cases with missing data or non-numerical responses on dependent or independent variables are excluded.
*T = treatment area; C = comparison area.

surveys. The increase in contraceptive use between 1977 and 1984 in the treatment area is evident among almost all demographic subgroups. The largest absolute increases in contraceptive use occurred among older women (30–39 years) and women of moderate parity (three to four living children or two living sons). Among all strata, levels of contraceptive use among women in the 1984 comparison area are lower than among women in either the 1977 or 1984 treatment area.

Significant increases in contraceptive use were also registered among all educational groups in the treatment area between 1977 and 1984 (Table 10). Although some educational differentials in contraceptive use persist in the treatment area, it is apparent from this table that by 1984, use of contraception had diffused to all educational strata, and was high even among uneducated women (37 percent). The rise in contraceptive use for the purpose of spacing was evident among all educational groups. While educational differentials in the use of contraception for spacing remained in the treatment area in 1984, it is nevertheless significant that almost one-quarter of uneducated women who wanted more children were current users of contraception. Contraceptive use levels among uneducated women wanting no more children increased only marginally during this period, and actually appear to have declined somewhat among women with some education. It is also evident from Table 10 that levels of contraceptive use in the 1984 comparison area were substantially lower than in the 1984 treatment area within each educational strata, for both potential limiters as well as spacers. It is notable that in contrast to the treatment area in 1984, among women in the 1984 comparison area, practice of contraception for the purpose of spacing does not appear to be widespread in any educational group.

Discussion

The findings presented here have a significant bearing on one of the central questions in the population field: Can family planning programs in the developing world succeed in the absence of extensive socioeconomic development? After more than two decades of population policy research, there has been relatively little convergence in views on this subject. Perhaps nowhere are contrasting perspectives on this issue more sharply crystallized and demarcated than for Bangladesh, one of the poorest countries in the world, and a country characterized by static and possibly even deteriorating economic conditions.

The evidence presented in this paper addresses three issues of relevance to this debate:

1 whether demand for contraception exists in Bangladesh;

Table 10 Percent currently practicing contraception by maternal education and desire for additional children, Matlab, 1977 and 1984

Maternal education/ Desire for additional children	1977		1984				Change in percentage points between:*	
	Treatment area		Treatment area		Comparison area			
	%	(N)	%	(N)	%	(N)	1977T & 1984T	1984C & 1984T
Total	23.7	(5,996)	38.9	(2,630)	16.5	(1,784)	+ 15.2	+ 22.4
No education	21.0	(4,199)	37.0	(1,482)	17.0	(1,102)	+ 16.0	+ 20.0
Want more	5.3	(2,386)	23.2	(628)	4.4	(408)	+ 17.9	+ 18.8
Want no more	41.6	(1,813)	47.1	(854)	24.4	(694)	+ 5.5	+ 22.7
1–5 years education	27.7	(1,473)	39.6	(1,117)	14.7	(580)	+ 11.9	+ 24.9
Want more	8.2	(807)	27.0	(511)	3.7	(245)	+ 18.8	+ 23.3
Want no more	51.4	(666)	50.2	(606)	22.7	(335)	− 1.2	+ 27.5
6+ years education	40.7	(324)	47.6	(231)	21.6	(102)	+ 6.9	+ 26.0
Want more	15.0	(187)	39.0	(123)	9.8	(61)	+ 24.0	+ 29.2
Want no more	75.9	(137)	57.4	(108)	39.0	(41)	− 18.5	+ 18.4

Note: Cases with missing data or non-numerical responses on dependent or independent variables are excluded.
*T = treatment area; C = comparison area.

2 whether demand for contraception has been changing over time; and
3 whether changes in demand and contraceptive use have been an outcome of service activities or exogenously determined.

Demand for Contraception

A frequently outlined perspective is that in the absence of extensive socioeconomic development, the provision of family planning services in societies such as Bangladesh is likely to meet with only limited success. Proponents of this view argue that contraceptive use occurs only where demand exists, and demand is determined by broader societal factors, not programmatic inputs. Given the strong incentives and institutional supports for high fertility in such societies, policies that focus solely on the provision of contraceptive supplies, and do not address or attempt to influence the demand for children, are unlikely to achieve a significant effect upon fertility levels.[21] Other observers, in contrast, maintain that while conditions for fertility decline are by no means favorable in settings such as Bangladesh, a substantial and largely unmet need for family planning services exists nevertheless. Proponents of this view cite the findings from a number of fertility surveys undertaken in Bangladesh, which consistently demonstrate a gap between the large number of women who express a desire to limit their fertility and the much smaller number who are actually doing so.[22]

The results of this study provide clear support for the position that substantial demand for family planning exists in rural Bangladesh. Family size preference data from the 1984 survey indicate that a majority of women in both the treatment and comparison areas expressed a preference for no additional children. Data from earlier Matlab surveys also showed that a significant percentage of women expressed views consistent with fertility limitation, prior to, or at the start of, the Matlab service program. Further evidence is provided by the actual behavioral response to the provision of services, not only to the current Matlab program—where the introduction of services led to the sharp uptake of contraception in the initial months of the program—but also by the experience of the precursor to the current Matlab project, the CDP, which produced initial high acceptance followed by a rapid decline in levels of use due to a weak supply strategy. Thus, there was substantial demand for contraception in Matlab even in the mid-1970s, but its fulfillment was only made possible by the institution of a comprehensive and supportive service program.

Changes in Level or Composition of Demand for Family Planning over Time

Our results indicate that between 1977 and 1984, there has been a moderate increase in the percentage of women who express a desire to stop childbearing, a primary component of demand. Moreover, while data on attitudes toward contraception for the purpose of spacing births—a second component of demand—are not available, it is clear that contraceptive use for spacing has also increased substantially within the service area. Thus, the composition of demand in the Matlab treatment area appears to have changed from an initial, almost exclusive focus on contraceptive use for fertility limitation to an emphasis upon both limitation and spacing. Although comparable baseline data for the 1977 comparison area are not available, the fact that women in the treatment and comparison areas had similar family size preferences

in 1975 makes it plausible to assume that demand to limit fertility may have also increased correspondingly within the comparison area. Our results also indicate that the demand for fertility limitation appears to have diffused widely across most demographic and socioeconomic subgroups in the treatment area.

Determinants of Changing Demand and Contraceptive Use

The basis for latent demand for family limitation in Bangladesh is at present not well understood. Some observers have hypothesized that it may be poverty-driven, due to the influence of extreme and possibly increasing impoverishment combined with rising aspirations that result from such "modernizing" factors as improved communication and education.[23] Within this context, family planning programs are viewed as making a significant contribution, in part by fulfilling an existing need for services. In addition, it has increasingly been recognized that programs may contribute by "activating" this latent demand for family planning in an environment where such demand is frequently "fragile."[24]

The broad similarities in reproductive preferences between the treatment and comparison areas in 1984 are consistent with the hypothesis that changes in reproductive preferences in Matlab—to the extent that they have occurred—have been the result of factors exogenous to the service program. Substantial evidence suggests that in the course of the past decade, Bangladesh has been affected by both modernizing influences and growing economic adversity.[25] It is persuasive to argue that these forces have contributed to changes in reproductive preferences; however, the role of the service program should also not be ignored, for a number of reasons.

First, the Matlab treatment and comparison areas are geographically contiguous to one another, with permeable boundaries, and thus substantial diffusion between areas is highly likely. One important source of diffusion has been the widespread practice of village exogamy for marriage, in which marriage partners are selected from outside the immediate village. While a young married woman may currently reside in one area, it would not be uncommon for her to have been raised in, and extensively exposed to, conditions in the other area. The common practice of women returning to their natal family for extended durations, either annually or for childbirth, has undoubtedly also assured the continuous dissemination of ideas and behavior—including those related to family size and family planning—between treatment and comparison areas. The pattern of migration between villages, a frequent occurrence within the Matlab area, may have had a similar effect. One possible consequence of these practices is that over time the distinction between treatment and comparison areas with respect to norms and attitudes toward family size and family planning may have become increasingly blurred.

Second, both the Matlab treatment and comparison areas are served by the regular government health and family planning program. In addition to centrally located clinics, the government service program includes regularly scheduled home visits by both male and female health and family planning workers. The government program has also invested considerable effort in a media campaign that emphasizes the benefits of smaller families and family planning. The increasing availability of radios and even occasionally television has made it possible to regularly reach a significant proportion of the population with messages about family planning. Thus, it is apparent that even in the comparison area, villagers have had extensive exposure to the concept of family planning quite independently from the ICDDR,B program.

Third, the conclusions reached hinge to a large extent on the choice of definitions and indicators of demand. If the desire for no additional children is used as the measure of demand, then it is certainly true that comparable change appears to have occurred in both treatment and comparison areas. This definition, however, ignores a very important component of demand—the desire for contraception for spacing—a component that accounted for almost three-fifths of the rise in contraceptive use within the treatment area between 1977 and 1984, and that has been clearly shown to be a direct outgrowth of the ICDDR,B intensive service program. Moreover, as a number of investigators have noted, a single general question on desire for additional children may fail to capture the substantial underlying variability in reproductive preferences.[26] For example, while similar proportions of women in the treatment and comparison areas in 1984 expressed a desire for no additional children, when questioned in greater detail, a higher proportion of treatment area women indicated that they would be "unhappy" if the birth of an additional child occurred.[27]

Fourth, the results of our study raise important questions about the definition of demand for fertility limitation and its relationship to contraceptive use. In Matlab, we are confronted with a situation in which two areas share broadly similar family size orientations, but diverge considerably in terms of levels of contraceptive use. In this setting, a definition of demand that focuses solely on reproductive preferences is too narrow and restrictive in accounting for differential contraceptive use. A more meaningful measure of demand is one that incorporates components reflecting both the *demand to limit childbearing* as well as the *demand for responsive family planning services*. Contraceptive use decisions are the product of the interplay between these two components.[28] High motivation may to some extent compensate for, or overcome, service barriers to the adoption of family planning. On the other hand, among couples who are ambivalent or indifferent—a state that likely characterizes a significant proportion and possibly even a majority of potential family planning clients in rural Bangladesh—it is likely that responsive and high quality services are essential

for the adoption and continued use of contraception. While researchers have tended to focus primarily upon family size preferences, it is likely that these concepts are highly intertwined from the perspective of rural village women. Our results clearly demonstrate the inadequacy of considering reproductive intentions in isolation of attitudes toward and feelings about the service delivery system, when attempting to account for differential contraceptive use.

While the success of the Matlab program has led some observers to advance improvements in socioeconomic development as an explanation, little evidence exists to support this view. While some social change has undoubtedly occurred within the Matlab study area, it is important to note that the population remains overwhelmingly rural and agriculturally based. Although some increase in female education within the treatment area has been evident, levels of educational attainment remain very low and this factor does not satisfactorily account for the increase in contraceptive use. Similarly, socioeconomic conditions in the treatment and comparison areas were very similar prior to the introduction of the service program, and while data are extremely meager, there is little to suggest more than minor differences between these two areas at present.[29]

When attempting to account for the differences between these two areas in contraceptive use, one is left with the role of the service program—while the treatment area is served by the intensive ICDDR,B outreach program, the comparison area receives only services provided by the regular government program. Although the two areas are characterized by a roughly similar demand for children, they are also characterized by programs that differ quite markedly in terms of the composition, intensity, and quality of services delivered.[30] It could be argued that the ICDDR,B program activated a latent demand for family planning—a demand that, in the absence of this intensive program, would in all likelihood have remained unfilled, as the experience of the comparison area illustrates.

The Matlab service program has conclusively demonstrated that substantial demand for family planning exists even within a setting such as rural Bangladesh. Important questions remain, however, about the cost-effectiveness of the Matlab project, given its special nature and the unusual resources that have been provided. Equally important is the question of the potential as well as the limits for transferring successful components of this pilot project into the Bangladesh national service program. These issues are currently the focus of inquiry in studies in Matlab and in separate areas of rural Bangladesh.[31]

References and Notes

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1 In the government system, three female workers are assigned to an area serving a population of about 25,000, versus 20 such workers in a comparable FPHSP service area. Because of this staff shortage household visitation is infrequent in government areas—a problem that is exacerbated by weak supervision and logistics difficulties. Contraceptive options are relatively limited, and the paramedical back-up is disrupted because clinics function less regularly than FPHSP clinics. Despite these limitations of the government program, however, some services are provided to the population residing in comparison areas of the FPHSP.

2 For a description of the design of the earlier project, named the Contraceptive Distribution Project (CDP), see M. Rahman, W.H. Mosley, A.R. Khan, A.I. Chowdhury, and J. Chakraborty, "Contraceptive distribution in Bangladesh: Some lessons learned," *Studies in Family Planning* 11, no. 6 (1980): 191–201.

3 See S. Bhatia, W.H. Mosley, A.S.G. Faruque, and J. Chakraborty, "The Matlab Family Planning-Health Services Project," *Studies in Family Planning* 11, no. 6 (1980): 202–212.

4 See J.F. Phillips, R. Simmons, J. Chakraborty, and A.I. Chowdhury, "Integrating health services into an MCH-FP program: Lessons from Matlab, Bangladesh," *Studies in Family Planning* 15, no. 4 (1984): 153–161; and D.S. DeGraff, J.F. Phillips, R. Simmons, and J. Chakraborty, "Integrating health services into an MCH-FP program in Matlab, Bangladesh: An analytical update," *Studies in Family Planning* 17, no. 5 (1986): 228–234.

5 However, in addition to receiving ORS (oral rehydration salts) packets during field visits by ICDDR,B demographic surveillance workers, residents of the comparison area have frequently made use of the central ICDDR,B treatment facility for diarrheal disease treatment, as well as for IUD and tubectomy adoption.

6 See Bhatia et al., cited in note 3.

7 J.F. Phillips, W.S. Stinson, S. Bhatia, M. Rahman, and J. Chakraborty, "The demographic impact of the Family Planning–Health Services Project in Matlab, Bangladesh," *Studies in Family Planning* 13, no. 5 (1982): 131–140.

8 J.F. Phillips, M.A. Koenig, and J. Chakraborty, *The Matlab Family Planning Health Services Project: Impact on Family Planning, Fertility and Child Survival*. Final Report to the United Nations Fund for Population Activities, December, 1985.

9 For a more detailed description of this survey, see J.F. Phillips, J. Akbar and M.A. Khan, "Aim and objectives of the Matlab In-depth Survey," Documentation Note Number 1, MCH-FP Extension Project, ICDDR,B, 1986.

10 Between 1978 and 1984, the mean age at first marriage for females rose from 16.8 to 18.2 years in the treatment area, and from 16.7 to 17.9 years in the comparison area. K. Sheikh, unpublished results.

11 See Rahman et al., cited in note 2.

12 W.S. Stinson, J.F. Phillips, M. Rahman, and J. Chakraborty,

"The demographic impact of the Contraceptive Distribution Project in Matlab, Bangladesh," *Studies in Family Planning* 13, no. 5 (1982): 141–148.

13 For a description of this baseline survey, see M. Rahman, W.H. Mosley, A.R. Khan, A.I. Chowdhury and J. Chakraborty, "The Matlab Contraceptive Distribution Project," *International Centre for Diarrhoeal Disease Research, Bangladesh Scientific Report No. 32* (Dhaka: ICDDR,B, December 1979).

14 Caution should be exercised in comparing these desired family size measures with the ideal family size measures obtained from the CDP survey, as they differ substantially in meaning and interpretation.

15 The corresponding prevalence rate in Matlab during the same period based upon the ICDDR,B service record-keeping system (RKS) was 44 percent. The reason for this discrepancy is currently being explored.

16 M.A. Khan, C. Smith, and M.A. Koenig, "Contraceptive dynamics in the Matlab treatment and comparison areas: Insights from a 1984 survey," paper presented at the Fourth Annual Conference of the Indian Society for Medical Statistics, Bangalore, India, 24–26 November 1986.

17 These rural samples differ somewhat in terms of age range, as well as in their inclusion of pregnant and non-fecund women.

18 Khan et al., cited in note 16.

19 This investigation is focusing upon factors such as underlying family size preferences, exposure to the risk of conception, and familial attitudes toward family size and family planning as possible explanations for the disparity between stated preferences and actual behavior.

20 For a discussion of the decomposition of rates, see E. Kitagawa, "Components of a difference between two rates," *Journal of the American Statistical Association* 50, no. 272 (1955): 1168–1174.

21 For elaborations of this argument as it pertains to Bangladesh, see P. Demeny, "Observations on population policy and population program in Bangladesh," *Population and Development Review* 1, no. 2 (1975): 307–321; W.B. Arthur and G. McNicoll, "An analytic survey of population and development in Bangladesh," *Population and Development Review* 4, no. 1 (1978): 23–80; M.T. Cain, "The household life cycle and economic mobility in rural Bangladesh," *Population and Development Review* 4, no.3 (1978): 421–438.

22 See, for example, C.F. Westoff and A.R. Pebley, "Alternative measures of unmet need for family planning in developing countries," *International Family Planning Perspectives* 7, no. 4 (1981): 126–136; and S.N. Mitra and A.R. Pebley, "Assessment of family planning needs in Bangladesh," *Unmet Need for Contraception in World Fertility Surveys of Developing Countries*, edited by A. R. Pebley et al. (Honolulu: East-West Population Institute, 1982), pp. 26–42.

23 D.S. Freedman and R. Freedman, "Adding demand-side variables to study the intersection between demand and supply in Bangladesh," PHN Technical Note 86-28, World Bank Research Division of the Population, Health and Nutrition Department, October 1986.

24 See Phillips et al., cited in note 7, for an elaboration of this argument, and Freedman and Freedman, cited in note 23.

25 For a discussion of this issue, see J.F. Phillips, R. Simmons, and M. Koblinsky, "Bureaucratic transition: A paradigm for policy development in Bangladesh," paper presented at the IUSSP Seminar on Societal Influences on Family Planning Programme Performance, Ocho Rios, Jamaica, 10–13 April 1985.

26 See L.C. Coombs, "Prospective fertility and underlying preferences: A longitudinal study in Taiwan," *Population Studies* 33, no. 3 (1979): 447–455.

27 Roughly comparable percentages of women in the 1984 treatment and comparison areas expressed a desire for no additional children. However, when women who wanted no more children and were not sterilized were asked their feelings about the birth of an additional son, a higher percentage in the treatment than comparison area indicated that they would be "unhappy" (26 vs. 19 percent). Similar findings were evident with respect to the birth of an additional daughter (29 vs. 22 percent).

28 For a discussion of this issue, see G.B. Simmons and R.J. Lapham, "The determinants of family planning program effectiveness," in *Organizing for Effective Family Planning Programs*, edited by R. J. Lapham and G. B. Simmons (Washington, D.C.: National Academy Press, 1987), pp. 683–700.

29 For a more extensive discussion of this issue, see J.F. Phillips, R. Simmons, M.A. Koenig, and J. Chakraborty, "The determinants of reproductive change in a traditional society: Evidence from Matlab, Bangladesh," unpublished paper, November 1986.

30 For a discussion of the differences between the government and Matlab programs, see M.A. Koblinsky, R. Simmons, J.F. Phillips, and Md. Yunus, "Barriers to implementing an effective national MCH–FP program," in *Selected Papers of the 1984 Annual Conference of the National Council for International Health: Controversy and Consensus* (Washington, D.C.: National Council for International Health, 1984).

31 See D. Balk et al., *An Analysis of Cost and Cost-Effectiveness of the Matlab Family Planning Health Services Project* (forthcoming); and J.F. Phillips, R. Simmons, G. Simmons and Md. Yunus, "Transferring health and family planning service innovations to the public sector: An experiment in organizational development in Bangladesh," *Studies in Family Planning* 15, no. 2 (1984): 62–73.