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Demographic transition in Bangladesh: What happened here in the 20\textsuperscript{th} century and what is next?

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Abstract The CPR was less than 10% and the TFR was more than 6 in the mid 1970s in Bangladesh. The CPR increased to about 45% and the TFR came down to 3.3 in 1993/1994. But the TFR remained stable since then, although the CPR increased to 54% in 1999/2000. The study investigated why and how the TFR could remain stable despite an increase in the CPR using the data of the Matlab demographic surveillance system (DSS). Matlab DSS has been collecting vital events for about 200,000 people since 1966. A comprehensive MCH-FP project was started in half of the DSS area in 1977. Results of the study showed that the desired family size declined over time, and was negatively associated with socioeconomic status and women’s education. The TFR was converging to the desired fertility, and the MCH-FP programme made the converging process quicker. However, without a further change in fertility preference or desired family size, a further emphasis on family planning may increase the CPR, but its effect is likely to be counter balanced by a negative impact of any other proximate determinants of fertility including abortion, and may not have any effect on fertility.

Background: At the beginning of the 20th century, the number of total population in Bangladesh was less than 30 million. The annual growth rate of population was less than 1% until 1951, when the number of population increased to about 44 million (BBS, 1998, p. 16). Mortality started to decline since early 1950s, but fertility remained high till 1970s. Due to this change in fertility and mortality, population started to grow in an unprecedented high rate since 1950s, and it was all time high (about 2.5%) in 1960s and 1970s. The growth rate started to decline since 1980s, and the current growth rate is about 1.5% (Figure 1). At the closing of the 20th century, the population of Bangladesh stood at about 130 million.

The main force behind the decline in population growth rate in Bangladesh in the 1980s and 1990s was a remarkable decrease in fertility during this time. In the early 1970s, total fertility (TFR) was about 7, and it was estimated to be 3.4 in the first Demographic and Health Survey (DHS) in 1993-1994. Total fertility rate was so surprisingly low in the first DHS that many people questioned about the quality of the DHS fertility data. However, Bairagi et al. (1996) validated the DHS total fertility rate from the Matlab
DSS. But total fertility rate remained almost stable at the level of 3.3 in the next two DHSs conducted in 1996-97 and 1999-2000 (Mitra et al., 1997; DHS, 2000). This unexpected halt in TFR raises quite naturally, questions about the factors of fertility dynamics and the future prospect of fertility decline in this country.

In 1978, the Government of Bangladesh declared the population pressure as the number one problem of the country. Since then, the government, non-government, private and international organizations have undertaken several programmes to solve the population problem. Some success in different areas has been achieved. For example, the female field workers, known as Family Welfare Assistants (FWAs), have established a well-designed network to provide door-to-door family planning services. As a result, a substantial increase in contraceptive use and a remarkable decline in fertility have been achieved in the last two decades (Fig. 2). For this success, the Bangladesh family planning programme is now considered a model for less developed countries. Despite these achievements, present TFR is far above the replacement level, and the population problem still continues to remain the number one problem in the country.

Many authors hold a strong view that the family planning programme played a main role in rapid fertility decline in the less developed countries including Bangladesh in the 1980s and 1990s. According to Lapham and Mauldin (1984), it is the family planning programme that contributes to the change in fertility, and according to Robey, Rustein and Morris (1993), family planning has the most direct influence on fertility. Cleland et al. (1994) concluded that the Bangladesh family planning programme is the main factor for fertility decline in this country. They also remarked, “if policies are implemented with sustained resolve, fertility decline is possible, even in the absence of rapid economic development and social change.”

However, many others do not agree with the view that a family planning programme can have a major effect on fertility. They opined that the major change in fertility has occurred not by birth control methods, but by other changes in demand for children. In their view, an improvement in birth control methods is mainly an induced response to
other decreases in the demand for children rather than an important cause of the
decreased demand (Becker, 1991). Caldwell et al. (1999) expressed doubt that only the
Bangladesh family planning programme could bring TFR down to the level of little over
3 from more than 6 in the mid-1970s without a change in the society.

Pritchett (1994) argued that to reduce fertility in a population, desired fertility, which
depends on development, culture etc., is important, and a family planning programme and
even contraceptive use itself have a very minor role to play in decreasing fertility in a
population. Citing the examples of different countries, he demonstrated that keeping the
desired family size constant, contraceptive has no major role to play in bringing fertility
down. The most notable example he gave was, “In 1977, Haiti’s desired fertility was 4.3,
while the modern contraceptive prevalence rate was only 4.7%; whereas Zimbabwe’s
desired fertility was 4.3 (in 1989), but the modern contraceptive prevalence rate was
36.2%......fertility in Haiti was actually only 0.4 of a birth higher than Zimbabwe’s
fertility (5.6 versus 5.2), despite the large difference in modern contraceptive use.” His
argument has also support from the recent relationship between the TFR and the CPR in
Bangladesh. The CPR in the country was 44.6% in 1993-1994, 49.2% in 1996/1997, and
53.8% in 1999/2000. Total fertility rate in these three periods were 3.4, 3.3, and 3.3
respectively (Mitra et al., 2000). It means that, although there was an increase in the
CPR by about 9% points since 1993/1994, there was virtually no decrease in TFR during
this period.

However, all these empirical examples failed to provide any convincing justification or
argument to clarify why fertility still remains the same in different populations, with a
very different level of contraceptive use but with the same level of desired family size.
Where will the effect of contraceptive use, which is a proximate determinant of fertility,
go? How is it possible? No investigation of the role of any other proximate determinants
of fertility that might have compensated the effects of contraceptive use on fertility, and
made TFR of the two populations, differing vastly in contraceptive use, almost the same
is available in the literature. To examine this issue, the results of the study carried out at
Matlab, Bangladesh are instructive.
Data and methods

The ICDDR,B: Centre for Health and Population Research maintains a demographic surveillance system (DSS) in Matlab, a typical rural area of Bangladesh, with an economy dominated by subsistence farming and fishing. Under the DSS, Community Health Workers (CHWs) have been collecting data on deaths, marriages (since 1974), migrations, births and other pregnancy outcomes, including abortions (since 1978) since 1966. The DSS covers a population of about 200,000. The CHWs collect these data through home visits at a two-weekly (monthly since 1997) interval. Their work is supervised and checked at different levels. Thus, a well-defined system of management and supervision to produce quality data exists in Matlab.

The ICDDR,B started an MCH-FP project in October 1977 in half of the DSS area, known as MCH-FP area, to test the hypothesis that demographic change can be induced through an intensive MCH-FP project without any intervention in socioeconomic status in a poor society. The other half of the area, known as Comparison area, remained under the usual programme of the government. An ideal design to study the impact of an MCH-FP programme would be to find a control area in which no family planning and health services are offered. Such areas are available neither in Matlab nor anywhere in rural Bangladesh, because basic MCH-FP services are provided in all areas by the government rural healthcare system. However, the Matlab research design allows a comparison of the effects of services of different levels of intensity, including the density of workers, supervision, and coverage.

There is one CHW for about each 2,500 population in the MCH-FP area, whereas there is one worker for about each 6,000 population in the Comparison area. Injectable contraceptive is delivered at doorstep in the MCH-FP area; whereas injectable user is required to visit a Family Welfare Centre for it in the Comparison area. Regular supply of different types of contraceptives is ensured in the MCH-FP area, but it can not be done
in the Comparison area. The MCH-FP project has a record keeping system (RKS) to routinely record and monitor maternal and child-health and family planning services, but it is absent in the Comparison area. Besides, management of contraceptive-related side effects is much better, and supervision is much stronger in the MCH-FP area. As a result of all these, the contraceptive prevalence rate (CPR) between the two areas became very different within a year of launching the MCH-FP project. The CPR was about 20 percentage points higher in the MCH-FP area (48% versus 68%) in 1996 (Razzaque et al., 1998).

Before the implementation of the MCH-FP project in 1977, both the areas were demographically and socioeconomically same (LeGrand and Phillips, 1996; Razzaque et al., 1998). After the implementation of the MCH-FP programme, the decline in both fertility and mortality was much faster in the MCH-FP area than in the Comparison area. Total fertility rate remained one child less, and under-5 mortality was lower by about 20% in the MCH-FP area for the most part during the last 20 years.

Abortion is a sensitive issue in Bangladesh, and many women who have an abortion do not disclose this to others, particularly to outsiders. This makes the situation extremely difficult to get a clear picture of abortion from survey data in this country. The situation is quite different in the Matlab DSS area where the CHWs have been visiting each household regularly for the last 30 years to collect vital events. If pregnancy of a woman is observed or reported during the routine visit of a CHW to either area, it is recorded. A CHW and her supervisor jointly fill up a pre-designed pregnancy outcome form. They know the correct definition of each of the outcome of a pregnancy, including spontaneous and induced abortions.

A CHW is considered a member of the family in her area. Yet, some induced abortions are reported as spontaneous abortions in the DSS (Bhuiya, Aziz, and Chowdhury, 1999), and the number of abortions in each area is found to be underestimated (Johnston, 1999). This misclassification and underestimation is thought to be consistent over time and between areas, because the same procedures have been followed over time and between
areas. Thus, the trend of abortion over time and a comparison of abortions between areas are not expected to be affected by misclassification or under-reporting. In this study, an abortion means an induced abortion, including menstrual regulation (MR). The MCH-FP project discontinued giving MR services since 1984. If a woman of the MCH-FP area needs to have a MR, she is advised to go to a government Family Welfare Centre (FWC). Both MCH-FP area and Comparison area have FWCs.

In addition to the longitudinal DSS and RKS data, this study used the data of three socioeconomic surveys conducted in 1974, 1982, and 1996, and three KAP surveys conducted in 1975, 1984, and 1999 in the DSS area.

Results
Data on the desired family size (DF) for both the areas in Matlab were available for three time points from three KAP surveys conducted on sample basis in 1975, 1984 and 1999. It was shown elsewhere that subsequent fertility depends significantly on the desire for children (Razzaque, 1999). The results on the desired/ideal family size are shown in Table 1. The desired family size in the both areas has been decreasing over time, but the difference between the two areas has been negligible at any time. It means that the Matlab MCH-FP project could not bring about any change in the desired family size in the area. It supports the view of Freedman (1997) that a family planning programme, as such, does not usually have any effect on fertility preferences.

Since 1970s, there have been many changes in the life style of the people of Bangladesh, as well as in the agriculture system and its cultivation procedure (Caldwell et al., 1999). Three socioeconomic surveys were conducted in the Matlab DSS area in 1975, 1982, and 1996 (Razzaque et al., 1998). The use of some durable goods, which were common in each of the surveys, is shown in Table 2. It is evident from this table that the standard of living, measured by possession of durable goods in both the areas, has improved substantially over years. There was also a remarkable improvement in women's education in the area (Table 3). About 75% of women had no schooling in 1974. It came down to about 70% in 1982, and about 45% in 1996. Less than 15% of women had schooling for 5 years or more in 1974. It increased to more than 40% in 1996.
Surveys on the desire for any more children of all married women of reproductive age of the MCH-FP area (about 15,000) have been conducted since 1990 at an interval of 18 months. We analyzed those data (results not shown) and found that controlling for the demographic variables, such as age, parity, sex composition of children, etc., socioeconomic status, such as education, and empowerment of women, has a negative effect on the desire for more children. In the national data, both desire for more children and ideal family size have been found to be associated negatively with education of women (Mitra, Al-Sabir, Cross and Jamil, 1997, pp.87-98).

The results presented in Tables 1, 2 and 3 and those of other studies suggest that an improvement in socioeconomic status, particularly women’s education, or in the lifestyle helps brought the desired family size down to some extent in the area. A part of the decline may also be the result of information, education and communication (IEC) services of the government to bring down fertility preference (Freedman, 1997).

Fig. 3A and 3B show the CPR, abortion ratio (abortions per 100 live births), DF (interpolated for 1979 and 1997), and TFR in the Matlab MCH-FP area and in the Comparison area from 1978 to 1998. A big change in the contraceptive use and fertility took place in the MCH-FP area immediately after the implementation of the MCH-FP services. At the beginning of the project, the CPR was 10%, but it rose to 25% within a year, and finally to 69% in 1998. The increase continued, although the growth has recently slowed down to 1% annually.

The CPR for the MCH-FP area could be calculated for each month using the RKS data. But it was available only for four time-points in 1984, 1991, 1994, and 1996 for the Comparison area from the data of four sample surveys. The CPR in the Comparison area also increased to about 47% in 1996, which was 20% points lower than that in the MCH-FP area.

The effect of the increased CPR on fertility in the MCH-FP area was enormous. Before the implementation of the MCH-FP project, fertility in both the areas was almost the
same (Fig. 1 from LeGrand and Phillips, 1996), but the TFR became more than one child lower in the MCH-FP area within a couple of years of the project. This decline in TFR continued in the MCH-FP area until 1991 when it was about 3.0. Since then and until 1998, TFR in the MCH-FP area remained almost stable, although the CPR increased by about 8% points during this time. This 8%-point increase should have brought down TFR by about 0.5 child (see the equation by Bongaart and Potter, 1983), but the effect of the increased CPR is not visible. On the other hand, the CPR was about 26%, and the TFR was 4.3 in the Comparison area in 1991. The CPR and TFR were 48% (projected) and 3.5 respectively in 1998. The increase in CPR and the decrease in TFR in the Comparison area seem to be consistent. But there was virtually no effect of the increased CPR on TFR in the MCH-FP area during this period. The question, therefore, remains to be addressed: how was it possible? The effect of the contraceptive use must have been compensated by one or more of the other direct determinants of fertility, the important ones of which are: abortion, post-partum infecundability, and age at marriage (or proportion of women of reproductive age in sexual union) (Bongaarts, 1978). The marriage has been almost universal in Matlab, and age at marriage has been increasing, although it is comparable between areas at any time. Post-partum amenorrhea is not expected to be very different between the MCH-FP area and the Comparison area, because the duration and patterns of breastfeeding are not likely to be much different between the areas. Moreover, only the effects of the post-partum amenorrhea cannot keep the TFR stable in the MCH-FP area throughout 1991-1998.

Fig. 3A shows that the abortion ratio was very high in the MCH-FP area immediately after the launching of the MCH-FP project in 1977. It was mainly due to the MR facility of the MCH-FP project. The MR facility was withdrawn from the project in 1984, and the abortion facilities including MR were the same in the two areas since then. The abortion ratio increased slightly in 1980s, perhaps as a result of a growing need to control family size in the country (Cleland et al., 1994, p. 41: Bongaarts and Westoff, 2000), and started to decline again after that. On the other, the abortion ratio increased linearly in the Comparison area throughout the time. The ratio was always, except for the first few years of the MCH-FP project, much higher in the Comparison area. It is evident from
Fig. 3A and 3B that the MCH-FP project was not only successful in bringing fertility down, but it was also successful in reducing abortions in the area.

These figures also indicate that the women in both the areas were using both contraceptives and abortion as means for controlling fertility, and the effect of the increased contraceptive use on fertility was counter-balanced by a decreased abortion ratio in the MCH-FP area, particularly in recent years.

Fertility in the both areas was converging to the same level in the two areas. The difference in the TFR between the areas was more than one child in 1990, but it came down to 0.5 in 1997, although there was a vast difference in the CPR and in abortion ratio between areas. This raises the question, why was fertility converging to the same level in the two areas? Has "desired fertility", as considered by Pritchett (1994) as the major important factor for determining fertility, anything to do with it? Fig. 3A and 3B have shown that fertility in the two areas was converging toward the desired family size, which is currently about 2.5 in both the areas. The TFR has been stable at 3 since 1991, and is only 0.5 child higher than desired family size in the MCH-FP area. On the other, fertility continues to decline in the Comparison area, and the couples there have been using both contraceptives and abortion to keep family size at the desired level.

Discussion and conclusions
It appears from this study that fertility in Matlab converges to the desired fertility. The Matlab couples used different proximate determinants of fertility, including contraception and abortion, in this converging process. The study does not support the hypothesis that an MCH-FP project alone can bring fertility down to any low level, and the view that the Government of Bangladesh will be able to bring population growth down by 25% by increasing only the CPR from its present 51% to 71%, as thought (POPLINE, 2000). If it can, why did not fertility decline in the Matlab MCH-FP area after 1991 for the next seven years, when the CPR increased by 8% points? This study rather suggests that the level of development, which includes socioeconomic status, education, modernization,
etc. determines the desired level of fertility, and an MCH-FP project helps reach a desired level of fertility quickly.

Although current desired fertility in Matlab is about 2.5, its expected desired fertility is not likely to be less than 3.0 due to the presence of sex preference for children in the region even under a perfect fertility control situation. Matlab is a son-preferring area (Bairagi, 2001), where the desired number of sons was recently found to be 35% more than the desired number of daughters. Sheps (1963) has demonstrated that expected fertility would be higher than desired fertility in presence of preference for the sex of children. For example, if desired fertility is 2, the expected fertility with an intention to have 1 son and 1 daughter is 3.00, and with an intention to have 2 sons is 3.88, and so on. So, it may be thought that fertility in the Matlab MCH-FP area has already come down to the current desired level. A further decline may need a decline in desired fertility or in gender preference, or in both. This study also suggests that without bringing any change in these phenomena, further emphasis on family planning programme may increase the CPR, but its impact on fertility is likely to be counter balanced by a decline in the impact of any other direct determinants of fertility, such as abortion, inefficient use of contraceptives (failure), etc. The contraceptive failure in the Matlab MCH-FP area is already very high (Bairagi, Islam and Barua 2000).

As mentioned earlier, the DHS data show that the recent fertility impact of the Bangladesh national MCH-FP programme is negligible. Although there was an increase in the CPR by about 9% points from 1993/1994 to 1999/2000, there was virtually no decrease in the TFR during this period. The effect of the increased CPR was counter balanced mostly by the decreased abortion ratio in the Matlab MCH-FP. It is important to examine the factors responsible to nullify the effect of the increased CPR on the TFR in the national level.

Abortion data at the national level are not at all reliable. However, from the Matlab result we can assume that a decline in abortion ratio or rate might be partly responsible for the stable situation of TFR in spite of 9% points increase in the CPR during the next 6 or 7
years since 1993-1994. It is important to note that the impact of the MCH-FP project in reducing the number of abortions in the Matlab area was remarkable. Abortion ratio was less than 50% (abortion rate will be less than this, because fertility was lower in the MCH-FP area). An increase in contraceptive failure during the period can not also be ruled out.

Based on the results of this study, we may conclude that a change in the desired family size and gender preference, along with family planning and reproductive health services, is apparently essential to have a further decline in fertility or to complete the demographic transition in Bangladesh. But the mechanism of achieving a lower fertility preference (a lower ideal family size) needs to be explored.

A change in the socioeconomic status, particularly in women’s education, is likely to bring about a change in the desired family size. The IEC services may indeed play a major role to motivate people to have a small family (Freedman, 1997). The policymakers need to pay attention to bring about a change in the current desired family size and gender preference, in addition to putting emphasis on the importance of family planning to bring down fertility further in Bangladesh.

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References


Table 1: Desired family size in Matlab by area and time.

<table>
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<tr>
<th>Year</th>
<th>MCH-FP area</th>
<th>Comparison area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>4.2</td>
<td>4.3</td>
</tr>
<tr>
<td>1984</td>
<td>3.4</td>
<td>3.5</td>
</tr>
<tr>
<td>1999</td>
<td>2.5</td>
<td>2.6</td>
</tr>
</tbody>
</table>

Table 2: Percentage of households possessing selected consumer durable goods in Matlab by area and time.

<table>
<thead>
<tr>
<th>Possession</th>
<th>1974</th>
<th>1982</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blanket</td>
<td>36.7</td>
<td>43.6</td>
<td>63.3</td>
</tr>
<tr>
<td>Lantern</td>
<td>59.2</td>
<td>70.8</td>
<td>86.7</td>
</tr>
<tr>
<td>Watch</td>
<td>13.0</td>
<td>14.7</td>
<td>55.5</td>
</tr>
<tr>
<td>Radio</td>
<td>11.6</td>
<td>16.8</td>
<td>45.8</td>
</tr>
</tbody>
</table>

Table 3: Percent distribution of women (14-49) by year of schooling according to area and year.

<table>
<thead>
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<tr>
<td>0</td>
<td>74</td>
<td>77</td>
<td>67</td>
<td>71</td>
<td>44</td>
<td>45</td>
</tr>
<tr>
<td>1-4</td>
<td>11</td>
<td>10</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>5-9</td>
<td>14</td>
<td>12</td>
<td>18</td>
<td>14</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>10+</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>6</td>
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<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Figure 1: Crude Birth Rate (CBR) and Crude Death Rate (CDR) in Bangladesh, 1901-2000

Source: Bangladesh Bureau of Statistics
Figure 2: Contraceptive Prevalence Rate (CPR) and Total Fertility Rate (TFR) in Bangladesh, 1963-96

Source: BBS statistical pocket book, 1983-96
Figure 3A:
Contraceptive prevalence rate (CPR), abortion ratio (AR) per 100 live births, desired fertility (DF), and total fertility rate (TFR) in MCH-FP Area, 1978-98.

Figure 3B:
Contraceptive prevalence rate (CPR), abortion ratio (AR) per 100 live births, desired fertility (DF) and total fertility rate (TFR) in Comparison area, 1978-98.