

## Desire for Children and Subsequent Abortions in Matlab, Bangladesh

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### ABSTRACT

This study investigated the relationship between desire for children and subsequent abortions in the treatment and comparison areas of Matlab, where ICDDR,B: Centre for Health and Population Research has been maintaining a Demographic Surveillance System (DSS) since 1966. The women at risk of pregnancy, interviewed in the In-depth-1984 (Cohort-84) and KAP-1990 (Cohort-90) surveys, were followed for five years through the DSS to ascertain their subsequent pregnancy outcomes. The desire for children was negatively associated with the risk of subsequent abortion in recent years. The number of abortions was higher in the comparison area than in the treatment area and increased over time in both the areas among those who wanted no more children. Among the sample women, one in five abortees had repeated abortions in the comparison area, but none had repeated abortions in the treatment area. The other factors associated with high risk of abortion were: old age, education, Hindu religion, and use of contraceptives (at the time of survey). The findings suggest that targeting women who want to limit family size with high-quality family-planning services would reduce the incidence of once and repeated abortions.

**Key words:** Abortion; Child; Bangladesh

### INTRODUCTION

Abortion—legal or illegal—has been practised in most countries of the world. The variation in the level of abortion across countries depends not only on legality of the procedure but also on religious restrictions and cultural acceptance. According to the Penal Code of 1860, induced abortion is illegal in Bangladesh except to save the life of the mother (1). Since the late 1970s, the law allows menstrual regulation in the early stages before pregnancy status is clinically confirmed (2,3).

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Such interpretation of the law, along with the decline in desired family size and availability of menstrual regulation services, has contributed to the increased incidence of induced abortions (4).

In the past, when the law was strict, abortions were usually performed either by self or untrained indigenous practitioners. Since liberalization of the law, menstrual regulation services are available in both public and private sectors. The government health facilities providing abortion services include: Family Welfare Centres, Upazila Health Complexes, and District Hospitals, while the non-government facilities include clinics located mainly in cities and towns. Despite the availability of these facilities, most abortions are still being performed either by the client herself or with the help of indigenous practitioners (5,6), and many who sought modern abortion services had initially experienced traditional methods (7,8).

Although the availability of abortion services has contributed to a substantial increase in the number of abortions in many countries, little increase has been observed in many others. This is mainly because of social stigma and religious prohibition against abortion. An unsafe abortion may lead to untold physical and mental distress or death. A survey in 1978 estimated that about 21,600 pregnancy-related deaths occurred during the year in Bangladesh. Of these deaths, 25.8% were due to induced abortion-related complications (9). Another study reported that a considerable proportion of hospital resources, in terms of time, bed occupancy, transfusions given, and antibiotics, was used or consumed for the management of abortion-related cases (10).

Studies based on Matlab data documented a higher number of abortions in the comparison area than in the treatment area (5,11). Rahman and colleagues reported that abortion of unintended pregnancies is similar in both treatment and comparison areas, but higher levels of contraceptive use have led to lower incidence of unintended pregnancy and abortion (11). Another study in Matlab documented that lack of use or lack of use-effectiveness of the family-planning methods resulted in unwanted pregnancies and, thus, abortion (7).

This study proposes that the desire for children is a predictor of abortion, and the predictive power gets stronger as intensity to limit family size increases. The objective of the study was to examine the relationship between desire for children and subsequent abortions (once and repeated) and also whether such abortions vary by socioeconomic characteristics.

## MATERIALS AND METHODS

### Study area

Data for the present study came from Matlab upazila where ICDDR,B: Centre for Health and Population Research has been maintaining a Demographic Surveillance System (DSS) since 1966. The DSS is currently known as Health and Demographic Surveillance System (HDSS). Matlab is a rural area located about 70 km southeast of Dhaka, the capital of Bangladesh. The area is low-lying, and the economy is largely based on agriculture (12).

To overcome the deficiencies of the simple household contraceptive distribution programme, major modifications in the field structure and programme activities were introduced in October 1977. An experimental maternal and child health and family-

planning (MCH-FP) programme was introduced in half of the DSS villages (treatment area), while the other half (comparison area) continued to receive limited services provided by the government programme (13). The MCH-FP programme in the treatment area has provided more accessible and high-quality family-planning services than the standard government services provided in the comparison area. In the treatment area, services have been provided by Community Health Workers (CHWs) through fortnightly home visits. The CHWs were locally recruited from influential families, were married, had eight or more years of education, and were users of contraceptives. Each CHW was responsible, on average, for visiting 20 households per day. During the visit, they asked mothers about their menstrual status, contraceptive use, contraceptive-related side-effects, pregnancy, breastfeeding, and morbidity. In the follow-up visit, they provided contraceptives and basic medicines and referred patients with complications to sub-centre clinics. The treatment area also has four ICDDR,B sub-centres that provide maternal and child health and family-planning services.

The differences in the availability of contraceptive services have led to a difference in contraceptive practice, women of childbearing age in the treatment area being more likely to use contraceptives than women in the comparison area. In both the areas, the use of contraceptives in 1975 was very low. In the treatment area, the use of contraceptives increased from about 10.0% in 1977 to 28.0% in 1978 after the introduction of the MCH-FP programme. It remained at the same level until 1982 when the use of contraceptives started to increase, reaching 60.6% in 1990 and 68.1% in 1996. With the increased use of contraceptives, the total fertility rate declined from 6.9 in 1976 to 5.1 in 1980, 3.6 in 1990, and 2.7 in 1996. In the comparison area, the use of contraceptives was much lower than in the treatment area but had also been increasing. The use of contraceptives increased from 4.7% in 1975 to 16.5% in 1984, to 27.2% in 1990, and 46.9% in 1996. The total fertility rate declined from 7.2 in 1976 to 6.7 in 1980, 5.2 in 1990, and 3.2 in 1996. The mean desired family size has been similar in both treatment and comparison areas and declined at similar rates from about 4.5 in 1975 to 3.0 in 1990, and 2.5 in 2000 (14-16).

### Data

The study used three sets of data from the Matlab DSS area: In-depth survey of 1984 (In-depth-84), KAP survey

of 1990 (KAP-90), and the DSS data of 1984-1988 and 1990-1994. The primary objectives of both In-depth-84 and KAP-90 surveys were to provide updated information on contraceptive use and performance of maternal and child health services from both treatment and comparison areas (17,18). The In-depth-84 survey was conducted on random cluster samples of 3,785 women of reproductive age in 37 villages and 2,429 women in 40 villages in the treatment area and in the comparison area respectively. However, young women were under-represented in the In-depth-84 survey due to sampling procedures that excluded newly-married women (17). The KAP-90 survey used the multi-stage sampling procedure. Thirty-one villages from the treatment area and 36 villages from the comparison area were randomly selected to include every alternate woman of reproductive age. The total number of respondents interviewed in the KAP-90 survey was 4,238 in the treatment area and 3,708 in the comparison area.

The DSS collected information on pregnancy outcome, death, migration, marriage, divorce, and household split. During the study period, the CHW recorded the DSS events through fortnightly household visits, and the Health Assistant, accompanied by the CHW, completed forms through household visits every six weeks. For all DSS events, except pregnancy termination, the household head or any senior member of the household was responsible for providing the information. For pregnancy termination, the respondent was the mother, and the CHWs were responsible for asking questions.

The DSS records three types of pregnancy outcome: livebirth, stillbirth, and miscarriages (induced and spontaneous). A pregnancy termination is called a livebirth when the product shows any evidence of life, such as crying, breathing, pulsation, beating of heart, or definite movement of voluntary muscles. If the termination occurs at seven months or afterward without any sign of life, it is termed as stillbirth. If termination occurs before seven months gestation without any sign of life, it is termed as miscarriage which can be induced or spontaneous. Induced miscarriage (abortion) is the pregnancy that is terminated intentionally by deliberate action. Spontaneous miscarriage, on the other hand, is the pregnancy that terminates naturally without deliberate action.

The women interviewed in the In-depth-84 and KAP-90 surveys were followed for five years through the DSS

to ascertain subsequent pregnancy outcomes, survival, and migration status. The study excluded those women who were not married at the time of survey, those who were aged 45 years or more, and those who were pregnant or sterilized. Pregnant women were excluded because their subsequent behaviours might be influenced by the pregnancy outcome. Users of the permanent methods were excluded because they were left with no reproductive choice. Consequently, the final sample consisted of 3,251 women in the In-depth-84 survey (1,887 in the treatment area and 1,464 in the comparison area) and 4,136 women in the KAP-90 survey (2,016 in the treatment area and 2,120 in the comparison area). During the follow-up, a woman might have experienced more than one pregnancy, and such pregnancies were considered a separate event; this allowed us to study repeated abortions.

In both the areas, pregnancy termination by manual vacuum aspiration, commonly known as 'menstrual regulation' is available from trained female paramedics at the government health facilities and at the private clinics. In the late 1970s, the Government of Bangladesh agreed to permit such pregnancy terminations in an effort to replace the practice of unsafe abortion. Menstrual regulation can be done only with the consent of the woman's husband, up to 10 weeks after the last menses and before pregnancy is clinically confirmed. Illegal abortion services are available from traditional healers, usually older women who use herbal roots or other solid objects.

Presence or absence of desire for more children has been widely used as a measure of preference in the studies of consistency between reproductive preferences and subsequent behaviour (19,20). The studies that used two preference measures have concluded that whether more children are wanted predicts subsequent fertility better than when desired and actual number of children are compared (21-23). In this analysis, 'whether more children are wanted' is used as a measure of preference. In both In-depth-84 and KAP-90 surveys, exactly similar questions were asked: 'Do you want more children in future? How many more do you want to have?'

#### Data analysis

Both bivariate and multivariate (logistic regression) analyses were used. For bivariate analyses, the abortion rate, i.e. number of abortions per 1,000 pregnancies, was calculated. For logistic regression, the dependent variable

took the value of 1 if a respondent had an induced abortion during the follow-up period and 0 if she had a pregnancy not terminated with abortion. The independent variables were: age of woman, number of living sons, desire for children, education of woman, possession of household items, religion, and cohort. Except age of woman, all other variables were treated as dummies; interaction of desire for children with other independent variables was also examined.

Three models were tested for each of these areas: (i) Model I included all covariates, except desire for children, (ii) Model II included all covariates of Model I and desire for children, and (iii) Model III is the final one which included all covariates, along with the interaction term.

The study villages were grouped into two categories: treatment area and comparison area. Age of woman was treated as continuous, while number of living sons was grouped into two categories: less than 2, and 2 or more. Educational levels of women were obtained by asking about completed years of schooling and grouped into two categories: none, and one or more; *Maktab* education was treated as 'none'. Possession of selected household items, such as quilt, hurricane lamp, bicycle, watch, and

Hindu). The status of contraceptive use (modern or traditional) at the time of survey was grouped into two categories: user and non-user. The women interviewed in the In-depth-84 survey and in the KAP-90 survey were subsequently followed for five years and treated as cohorts (Cohort-84 and Cohort-90). Desire of women for children was grouped into two categories: wanted no more and wanted more children.

The descriptive statistics for the explanatory variable are shown in Table 1. With a few exceptions, the two cohorts were similar—currently married, non-sterilized and non-pregnant women aged 15-44 years. In fact, Cohort-84 was better-educated and lower contraceptive user than Cohort-90. Therefore, the effect of these variables is needed to be controlled by multivariate analysis.

### Bivariate results

Table 2 shows the abortion rate per 1,000 pregnancies by desire for children, cohort, and study area. The number of abortions was higher in the comparison area (2.5 times for Cohort-84 and 3.2 times for Cohort-90) than in the treatment area for both the cohorts. The number of abortions increased over time by 1.3 times in the treatment area and 1.7 times in the comparison area.

**Table 1.** Percent distribution of women by explanatory variables, study area, and cohort

Variable	Cohort-84		Cohort-90	
	Treatment area	Comparison area	Treatment area	Comparison area
Age of woman (mean)	26	27	26	26
Two or more sons	37	43	26	34
One or more year(s) of schooling	50	39	41	34
User of contraceptives	27	8	46	19
Muslim	88	88	86	91
One or more item(s)	57	53	60	53
Wanted no more children	71	60	78	67

**Table 2.** Abortion rate (per 1,000 pregnancies) by desire of women for children, cohort, and study area

Desire for children	Treatment area			Comparison area		
	Cohort-84 (1)	Cohort-90 (2)	Ratio (2:1)	Cohort-84 (3)	Cohort-90 (4)	Ratio (4:3)
Wanted more	14	12	0.9	27	36	1.3
Wanted no more	28	74	2.6	75	167	2.2
All	18	24	1.3	46	78	1.7
Ratio (2:1)	2	6.2	-	2.8	4.6	-

whether received remittances were used for assessing household wealth and grouped into two categories: none, and one or more. Religion divides the population into distinct groups based on beliefs and culture (Muslim and

The desire for children was associated with abortion (Table 2). For Cohort-84, those who wanted no more children had 2.0 times the abortion rate in the treatment area and 2.8 times in the comparison area compared to

those who wanted more. For Cohort-90, the relationship was even stronger (6.2 times) for those who wanted no more children than those who wanted more in the treatment area compared to 4.6 times in the comparison area. Over the period, the number of abortions declined slightly (0.9 times) in the treatment area among those who wanted more but increased slightly (1.3 times) in the comparison area, while among those who wanted no more children, the number of abortions increased by 2.6 times in the treatment area and 2.2 times in the comparison area.

Table 3 shows the abortion rate per 1,000 pregnancies by socioeconomic variables, study area, and desire for children. The data of the two cohorts were combined to increase cell frequencies. For those women who wanted no more children, the number of abortions increased in both the areas with increase in age of woman and number of living sons. However, the difference was not significant by number of living sons in the treatment area. For example, the abortion rate in the treatment area

was 3.0 times for those who were aged 35 years or more than those who were aged less than 25 years, while the comparable figure in the comparison area was 2.6 times. The number of abortions was higher among Muslims, users of contraceptives, those with one or more household item(s), and those who had some schooling compared to Hindus, non-users of contraceptives, those who had no household items, and those who were illiterate. The difference was not significant by religion in the treatment area, while it was not significant by possession of household items in the comparison area. For example, the abortion rate in the treatment area was 2.1 times for those who had some schooling compared to those who were illiterate, while the comparable figure in the comparison area was 1.3 times. On the other hand, for those who wanted more children, the difference between the socioeconomic variables and abortion was not usually prominent in the treatment area, but the differences were significant in the comparison area, except for religion.

**Table 3.** Abortion rate (per 1,000 pregnancies) by socioeconomic characteristics, study area, and desire for children

Variable	Wanted more children				Wanted no more children			
	Treatment area		Comparison area		Treatment area		Comparison area	
	Rate	No. (AB, TPG)	Rate	No. (AB, TPG)	Rate	No. (AB, TPG)	Rate	No. (AB, TPG)
Age of woman (years)								
<25	11	(34, 2976)	22	(64, 2928)	24	(5, 209)	82	(29, 353)
25-34	14	(28, 1934)	50	(87, 1755)	45	(44, 980)	97	(154, 1588)
35+	24	(3, 125)	58	(4, 69)	73	(25, 341)	212	(142, 671)
p value	NS		0.01		0.05		0.01	
Number of living sons								
<2	11	(48, 4199)	31	(125, 3997)	44	(18, 408)	74	(49, 659)
≥2	20	(17, 836)	40	(30, 755)	50	(56, 1122)	141	(276, 1953)
p value	0.05		NS		NS		0.01	
Contraceptive use								
Non-user	11	(38, 3483)	26	(108, 4225)	30	(28, 925)	104	(220, 2112)
User	17	(27, 1552)	89	(47, 527)	76	(46, 605)	210	(105, 500)
p value	NS		0.01		0.01		0.01	
Education of woman (years)								
None	13	(35, 2745)	23	(68, 2960)	32	(28, 865)	115	202, 1764)
One or more	13	(30, 2290)	49	(87, 1792)	69	(46, 665)	145	(123, 848)
p value	NS		0.01		0.01		0.01	
Possession of items								
None	10	(21, 2111)	25	(57, 2259)	26	(17, 661)	122	(151, 1240)
One or more	15	(44, 2924)	39	(98, 2493)	66	(57, 869)	127	(174, 1372)
p value	NS		0.01		0.01		NS	
Religion								
Hindu	17	(12, 714)	22	(11, 511)	72	(7, 97)	229	(51, 223)
Muslim	12	(53, 4321)	34	(144, 4241)	47	(67, 1433)	115	(274, 2389)
p value	NS		NS		NS		0.01	

AB=Abortion; NS=Not significant; TPG=Total pregnancies (livebirths, abortions, miscarriages, and stillbirths)

Table 4 shows the number and percentage of women having abortions in five years by cohort and study area. In the treatment area, no repeated abortions happened in either cohort, but about 20% of the women had repeated abortions in the comparison area. Of the abortees in the

examined once and repeated abortions in the two areas with different family-planning programmes but similar socioeconomic conditions. It has followed two cohorts that provide a broader perspective on the issue. The limitation of the study is that data on desire for children

**Table 4.** Number and percentage of women having abortions in five years by cohort and study area

No. of abortions	Treatment area				Comparison area			
	Cohort-84		Cohort-90		Cohort-84		Cohort-90	
	%	No.	%	No.	%	No.	%	No.
1	100	57	100	82	81.7	94	80.4	209
2	-	-	-	-	14.8	17	11.9	31
3	-	-	-	-	3.5	4	4.2	11
4	-	-	-	-	-	-	3.5	9

comparison area, about 8% had repeated abortions in each cohort among those who wanted more children, while it was about 25% among those who wanted no more children (Table 5).

**Table 5.** Percentage of repeated abortions by desire for children and cohort in comparison area

Desire for children	Cohort-84	Cohort-90
More	8.9	7.1
No more	24.3	27.3

### Multivariate results

The desire for children was highly significant in both the areas (Model I compared to Model II), and it demonstrated the extra predicting power (Table 6). In the presence of desire for children (Model II), the odds ratios of all the variables remained almost unchanged, except number of living sons, which became insignificant. The number of abortions increased over time in both the areas, predominantly among those women who wanted no more children compared to those who wanted more (Model III).

The number of abortions increased with increase in age of woman, and it was higher among Hindus, educated women, users of contraceptives, and those households that owned one or more item(s) compared to Muslims, illiterate women, non-users of contraceptives, and those households that owned no items. Such relationship did not change over time (interaction between these socioeconomic variables and cohort was not significant).

### DISCUSSION

The study has several advantages and a few limitations. The data are longitudinal in nature, and the study

are cross-sectional in nature and might have changed during the follow-up period. Lack of data on change in desire for children may underestimate the predictive power.

The findings of the study show a strong negative relationship between the desire for children and subsequent abortions in the treatment and comparison areas of Matlab in the recent years. However, such relationship was weak in the past. The number of abortions was low in the past because couples were less serious about controlling fertility than in recent years, but as the desire to limit family size increased, more women had abortions, particularly those who wanted no more children, resulting in a strong relationship. Abortion rate is relatively low in Bangladesh. It has increased over time due to increased motivation for small family size (16,24) and as a result of the liberalization of abortion law, particularly for menstrual regulation (illegal earlier), and availability of services (4).

Our findings suggest that high-quality family-planning services can reduce unwanted pregnancies and, thus, abortion rate (11). The study also found that such family-planning services can prevent repeated abortions. The occurrence of repeated abortions in the less-intensive family-planning programme area indicates that there is a demand for abortion, and it can increase in the absence of high-quality family-planning services.

The number of abortions increased with the increase in age of woman in both treatment and comparison areas, particularly among those who wanted no more children. The high abortion rate among elderly women could be due to a greater intention to limit family size. These women also might have children old enough to marry and bear children; this factor is often called the

'grandmother effect' (25). On the other hand, the number of living sons was positively associated with subsequent

This could be due to the fact that the users of contraceptives had higher motivation either to limit or

**Table 6.** Logistic regression models (odds ratios) of incidence of subsequent abortions

Variable	Model I		Model II		Model III	
	Treatment area	Comparison area	Treatment area	Comparison area	Treatment area	Comparison area
Age of woman (continuous)	1.11**	1.11**	1.08**	1.09**	1.08**	1.09**
Number of living sons						
<2	1	1	1	1	1	1
≥2	1.59*	1.76**	1.19	1.34*	1.17	1.31*
Education of woman (years)						
None	1	1	1	1	1	1
One or more	1.46*	1.86**	1.47*	1.89**	1.49*	1.91**
Contraceptive use						
Non-user	1	1	1	1	1	1
User	2.04**	2.62**	1.95**	2.46**	1.91**	2.47**
Religion						
Hindu	1	1	1	1	1	1
Muslim	0.66	0.49**	0.62+	0.49*	0.59*	0.50**
Possession of items						
None	1	1	1	1	1	1
One or more	1.85**	1.18	1.83**	1.17	1.87**	1.15
Desire for children						
Wanted no more	-	-	1	1	1	1
Wanted more	-	-	0.45**	0.51**	0.93	0.76
Cohort						
Cohort-84	1	1	1	1	1	1
Cohort-90	1.36+	1.93**	1.39+	1.96**	2.57**	2.39**
Desire for children* Cohort	-	-	-	-	0.29**	0.56**
-2-log likelihood	1237.7	3106.4	1225.1	3083.7	1212.9	3077.3
(df)	(7)	(7)	(8)	(8)	(9)	(9)

\*\*p<0.01, \*p<0.05, and +p<0.10

abortions, and such relationships disappeared when the desire for children was included in the regression model. This is because the desire for children was associated with the number and sex composition of children, suggesting that the desire for children is a more proximate determinant of abortion.

The abortion rate was higher among the educated than among the illiterate women which is expected because education is linked with modernization, exposure to the outside world, and female autonomy. Education may help couples adapt in a modern society and increase aspiration for self and children, and this can be achieved through limiting family size (26).

The users of contraceptives, at the time of survey, had a higher subsequent abortion rate than non-users.

to postpone subsequent birth compared to the non-users. A contraceptive user who wants to limit family size can subsequently become pregnant either because of discontinuation due to side-effects, change in desire for family size, or use-failure (8). In the Matlab treatment area, previous research had documented that discontinuation of all contraceptive methods for 12 months was about 35% (27), while the use-failure rate was 1% for injectables, 3% for intra-uterine devices, and 15% each for pills and for other methods (28).

The high incidence of abortion among women who wanted no more children has strong programmatic implications for reduction in the number of abortions in Bangladesh. The family-planning programme should target women who want to limit family size to reduce the number of abortions.

## ACKNOWLEDGEMENTS

The research was supported by ICDDR,B: Centre for Health and Population Research. ICDDR,B is supported by countries and agencies that share its concern for health problems of developing countries.

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