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Determinants of Induced Abortion in Rural Bangladesh

Introduction

INDUCED abortion is prohibited in Bangladesh except when done to save a women's life. However, menstrual regulation (MR) is allowed in the early stage, before pregnancy status is clinically confirmed. MR is used in the government and other family planning service centers without reference to or clinical diagnosis of pregnancy in the official record (Bangladesh Second Five Year Plan: 1980-85). MR services, however, are not widely available in rural areas as a replacement for the practice of indigenous abortion, which is still frequently practiced there.

Abortion through indigenous and unhygienic methods by traditional practitioners is believed to be frequently performed by village women. Such abortions lead to life-threatening complications. Hospital admission for abortion-related complications have been estimated and it is found that abortion complications account for approximately half of the admissions to gynecology units of major hospitals in Bangladesh (Measham *et al.,* 1981).

There is a social stigma and religious prohibitation against induced abortion in Bangladesh. As a result women who decide to have an abortion take assistance from a provider who can do it at client's home and maintains a secrecy. Traditional practitioners perform abortion at clients' home using unhygienic indigenous procedures which are life-threatening.

In order to adopt a safe and hygienic procedure of abortion, village women have to go to Health and Family Welfare Center (HFWC) which serves a population about 25,000 including about 6,000 married women of reproductive age (MWRA). The Family Welfare Visitor (FWV), a female paramedic, performs MR at the HFWC. The utilization of HFWC by women is limited because of women's limited mobility outside home, lack

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of transport communication, and lack of awareness of services available at HFWC. Therefore, the utilization of HFWC for safe abortion is not common in the villages. Abortion is free-of-cost and is registered in the record of HFWC. This may be a fear to women that registration of an induced abortion may be in public which may refrain them from attending HFWC for abortion. However, the FWV performs induced abortion without registering it for an amount of fee which is basically illegal. These fees are not affordable by majority of the clients. Use of traditional practitioners are relatively inexpensive, and convenient since abortion is done at clients' home and secrecy can be maintained.

Abortion in Bangladesh is not well studied mainly because of lack of reliable data. It is difficult to obtain information on abortion from the clients. Available service statistics are highly inaccurate. Studies on the risk factors of induced abortion are almost non-exist.

In this study, we examine the trend of abortion and identify risk groups of women who are prone to abortion. The analysis covers over 80,000 pregnancy terminations during 1982-91 in three rural areas of Bangladesh. We also examine the pattern of contraceptive use following an abortion.

We developed three hypotheses in this paper. First, we hypothesize that abortion is increasing in the country because of two main reasons: (i) desired family size is declining and, (ii) contraceptive use is increasing. In the developing stage of family planning programme, use-effectiveness, quality of services and user literacy are relatively poor. This may lead to frequent failure and discontinuation of contraception leading to high induced abortion. Second, hypothesis is related with the first one; contraceptive users are likely to have higher abortion because they are highly motivated to delay next birth or family limitation and may have abortion in the case of method failure. Third, hypothesis is that abortion may decline if contraceptive use becomes widespread, and the users attain an efficiency of use of a method. Also with the development of health and family planning programme induced abortion may decline as women will have better access to health and family planning services which are also likely to be of better quality.

Methods and Procedures

Study Area

The study was conducted in three rural areas of Bangladesh: Abhoynagar, Matlab, and Sirajgonj. Abhoynagar is located about 300 km south-west of Dhaka, the Capital of Bangladesh. Matlab is located about 50 km south of Dhaka and Sirajgonj is located about 200 km north-west of Dhaka. Subsistence agriculture, primarily rice agriculture dominate the economy of these areas. Fishing is quite common in Matlab and Sirajgonj. Literacy, particularly among women, is still relatively low in all areas. The areas are largely inaccessible to Dhaka either because of inadequate transport communication or long-distance. Social institutions are predominantly traditional although the influences of modernization are increasing through access to radio and personal commercial contact

with urban areas. Among the three areas, Abhoynagar is the least conservative and Sirajgonj is the most conservative and remotest.

Matlab is divided into two areas—treatment and comparison areas. The treatment area has received from the International Centre for Diarrhoeal Disease Research, Bangladesh, a series of carefully designed health and family planning interventions since 1977. In 1992, contraceptive use was over 60 percent and corresponding total fertility rate (TFR) declined to below 3.0. Infant and child mortality also has declined remarkably. Abhoynagar receives health and family planning services from the regular Government programme. Since 1982, the Government health and family planning programme in Abhoynagar have received technical assistance from the ICDDR,B's Maternal and Child Health and Family Planning (MCH-FP) Extension Project (Rural). The joint activities of the Government and the project helped improved the utilization of services. In 1992, contraceptive use was about 60 percent and TFR was below 3.0 in Abhoynagar. Sirajgonj also received services from the regular Government programme, however it also received technical assistance from ICDDR,B's MCH-FP Extension Project during 1982-93. Contraceptive use was about 40 percent with a TFR of over, 4.0 in 1992. Matlab comparison area receives services from regular government programme; the levels of contraceptive use and TFR were nearly similar to those in Sirajgonj.

The Data

Information for the Matlab treatment and comparison areas is obtained from the Demographic Surveillance System (DSS) which has been maintained by ICDDR,B since 1966. Pregnancy termination (live births, induced abortions, spontaneous abortions, and still births), deaths, migration, and marital events are registered by Health Assistants (HA) who make routine visitations at each household once a month. Female Community Health Workers (CHW) who make fortnightly visits to every households also keep records of events in their Record Book to help HA's accurate completion of vital events. The completeness of vital registration in Matlab DSS is exceptionally high (United Nations, 1992).

Information for Abhoynagar and Sirajgonj is obtained from the Sample Registration System (SRS) which has been maintained by the MCH-FP Extension Project (Rural) of ICDDR,B since 1982. All vital events like in Matlab are registered by a Field Research Assistant (FRA) who routinely visit each sample household once in a quarter. Pregnancy status of each MWRA is recorded by the FRA during routine household visitation. This helps relatively accurate detection of pregnancy terminations.

History of contraceptive use of each MWRA is also obtained from service statistics in the Matlab treatment area. The service statistics is known as Record Keeping System (RKS). In the SRS of Abhoynagar and Sirajgonj, status of contraceptive use of each sample MWRA is recorded every quarter during the home visit of the FRA.

It is quite well known that the incidence of induced abortion and spontaneous abortion (miscarriage) is likely to be under-reported because of various reasons. The under-reporting

of induced abortion which is likely to be intentional is of greater concern. We have this unavoidable limitation of the data sets. However, longitudinal data collection systems of ICDDR,B have earned international reputation for high-quality data available in a developing country setting.

Definitions

ICDDR,B vital registration systems classify a pregnancy termination regardless of duration of pregnancy, as a live birth if it shows any sign of life in terms of breathing, crying, or movement of any organ. If, for example, a baby shows any sign of life and then dies it is classified as a live birth. Pregnancy termination is classified as non-live birth if does not show any sign of life. A non-live birth is classified as a still birth if the duration of pregnancy is eight months or more. A non-live birth with a pregnancy duration of seven months or less is classified as miscarriage or spontaneous abortion if the pregnancy termination is spontaneous. A non-live birth with a pregnancy duration of seven months or less is classified as induced abortion if the termination is induced through medical or non-medical or indigenous procedures.

The Analysis

Ratios of induced abortion, miscarriage (spontaneous abortion), and still births per 1,000 live births are compared for different categories of independent variables. Miscarriages and still births are included in the analysis for comparative purposes. A net association between a variable and induced abortion. Miscarriage, and still birth is estimated in logistic regression in which all independent variables under consideration are included. In logistic regression, induced abortion, miscarriage, and still birth are treated as cases and live birth as a non-case. The independent variables included in the analysis are: maternal age, parity, previous pregnancy interval, contraceptive use prior to the present pregnancy, maternal education, household space (a proxy for household income), study area, and calendar year of pregnancy termination. Proportional hazards models are used in the analysis of the subsequent contraceptive behaviour following a pregnancy termination. The analysis involving contraceptive use is restricted to the Matlab treatment area, Abhoynagar, and Sirajgonj since information on contraceptive use in the Matlab comparison area was not available.

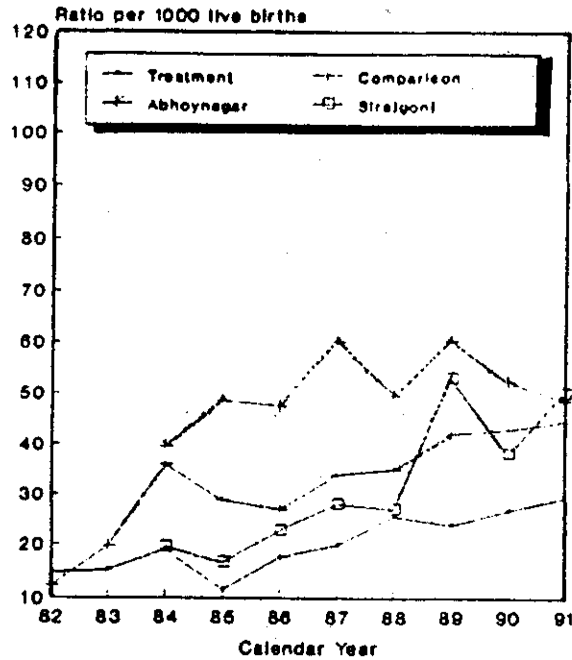
Results

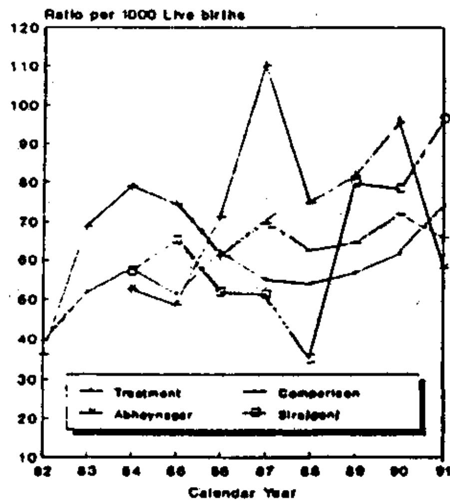
Number of pregnancy terminations and abortion ratios are shown in Table 1. Abortion Ratio varied by area; lowest of 20 abortions per 1,000 live births was in the treatment area of Matlab and highest of 51 abortions per 1,000 live births was in Abhoynagar. The Matlab comparison area and Sirajgonj had similar abortion ratios. Miscarriage also

had similar areal variation; lowest of 56 per 1,000 live births was in the Matlab treatment area and highest of 74 per 1,000 live births was in Abhoynagar. Areal variation of still birth ratios, however, was not pronounced.

TABLE 1: NUMBER AND RATIOS (PER 1,000 LIVE BIRTHS) OF ABORTIONS, MISCARRIAGES, AND STILL BIRTHS BY AREA, 1982-91

Event	*Area*			
	Treatment	*Comparison*	*Abhoynagar*	*Sirajgonj*
Abortion				
Ratio	20	33	51	31
Number	610	1,183	152	171
Miscarriage				
Ratio	56	66	74	61
Number	1,689	2,398	220	353
Still Birth				
Ratio	35	36	38	41
Number	1,064	1,365	115	237
Live Birth				
Number	30,110	36,254	2,993	5,791
Total terminations	33,473	41,200	3,480	6,552





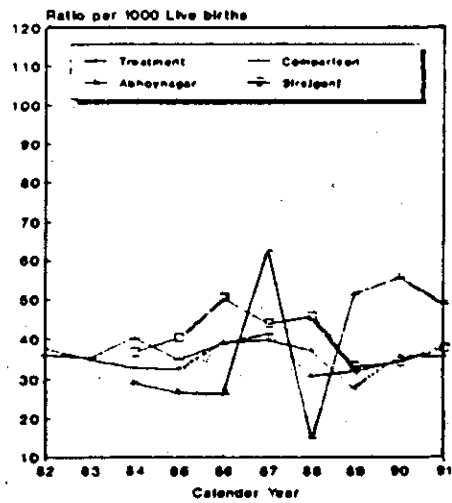


Fig. 1. Abortion, Miscarriage and still Birth Ratio by Calender and Area

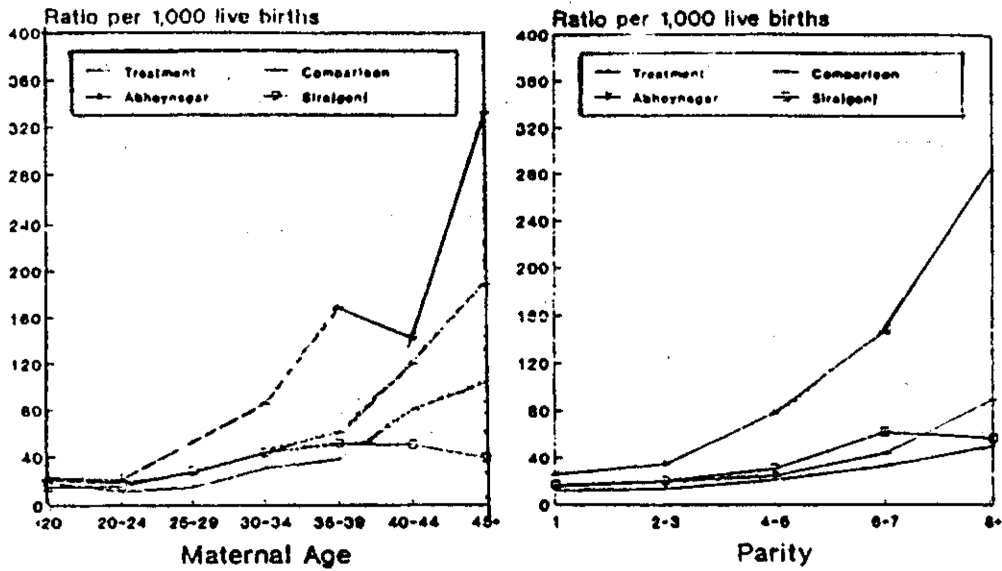


Fig. 2. Abortion Ratio by Maternal Age, Parity, and Area

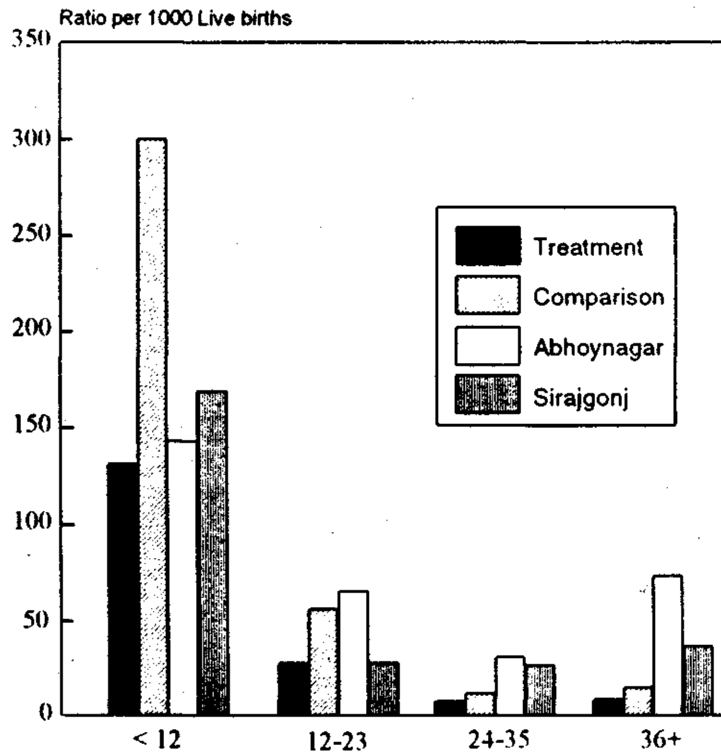


Fig. 3. Abortion Ratio by Pregnancy Interval and Area

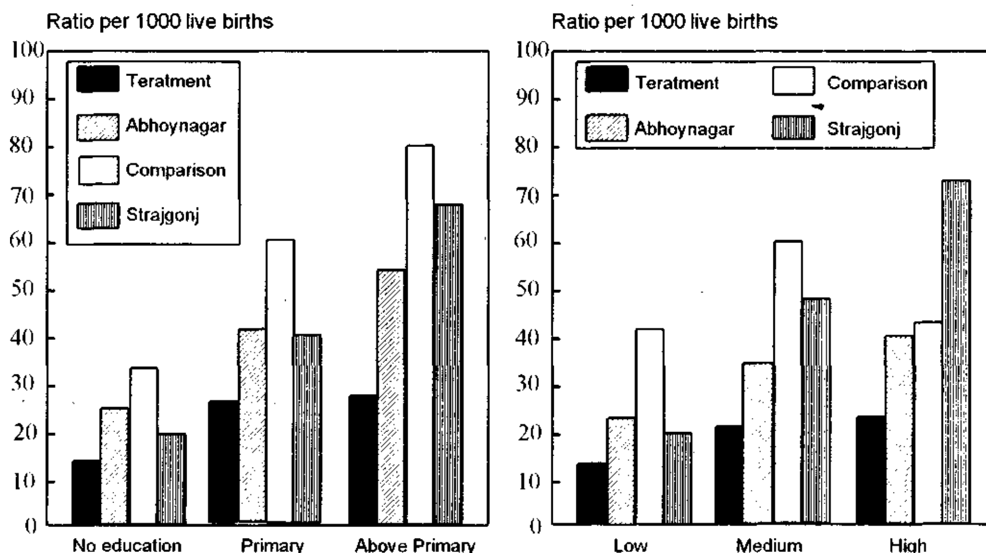


Fig. 4. Abortion Ratio by Maternal Education. Household Space, and Area

Women who used contraception in the current pregnancy interval prior to the pregnancy termination had higher abortion than those women who did not accept contraception in the same interval (Table 2). In contrast, miscarriage, and still birth were lower among users than non-users. Abortion ratio was 28 for users and 15 for non-users. Miscarriage ratio was 58 for non-users compared to 53 for users. Similarly, still birth ratio was 38 for non-users compared to 30 for users. Condom and traditional method users had highest ratio (61) followed by users of pills (36) and IUD (33). Injectable users had an abortion ratio which is close to that of non-users.

TABLE 2: RATIOS (PER 1.000 LIVE BIRTHS) *OF* ABORTION. MISCARRIAGE. AND STILL BIRTH BY CONTRACEPTIVE USE PRIOR TO CURRENT PREGNANCY IN MATLAB TREATMENT AREA 1982-91 (*n* - 33,473)

Type Non-users	*Abortion* 15	*Miscarriage* 58	*Stillbirth* 38
User	28	53	30
Pill	36	52	28
RID	33	56	28
Injectable	17	50	29
Condom and traditional methods	61	61	41

Table 3 shows the logistic regression results for the Matlab treatment and comparison areas. In this table, we compare odds ratios (OR) from the models of abortion, miscarriage.

and still birth. Induced abortion increased sharply and significantly with parity indicating that women with large number of children opted for abortion (Table 3). This supports our hypothesis that women chose an abortion of a pregnancy that occurs after having some children. Induced abortion decreased with maternal age indicating that relatively young women were more in favour of abortion in order to have small families. The likelihood of induced abortion decreased with pregnancy interval indicating that women chose an abortion of a pregnancy that occur within a short interval. This supports our hypothesis that women opt for abortion also for spacing of birth.

TABLE 3: LOGISTIC REGRESSION ODDS RATIOS: ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND ABORTION, MISCARRIAGE, AND STILL BIRTH IN MATLAB, 1982-1991 (n = 74673).

Factors	*Abortion*	*Miscarriage*	*Stillbirth*
Maternal Age[A]	0.92+	0.84***	1.12***
Parity			
1st birth	1.00	1.00	1.00
2-3	1.32**	1.04	0.82
4-5	2.02***	0.97	0.89+
6+	5.34***	1.53***	1.33***
Pregnancy interval			
< 12 months	1.00	1.00	1.00
1 2-23 months	0.20***	0.16***	0.26***
24+ months	0:04***	0.01***	0.03***
Maternal education			
No education	1.00	1.00	1.00
Primary	1.57***	1.02	0.94
Above primary	2.37***	1.05	0.99
Household space			
Low	1.00	1.00	1.00
Medium	1.45**	1.03	0.96
High	1.49***	0.94	0.99
Religion			
Hindu	1.00	1.00	1.00
Muslim	0.87+	1.19**	0.92
Area			
Treatmemt	0.69***	0.87***	1.00
Comparison	1.00	1.00	1.00
Year of Pregnancy termination (1982 = 0 and 1991 = 10)	1.09***	1.01	1.00
Constant	0.00***	0.05***	0.04***
-2Loglikelihood	15571	31017	20573

[a]: Maternal age is continuous variables; age squared was included in the model and was not significant.
+ $p < 0.10$; *p 0.05; **p< 0.01 ;***p< 0.001.

The likelihood of induced abortion increased with maternal education as well as household space that is, with household income (Table 3). Induced abortion was 31 percent lower in the treatment area than in the comparison area. The intensity of health and family planning services is higher in the treatment area than in the comparison area. Also quality of services is higher in the treatment area. TFR was 3.0 and over 4.0 in the treatment and comparison areas, respectively in 1992. Average birth interval was also longer in the treatment than comparison area. Contraceptive prevalence rate was over 60 and over 30 percent in the treatment and comparison areas, respectively, induced abortion in the treatment area supports our hypothesis that use of an abortion for spacing and limiting birth declines if health and family planning services are improved or level of fertility declines through widespread use of contraception. We have already documented that induced abortion is low among mothers with smaller number of children or with longer birth interval (Table 3). Since we include the effects of parity and birth interval in the regression model, it is highly likely that the variable "Treatment area" captures the effect of better health and family planning services in the treatment area.

During the period 1982-91, the likelihood of induced abortion increased by about nine percent per annum supporting our hypothesis that incidence of induced abortion is increasing over time.

The results of Table 4, in general, conform with those of Table 3. However, there are two additional variables and one interaction term in the model shown in Table 4. [7]nduced abortion was lower among those women who had higher proportion of previous child death. This probably reflects two things. First, women who have lost their children due to death are likely to be less determined about the number of children after which they want to stop childbearing because they may perceive that some more children may die. Therefore, even if they are pregnant after achievement of desired number of children, they may not decide to have an abortion. Second, this result probably reflect a selectivity-effect. There may be women who have poor behaviour in terms of health care and desired family size which leads to higher child mortality as well as large family size. Therefore, such women may not decide to have an abortion even if they are pregnant after a large number of children.

Women who used contraception prior to the current pregnancy had 4.84 times higher likelihood of induced abortion than non-users of contraception (Table 4). This support our hypothesis that abortion is high among contraceptive usens either because contraceptive users are highly motivated to delay next birth or family limitation or there was a method failure.

Abhoynagar had about 3 times higher induced abortion than Sirajgonj (Table 4). Induced abortion increased by 16 percent per year during the period 1984-1991. The significant interaction between Abhoynagar and year of pregnancy termination indicates that the increase in induced abortion was higher in Sirajgonj than Abhoynagar. It is worth noting that Abhoynagar had much higher incidence of induced abortion than Sirajgonj in the initial year of the study.

TABLE 4: LOGISTIC REGRESSION ODDS RATIOS: ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND ABORTION IN ABHOYNAGAR AND SIRAJGONJ, 1984-1991 (*n* = 10.032).

Factors	*Odds Ratio*
Maternal age[a]	1.06***
Number of children	1.22***
Preceding child	
Deaths	0.42***
No deaths	1.00
Maternal education	
No education	1.00
Primary	1.67***
Above Primary	2.52***
Pregnancy interval	
First birth	3.56***
<24 months	3.73***
24+ months	1.00
Prior contraceptive use	4.84***
Area	
Abhoynagar	2.95***
Sirajgonj	1.00
Year of pregnancy termination (1984 = 0 and 1991 =08)	1.16***
Abhoynagar*Year of Pregnancy termination	0.87**
Constant	0.00***
-2Los likelihood	2392

[a]: Maternal age is continuous variables; age squared was not significant and thus not included

+p<0.10; *p 0.05: **p< 0.01;** *p< 0.001.

We examine the subsequent contraceptive behaviour of the women who aborted their fetus. We hypothesized that abortion is chosen by the mother who want to limit fertility as well as space their subsequent birth or in the case of method failure. If this is true, we expect to find that the likelihood of use of contraception would be higher among women who abort their fetus than those women who did not abort. For all pregnancy terminations, we linked information of subsequent contraceptive use and recorded the interval between pregnancy termination under consideration and subsequent contraceptive use. Abortion, miscarriage, and still birth were dummy categories. Contraceptive use was modelled in a proportional hazard regression (Table 5). Relative risk of the variable "pregnancy

termination" shows that contraceptive use was significantly and 57 percent higher for mothers who had an abortion compared to those mothers who had a live birth. In contrast, contraceptive use was 56 percent lower among mothers who had a miscarriage compared to those mothers who had a live birth. The likelihood of contraceptive use of mothers after having a still birth was not significantly different from those mothers who had a live birth.

TABLE 5: RELATIVE RISK FROM PROPORTIONAL HAZARDS REGRESSION: ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND PREGNANCY TERMINATION AND CONTRACEPTIVE USE IN THE MATLAB TREATMENT AREA (*n* = 23,162)

Factors	*Relative Risk*
Maternal Age	0.75***
Parity	0.87***
Maternal Education	
No education	1.00
Primary	1.07**
Above Primary	1.18***
Household Space	
Low	1.00
Medium	1.06*
High	1.09**
Religion	
Muslim	1.00
Hindu	0.88***
Year of Pregnancy termination (1982 = 0 and 1991 = 10)	0.82***
Pregnancy Termination	
Live birth	1.00
Abortion	1.57***
Miscarriage	1.56***
Stillbirth	1.15+

+ $p<0.10$; *p0.05: **$p<0.01$; ***$p<0.001$.

Discussion and Conclusions

The study is based on information on induced abortion obtained from high quality longitudinal vital registration systems. The analysis considers three populations with different socio-economic and cultural background and varying level of contraceptive use and their fertility. The Matlab treatment area is different from the comparison area because

of its accessibility to a carefully designed health and family planning programme. A very large number of over 80,000 of pregnancy terminations are included in the analysis for a period of 10 years where a remarkable decline of fertility and infant and child mortality had occurred.

It is found that induced abortion has increased significantly over the period 1982-1991. This may be because of increased proportion of women not desiring for additional children over time. Women who have achieved desired family size but conceive attempted to have an abortion. Use of contraception has also increased over the study period which could have reduced the exposure of women to induced abortion. But contraceptive method-mix in Bangladesh indicates that a large majority of the users adopt pills, condoms, and traditional methods (Bangladesh Demographic and Health Survey, 1993-94). These methods have a high use-failure rates (Bairagi and Rahman, 1996). Bangladesh family planning programme is in a developing stage where method use-effectiveness, quality of services, and user-literacy are relatively poor. These may lead to contraceptive use-failure resulting in induced abortion.

Findings on the association between method use and induced abortion indicate that traditional method users, condom or pill users had significantly higher induced abortion than non-users or injectable users. This indicates the role of method failure. These findings have several programmatic implications for reduction of induced abortion. A better contraceptive method-mix geared towards permanent methods will lead to reduction in induced abortion. Promotion of injectable contraceptives is another option as we find that induced abortion was lowest among injectable users. Injectable contraceptive have very high use-effectiveness but are associated with expensive delivery mechanisms and certain long-term health risk associated with needle management. Health and family planning programme managers may develop a strategy of contraceptive method-mix after careful consideration of costs, risks and numerous benefits associated with contraceptive methods.

Since induced abortion was higher among certain method users, one potential and cost-effective way of reducing the burden of induced abortion may be through dissemination of information. The health and family planning workers can educate and motivate women to use pill and condom properly and regularly in order to avoid unwelcome conception. The workers can motivate women to adopt more effective and longer-acting methods which have least risks of method failure. Specific message, in order to reduce induced abortion and associated reproductive health risks, may be: A woman avoids an induced abortion, she can avoid it by timely adopting a contraceptive method, more, by using an effective method or a longer-acting method. If she has to opt for an abortion, should take help of health and family planning professionals who can help prevent from life-threatening or long-term injuries and complications of induced abortion.

The message should also emphasize on the definite post-abortion use of effective contraceptive method or on the switching to a more-effective or even a permanent method if the women was already a user of a method.

We find that the likelihood of abortion was lowest in Matlab treatment area. This is probably due to the accessibility of women to the well-organized and intensive health

and family planning programme in there. The level of fertility in the treatment area is also the lowest, but it is highly likely that the area's lowest abortion is associated with its health and family planning programme. Abhoynagar also has the lowest fertility but has the highest abortion level. The health and family planning services are delivered through a community-based distribution approach in all areas. Special effect are made in the treatment area. The workers visit each women every fortnight, make a routine follow-up, provide information and counselling,, and.facilitate referral services. Injectable is the dominant method of contraception which has the lowest use-failure (Bairagi and Rahman, 1996), and also, injectable users have lowest risk of induced abortion (Table 2) in the Matlab treatment area. The entire service delivery is closely monitored and supervised. All these activities have led to low fertility, infant and child mortality. We document, in this study, that induced abortion also has remained at a low level. A well-designed and closely supervised health and family planning programme can reduce induced abortion in Bangladesh and similar setting.

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