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USE OF PERIODIC ABSTINENCE IN BANGLADESH: DO THEY REALLY UNDERSTAND?

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Summary. Data from a nationally representative study in Bangladesh (BDHS 1996–97) were analysed to identify significant predictors of use of periodic abstinence, in comparison with other modern contraceptive methods. The study found that women in Bangladesh mostly use modern methods during their peak reproductive years, after which some of them switch to periodic abstinence. These women tend to be more from educated and from higher socioeconomic backgrounds and with at least one living son. Another set of data from the Matlab DSS was analysed and the results were in the same direction. Focus group discussions found that women were using the periodic abstinence method incorrectly, abstaining for more days than is necessary. For Bangladeshi contraceptive users to reach a higher degree of use-effectiveness for period abstinence, more IEC materials need to be developed.

Introduction

According to estimates by Population Action International, cited by Rogow & Horowitz (1995), in 1991 30–35 million couples relied on periodic abstinence (PA) from sexual intercourse to prevent pregnancy. Although abstinence from vaginal intercourse to avoid pregnancy has been practised throughout history, it was only in 1929 when the practice of periodic abstinence began. The discovery that ovulation has a fixed relationship to the upcoming menstrual period, occurring approximately 14 days before its onset, brought out a scientific co-relationship between practice of PA and avoidance of pregnancy. According to an IPPF publication: 'It is a viable contraceptive alternative for those couples which have the necessary motivation to comply with the rules and requirements of the method. Learning to use the approach properly, however often requires considerable training and access to the appropriate teaching facilities' (IPPF, 1995, unpublished).

In most of the developing world, where health services are poor, contraceptive methods that are advocated by grass roots level workers scarcely include the adoption of PA or other traditional methods, even though a considerable proportion of the

population in such countries have been found to use traditional methods. In Bangladesh, where an effective family planning programme has been operative at the government level for more than twenty years, the practice of PA had increased from a mere 0·5% in 1975 to 5% in the 1996–97 BDHS (Mitra *et al*., 1997). This is a ten-fold increase in almost 22 years. In more recent surveys held in 1999–2000 and 2004 (Mitra *et al*., 2000, 2004), the use rates of PA are recorded as 5·4 and 6·5% respectively. This magnitude of increase in the practice of PA is quite astounding, given the fact that since the late 70s the Bangladesh government has been carrying out massive efforts in promoting modern methods in Bangladesh, and even distributing free hormonal pills and condoms. Both the introduction of female workers at the grass roots level and the heavy emphasis on IEC have jointly contributed to the increase in family planning awareness and use among eligible couples in Bangladesh. As the contraceptive prevalence rate rapidly increased, so did the practice of traditional methods, especially PA. One would hardly expect use of PA to comprise 5% of users, when other modern methods are available in abundance. Static and mobile clinics at every level of administration have been established to contribute greatly to the use of modern methods and the world has witnessed a rise in contraception use in Bangladesh to almost 49·2% in 1997 (Mitra *et al*., 1997) from a mere 7·8% in 1975.

In neighbouring Sri Lanka, where the level of female education is the highest in the sub-continent, 15·2% women are current users of PA, which is only second to that of Peru where 18% are current users of PA (Sheon & Stanton, 1989). A study conducted in 24 countries has shown that use of PA is most appealing to the better educated (Vaessen, 1991), hence it is surprising that the current level of PA use in Bangladesh is almost one-tenth of the total of other methods, although literacy rates of males and females are very low (50% and 26% respectively; World Bank, 1996).

Although much has been written on the various aspects of family planning programme success in Bangladesh – method mix, failure rates etc. – very little research has been done on traditional method use, specially PA. One study in Bangladesh found that traditional method users have high overlapping with other methods, which include both other traditional and modern methods (Gray *et al*., 1999). For example, PA users resort to the 'withdrawal' method when they are unsure about dates and also use condoms for the same reason and for increased protection. However, none of the studies conducted in Bangladesh has investigated the reasons why couples choose to practise PA instead of other more secure modern methods, which are readily available. More important to the issue of stating contraceptive prevalence rates (CPR) in Bangladesh is whether those who respond as users of PA are practising it correctly. Incorrect practise would obviously put this group in a vulnerable position. In fact, some of those practising this method incorrectly and without any alternative form of protection may as well be classified as non-users, which in turn will greatly affect the current CPR of Bangladesh.

Matlab Thana in Bangladesh is an area where the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) has been maintaining a Demographic Surveillance System (DSS) since 1966. This DSS area is divided into two halves, one of which is called the treatment area, where the ICDDR,B has provided extensive coverage of Maternal Child Health and Family Planning

(MCH-FP) since 1977. The other half is called the comparison area where usual government facilities exist. The resulting CPR in the treatment area is much higher than in the rest of Bangladesh (70·6% in 1996). The fact that in spite of such intensive coverage and widespread availability of modern methods in Matlab, the practice of PA is almost 2·5%, may rule out under-coverage by fieldworkers as a possible reason for high adoption of PA. Although these figures are exactly half of those rates (5%) available for the most current BDHS (1996–97), the question remains why any couple would want to adopt PA when other modern methods exist. However, these dynamics, and those of the adoption of PA given the easy availability of other modern methods, are unknown in the literature. Since PA as a contraceptive method is known to have high failure rates (Vaessen, 1991), it is important to know the socioeconomic profile of PA users in Matlab as well as in the rest of Bangladesh.

This study has therefore been undertaken to investigate two principal questions related to use of PA in Bangladesh: (1) to ascertain whether PA users correctly comprehend and practise this method; and (2) to investigate whether the socio-economic and demographic profile of PA users is different from those of modern method users and whether these factors differ between the Matlab Record Keeping System (RKS) area and the nationally representative data. The study uses both qualitative and quantitative methods to investigate the above mentioned questions.

Methods

The study uses data from the nationally representative 1996–97 Bangladesh DHS. Although two other national surveys have followed this survey, these data were chosen for their comparability with the RKS data, on which the detailed field observations were based. Details of this survey are available from Mitra *et al.* (1997). Another set of data was obtained from the RKS of the International Centre for Diarrhoeal Diseases Research, Bangladesh (ICDDR,B). In October 1977, ICDDR,B launched an experimental Maternal Child Health and Family Planning Programme (MCH-FP) in half of the villages, which have been under a Demographic Surveillance System (DSS) since 1966. The other half continued to receive limited services provided by the government programme (Bhatia *et al*., 1980). Information on the reproductive health and contraceptive use of the treatment area in the RKS forms the basis of the second analysis. Data from the RKS for the year 1996–97 were used in this study. Figures 1 and 2 present the current use of contraceptive methods in BDHS and RKS for the year 1996–97.

The RKS data afforded us another added advantage. Since the names of PA users were available, focus group discussions (FGD) were carried out among these women who were questioned on various aspects of the use of PA. Twenty-two women from the treatment area were interviewed in these FGDs, which were conducted in three groups of five and one of seven. Similar FGDs were conducted on only sixteen women from the comparison area in two groups of five and one of six. Although it was originally designed to include the same number of women from both areas, this was not possible in the comparison area. Government fieldworkers do not maintain records of users of PA and only sixteen users could be identified by a snowball

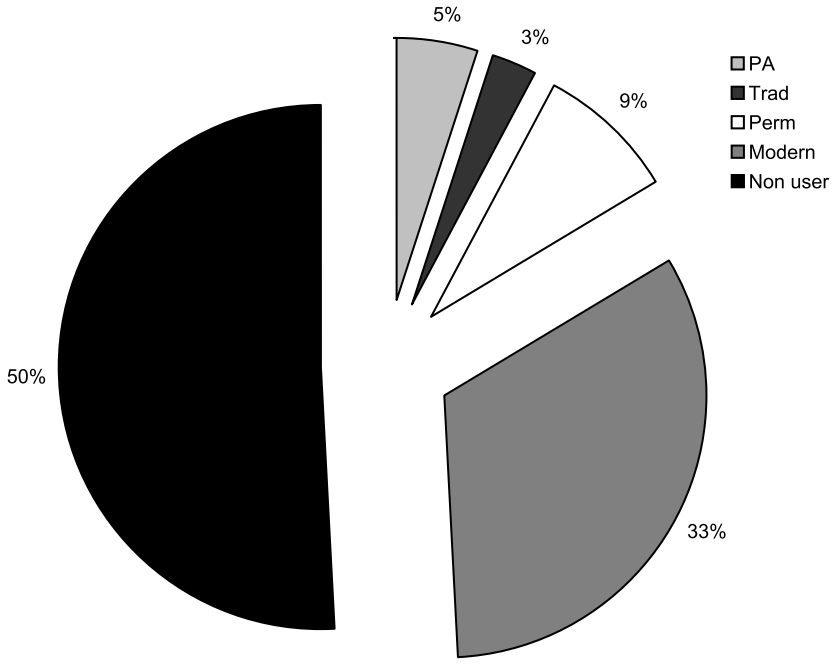

Fig. 1. Current method mix of contraceptives, Bangladesh DHS 1996–97.

method in the given period of time. These women were thought to be more representative of the rest of Bangladesh where the fieldworker coverage is the same as that of the comparison area.

Initial analysis included bivariate analysis and data screening and investigation for trends and patterns. Several variables were available from both the BDHS and the RKS data. Both were scrutinized to select appropriate variables that have been identified as correlates of contraceptive use in other studies of a similar nature (Kamal & Sloggett, 1996). Principal Component Analysis (PCA) was used to identify variables suitable for construction of a socioeconomic score. This score was constructed with the same variables for both sets of data to make them comparable. These variables were possession of a watch or clock, and ownership of land and household roof materials. The socioeconomic score was re-grouped to give three categories – high, medium and low – and was entered as an independent predictor variable into the subsequent regression models. The construction of this socioeconomic score is explained in details in the Appendix.

Multinomial logistic regression was used to investigate the association of the use of various methods of contraception with their correlates. This model is used when the dependent variable is polytomous and the outcomes have no natural ordering. If the variable has only two outcomes, the model is the usual logistic regression model. In this case, the dependent variable is the contraceptive use status of the woman. Non-use was taken as the reference category. Other categories were PA, modern reversible methods (MRM; includes users of pills, condoms, IUDs, hormonal

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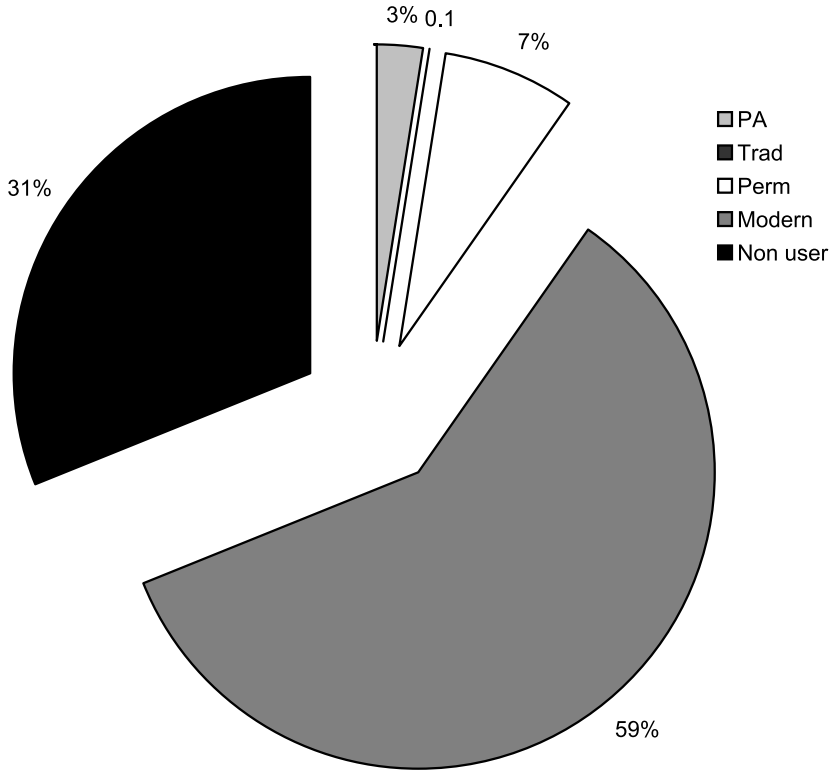

Fig. 2. Current method mix of contraceptives, Matlab RKS, Bangladesh 1996–97.

injections and implants) and permanent methods (PM; includes male vasectomy and female ligation).

Instead of underlying coefficients, the odds ratios are presented, along with their levels of significance. For example in Table 1 the odds of being a user of PA versus being a non-user increase 2·49 times if the variable 'age of woman' increases by one unit (in this case changes from less than 35 to 35–39). However, the tables cannot be read across.

Results

The regression results from the BDHS 1996–97 are presented in Table 1. Among the variables included in this analysis, the sex composition of living children shows the strongest association with use of PA. Compared with women with no sons, those with one son are twice as likely to be users of PA, and those with more than one son are three times more likely to be users of PA. Although in this model this variable is the most significant determinant of practice of PA, it also has similar associations with users of both MRM and PM. The effect of sex composition of living children is more pronounced in the case of adopters of PM and has been discussed extensively in the literature (Kamal *et al*., 1996). This result only portrays the universal demand for sons

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Table 1. Multinomial logistic regression of contraceptive methods used by couples on selected variables, 1996–97 DHS, Bangladesh

	Methods of contraception					
	Periodic abstinence		Modern reversible		Permanent	
Variables	Odds ratio	Significance	Odds ratio	Significance	Odds ratio	Significance
Age of woman						
<35[a]	1·00		1·00		1·00	
35–39	2·49	<0·001	0·98	ns	3·51	<0·001
40–44	1·58	<0·05	0·51	<0·001	3·31	<0·001
45+	0·65	ns	0·17	<0·001	1·82	<0·001
Education						
≤Class 4[a]	1·00		1·00		1·00	
Class 5	1·80	<0·001	1·29	<0·05	0·80	ns
≥Class 6	2·22	<0·001	1·73	<0·001	0·55	<0·001
Sex composition of living children						
No son[a]	1·00		1·00		1·00	
One son	2·14	<0·001	2·56	<0·001	3·62	<0·001
>One son	3·01	<0·001	2·79	<0·001	5·14	<0·001
Socioeconomic score						
Low[a]	1·00		1·00		1·00	
Medium	1·28	<0·05	1·39	<0·001	0·70	<0·001
High	1·81	<0·05	2·26	<0·001	0·82	ns
Occupation						
Housewife[a]	1·00		1·00		1·00	
Unskilled job	1·83	<0·001	1·30	<0·001	1·52	<0·001
Skilled job	1·49	<0·05	1·47	<0·05	2·15	<0·001
Religion						
Muslim[a]	1·00		1·00		1·00	
Non-Muslim	1·76	<0·001	1·18	ns	2·37	<0·001
Visited by FWA						
No[a]	1·00		1·00		1·00	
Yes	1·63	<0·001	5·01	<0·001	0·50	<0·001
2 Log likelihood –7480·74						

[a]Reference category.

among Bangladeshi couples, achievement of which makes them more likely to be users of contraception (Rahman & DaVanzo, 1993).

Age of the woman is another significant determinant of practice of PA in this analysis. Compared with women aged under 35 years, women aged between 35 and

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39 are more likely to practise PA. Similar directions are observed in the adoption of PM where, compared with those below 35 years of age, women between the ages of 35 and 39 are more likely to adopt. For MRM the effect of age on use is exactly opposite. Women aged under 35 years are more likely to be users of MRM and this gradually declines with age.

In this model, women's education has a significant association with practice of PA. This variable has a pronounced effect on PA compared with MRM, where the direction of influence of woman's education is the same. Compared with women with no education, women who have completed grade five are 1·8 times more likely to practise PA, while those who have higher education are 2·2 times more likely to practise PA. The direction of influence is reversed for those who adopt PM. More educated women are less likely to adopt PM. This result matches previous findings from other DHS surveys in Bangladesh (Kamal & Sloggett, 1993, 1996; Kamal, 2000).

Compared with women who are housewives, those who are in unskilled jobs and professional jobs are respectively 1·83 and 1·49 times more likely to practise PA. For MRM and PM models in Table 1, it is found that there is an upward gradient in use as women shift from being housewives to having more skilled jobs.

Compared with Muslim women, non-Muslim women are more likely to practise PA and this is true for PM as well. For use of MRMs, religion is an insignificant predictor and both the results match previous findings (Kamal & Slogget, 1996).

The socioeconomic score is a significant predictor of practice of PA. Women with higher socioeconomic scores are more likely to practise PA. The same effect is noticed for MRMs, but for PM the effect is reversed. Women with higher socioeconomic scores are less likely to adopt PM. The effect of socioeconomic status on the practice of PA was more pronounced in earlier models. When the variable 'visits by fieldworker' (family welfare assistant or FWA) was entered into the model, the effect of socioeconomic score diminished, although the directions remained the same. This may support the positive role played by the FWA, which has been discussed in earlier studies (Kamal & Sloggett, 1996).

'Visits by the FWA' is a very important variable in the study of contraceptive use among Bangladeshi women. In this analysis it is found that women are 1·63 times more likely to practise PA when they have been visited by an FWA in the last 3 months, as opposed to when they have not. This suggests that even though advocacy of PA is not included in the formal 'cafeteria' of methods advocated by the FWA, women have benefited from being visited by an FWA. The effect of this variable on the use of MRM is remarkably significant and is the most important determinant in this model. This matches previous findings (Kamal & Sloggett, 1996) and has been discussed extensively in the literature. For permanent methods, the direction is reversed. In this analysis those visited by an FWA are less likely to adopt PM and that too is in the expected direction (Kamal & Sloggett, 1996).

When the RKS data were used for regression (table not included) most of the variables were found to vary in the same directions. For use of MRM, the directions observed in the RKS data were exactly the reverse of that of the national data, which is noteworthy and contrary to earlier findings as well. In the RKS data, as the educational level of woman exceeds class 6, she is less likely to use MRM, which is exactly the reverse of what was observed in the national BDHS data, where use of

MRM increases with education, and which has been observed in other studies (Kamal & Sloggett, 1993, 1996). Although there are very few women (<20%) in this category in the RKS, it is possible that these women are more likely to be adopters of PA.

The results from the national survey and the RKS may be summarized as follows. Women in Bangladesh aged below 35 are most likely to be users of MRM during their active reproductive years. As they grow older and have at least one son, they either practise PA or adopt PM. This study finds that educated women are more likely to practise PA while uneducated women are more likely to adopt PM. The analysis also suggests that women with lower socioeconomic scores are more likely to adopt PM and those with higher socioeconomic score are more likely to practise PA.

Findings from the focus group discussions

In the focus group discussions conducted in the treatment and comparison areas of the Matlab RKS, one observation was consistent between the two areas and also with the multivariate data analyses in the previous sections: women in Bangladesh use PA when they are older and have almost completed childbearing. Two main reasons for use of these methods was found from the FGDs. Firstly, many had tried modern methods such as pills, injections and IUDs and had been dissatisfied with their side-effects and resorted to use of PA. Secondly, others thought that at this point in their lives their libidos were lower than before and it was possible to observe PA.

In total, between the treatment (22) and comparison area (16), there were 38 women who had participated. These women were aged between 30 and 49, the modal age group being 30–34 (twelve women), and only one woman was aged 21 from the comparison area. This woman had only one child and others had between two and eight children, the modal parity being between four and five. Among these women, 26 had received some education (including one who was a graduate), while the remaining twelve had none. Only two women out of 38 respondents were working for cash; all others were housewives.

All the 38 respondents had heard of modern methods, knew how to obtain them and knew how to use them, and many had even used in their earlier years. There was not a single respondent who had used PA because of lack of fieldworker coverage or unavailability of modern methods in her area, be it the treatment or comparison area in Matlab. However, as expected, compared with women in the treatment area, women in the comparison area were less satisfied with the performance of their respective fieldworkers and also complained about the lack of supply of modern methods.

Although several questions were directed towards the respondents who claimed to be users of PA, the main goal of these FGDs was to ascertain whether these couples were correctly using the method. In the comparison area, two groups of five and one of six women participated in three FGD sessions. In the first group four women used the method correctly, except one who explained the method in exactly the opposite direction: '… the week after menstruation was unsafe, then ten days safe and then unsafe again.' This shows lack of any kind of communication about PA with learned health personnel, because she claimed to have obtained this information from her sister-in-law. In the other group of five women, the answers reveal similar

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shortcomings of the national FP programme. None of the women had had this method explained to them by any trained fieldworker and were observing it on the basis of suggestions and recommendations from other relatives who were ever-users of PA. The same was the case for the next FGD of six women, where one woman had it explained by the local doctor, and one had read about it in a religious book (Islamic). They observed 21 days as unsafe after the onset of menstruation and observed only one week prior to menstruation as a safe period. Since the correct method is unknown to them, this is almost equivalent to observing sexual abstinence, with a much higher sexual and psychological cost than is actually necessary. No wonder one woman complained that her husband found it difficult to observe these dates!

In the treatment area, most women correctly reported use of PA. Many women were advised to adopt PA by their respective community health workers or doctors who found them unsuited for use of other modern methods, and they reported correct use. These women also reported having the method explained to them by fieldworkers. Others, who were advised by their relatives, were using 21 days abstinence and just 7 days of safe period, which is similar to those observed in the comparison area.

In the comparison area there was only one woman who was forced to use this method because her husband said: 'A woman should live within the confines of her hut, which means not only within one thatched roof, it should actually be five layers of that roof. If she goes to obtain modern methods outside her home and to the health centre she will be seen by other men and that will be a sin.' This is the only woman out of 38 participating in the FGD who wished to use another modern method (injection), because she found it difficult to continue, and she was also one of those who actually observed it incorrectly (abstaining for 21 days at a stretch). All other women interviewed for this study were very satisfied using this method and had no plans of adopting any other method.

The evidence from these FGDs adds further support to the well known finding that the demand for sons over daughters is very high in rural Bangladesh (Arnold, 1997). All respondents except one replied that daughters are married off and cannot look after their parents in their old age. However, sons grow up to earn and look after their parents, and bear the family name in both a social and financial sense. Only one woman thought that two children were enough and had no preference for a son over a daughter. This woman was in the treatment area, had completed her graduation and was a local schoolteacher.

The FGDs suggest that, in comparison with the comparison area, the intensity and coverage of the FP programme in the treatment area had enabled women to use PA correctly.

Discussion and Conclusions

This study uses data from the Bangladesh DHS 1996–97 and compares them with cross-sectional data from the Record Keeping System (RKS) of Matlab to investigate socioeconomic correlates of adoption of periodic abstinence and whether these factors vary between the two samples. The analysis finds that in the nationally representative data, higher use of PA is reported compared with that in the RKS area. It is possible

that higher coverage by the fieldworkers in the latter area may have motivated eligible couples to use other modern methods instead of PA, because the observed CPR is higher in the RKS area (70% as opposed to 49·2% in the BDHS) and the corresponding rates of adoption of PA are half in the RKS (2·5%), compared with the 1996–97 BDHS (5%).The logistic regression models of contraceptive use on various correlates find that the major predictors and directions are the same for both groups of women, although some variables are more significant in one data set compared with the other.

The study supports the findings by Koenig *et al.* (1992) that a strong family planning programme removes differential fertility. In particular, in this study it was found that the effect of socioeconomic score is insignificant in the use of MRM for the RKS data, while it is still significant for the national data.

The analysis finds that for both data sets, older women are more likely to use PA once the peak childbearing ages are over. It was found that older women with higher socioeconomic scores are more likely to use PA, while those with low socioeconomic scores are more likely to adopt permanent methods.

This study also supports the evidence obtained from other countries that more educated women are more likely to be adopters of PA (Hermann *et al.*, 1986) and also to use it successfully (Sheon & Stanton, 1989). These findings matched those in Sri Lanka where over 15% of couples were found to use of PA and where female literacy is 98% (Sheon & Stanton, 1989). Similar results have also been observed in another study on method switching in Bangladesh, where more educated women were more likely to switch to traditional methods (Steele & Diamond, 1999). These results suggest that more emphasis on women's education and IEC on adoption of PA may be fruitful ways of increasing use-effectiveness of this method. In fact, one study in Egypt found that exposure to a TV programme had a negative impact on failure rates of PA and other methods (El-Tawila, 1995) and similar ideas may be replicated in Bangladesh.

The effect of the sex composition of living children and the occupation of the woman were in the expected directions and there exists extensive work in the literature to cover these topics, especially in the context of use of modern methods, and the arguments in those direction may be similar for adoption of PA (Rahman & DaVanzo, 1993; Steele & Diamond, 1999; Kamal, 2000).

The focus group discussions conducted both in the treatment and comparison areas revealed very interesting findings. In the comparison area, which could be thought to represent the rest of Bangladesh, the majority of women were using the method incorrectly, meaning their sexual sacrifice is much greater than is actually necessary. One woman was using it in exactly the reverse direction, taking unsafe time to be safe and vice versa and others were abstaining for 21 days and the practice was more akin to 'celibacy' than practise of PA. In the treatment area, where there is a strong programme with higher intensity of fieldworker coverage, only 18% were observing the incorrect cycle. The incorrect users abstained for 21 days after the onset of the menstrual cycle. Those who were observing the correct method had been briefed by their respective community health worker and were even recommended this method in certain cases where other methods were inappropriate due to side-effects.

In one study in the Philippines 75% of the women who said they were using PA were interviewed. Among them, 13% were found to be unaware of the cycle (Laing, 1986). Another study found that half of all women who adopt PA can correctly identify the fertile period (Sheon & Stanton, 1989). These studies indicate that incorrect use of PA is prevalent in other countries as well. Since national level use of PA is high, it is important that the relevant health personnel should know the correct method and explain it to clients for whom other contraceptive options are limited in some way.

In both the data sets of this study it was observed that the majority of women who were currently adopting PA had used other modern reversible methods before and are doing so to avoid side-effects. Similar findings have been observed in Turkey and the Philippines where women have adopted PA due to fear of side-effects of other modern methods (Breslin, 1977). However, the switching pattern for Bangladeshis observed in this study is different. Many women had used other modern methods (pills, IUDs, injections) for several years at a stretch, and as they reached their forties they started reporting various symptoms of discomfort and dissatisfaction in using these methods. The sample size here is very small and the scope of this study does not cover detailed investigation into the symptoms. However, Steele & Diamond (1999) have observed, from nationally representative data from the 1994 BDHS, that increased duration of use of modern methods is positively correlated with switching to traditional methods. It may be worthwhile to investigate whether these women have actually had side-effects from the prolonged use of modern methods, or have incorrectly attributed every health complain to the use of contraception. It is also well known that around these ages a woman's body goes through hormonal changes. The symptoms reported in this study (such as weight gain, nausea, irregular bleeding, jaundice) could be attributed to other illnesses such as high blood pressure, diabetes or the existence of an ovarian cyst/fibroid etc. Some women even said that doctors recommend nutritious food with the intake of hormonal methods, and they perceive that the inability to do so produces side-effects. There is a need to investigate the authenticity of women's claims of side-effects due to use of modern contraception. It may also be mentioned here, that in Bangladesh women are not tested for high blood pressure or other existing conditions before a contraceptive method is prescribed. In fact, women may even buy contraceptive pills off the shelf, which is not common in developed countries. Hence, the association of the age of the woman and her reported discomfort from various modern methods merits further research. This study finds that improved supervision of the side-effects from modern methods may be one way of avoiding the switch to periodic abstinence. The future target of the family planning programme in Bangladesh should be more towards quality of care than increasing the number of users (Kamal & Sloggett, 1996).

The focus group discussions also reveals that in both treatment and comparison areas of Matlab women know about the use of condoms, but only 10% are actually using them in conjunction with PA. Some couples also reported using the 'withdrawal' method along with PA. These findings lend some support to the results presented by Gray *et al.* (1999) who reported that couples using PA also used other methods, both modern and traditional; however it sheds no light on the proportion of PA users who are doing so. These findings also suggest that more needs to be done

in promoting the use of condoms in Bangladesh, both as an independent method and one to be used in conjunction with PA.

The study also found that in spite of high coverage by the national level family planning programme both in the form of motivation, IEC materials and supply, there still exist some reservations about the use of modern contraception among the male population in Bangladesh. More male involvement and increased opportunities for the male population to obtain information from common sources such as father's clubs, common meeting points etc. is recommended. Non-government organizations may also include teaching of this method, as is being practised in various organizations in India. One of them, called Mother Teresa's Missionaries of Charity, has had an ongoing programme since 1967 and had 43,000 couples in 1982. Under this programme couples are considered as 'unregistered' until they are able to correctly identify the fertile and infertile phases of the cycle. After four to six months of instruction, couples are presented with a certificate and registered as users (Hermann *et al.*, 1986). This method, if applied to the national family planning programme in Bangladesh, may lead to a more correct assessment of the number of adopters of PA. Alternately, when PA use is not being promoted, just including them in the traditional methods category as users is misleading and is unnecessarily inflating the contraceptive prevalence levels of the country.

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Appendix

Principal Component Analysis (PCA) is a statistical technique that can be applied to a set of highly correlated variables in order to construct a smaller set of uncorrelated components. These components can be used in place of the original variables in the interests of efficiency and parsimony. The technique identifies groups of variables that are highly correlated with each other, and constructs components based on these groups. The method can extract as many components as there are variables. That

does not serve the purpose of variable reduction, and only components which explain a good proportion of overall variance and have an intuitive interpretation are usually extracted for subsequent use in regression analysis (Kamal & Sloggett, 1993).

Variables that could be possible indicators of socioeconomic status of a couple were subjected to PCA and the results are presented in Table A1.

Table A1. Component scores following PCA with varimax rotation*

Variables	Factor 1	Factor 2	Factor 3
Electricity	0·60		
Almirah	0·74		
Table/chair/bench	0·78		
Watch/clock	0·79		
Cot/bed	0·62		
Land ownership	0·36		0·70
Roof materials		0·91	
Wall materials	0·13		
Occupation			

*Component scores below 0·5 have been suppressed.

The following scheme was used to construct the component variables to represent socioeconomic score. From the first factor one variable with the highest score was chosen (watch/clock), one variable with highest loading from the second factor (roof materials) and similarly land ownership from the third factor. All these variables had scored highly in the same component in previous runs of PCA and it was judged appropriate to select variables from highly scoring groups, in such a way as to provide a balance between possessions, housing type and land ownership.

Each variable was given a score of 1 or 0 and the resulting variable was named socioeconomic score and grouped into three categories according to the following socioeconomic score cut-off points: low, 0; medium, 1–2; and high, 3. This variable was introduced into the regression model as an independent predictor variable.