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Differential patterns and correlates of postpartum amenorrhoea in Bangladesh: A multivariate analysis

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Introduction

The importance of postpartum amenorrhoea for reducing fertility is especially pronounced in a developing country like Bangladesh where levels of contraceptive use have until recently remained relatively low. [1] The duration of postpartum amenorrhoea in Bangladesh is among the longest in the world. It is now well established that breast-feeding is the principal determinant of postpartum amenorrhoea and hence the temporary absence of menstruation after birth is called lactational amenorrhoea. [2] The Period of postpartum amenorrhoea is defined as the period between birth to the return of the first ovulating menstrual period, but since ovulation itself is difficult to identify, the closet possible estimate of the end of amenorrhoea is the return of menstruation itself. [3]

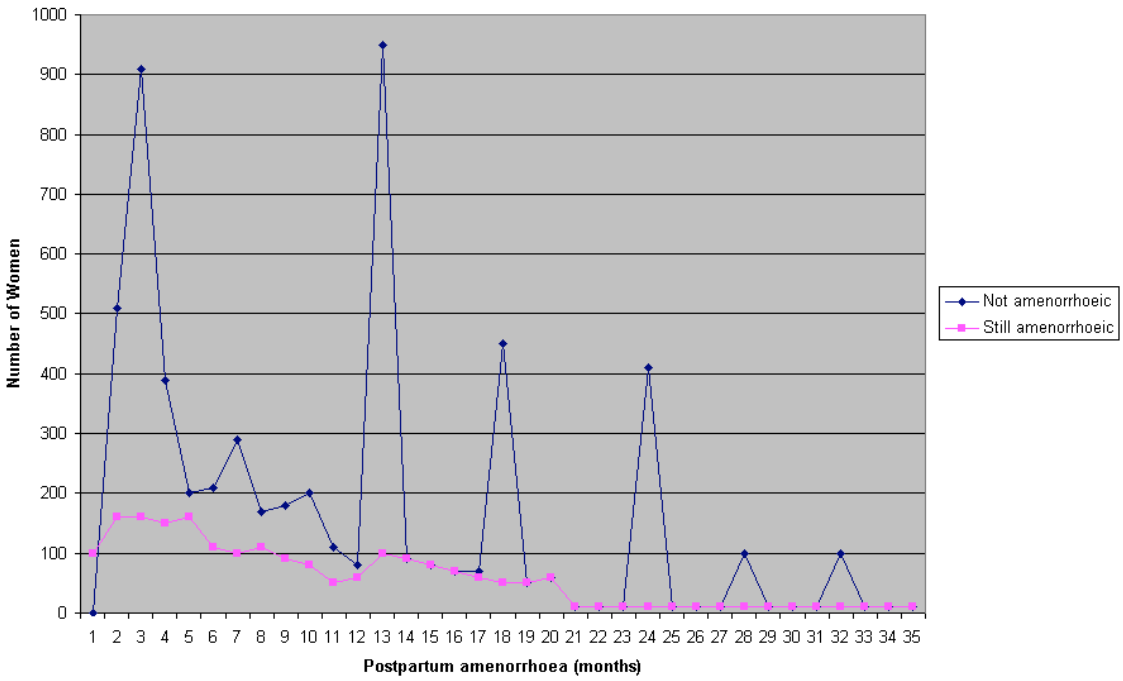
The purpose of this study is to identify the determinants which may have pronounced effects on the duration of postpartum amenorrhoea and also examine their impact. The importance of the study lies in the fact that this is the first such detailed study using national level data in Bangladesh.

Source and quality of data

This study is based on the 1989 Bangladesh Fertility Survey (BFS 1989) data, which was conducted by the National Institute of Population Research and Training (NIPORT), Bangladesh, with financial support from the World Bank. Information was collected from a nationally representative sample of 11,906 ever-married women under 50 years of age. Information on the duration of postpartum amenorrhoea was collected from ever-married women who had had at least one live birth within the six-year period preceding the interview. Questions on the duration of amenorrhoea were related to the last four births of women during this period.

The retrospective data of amenorrhoea showed heaping at multiples of 6 or 12 months (see Figure 1). Such heaping is almost entirely due to rounding, 4 and

similar patterns have been found in retrospective studies of postpartum amenorrhoea in other countries [4], [5] and current status data do not show such patterns (see Figure 1).



Using quotients proposed by Srinivasan [6] for measuring digital preference in duration variables, the quotients were found to be 0.12 and 0.62 respectively for current status and retrospective data of postpartum amenorrhoea in the current open birth interval. When the quotient ranges from 0 to 1; the value 0 indicates absolutely no digital preference and the value 1 indicates that all the frequencies are in multiples of six months. Thus, the effect of digital preference was considerably lower in current status data than in retrospective data.

Methodology

There are a number of methods for estimating amenorrhoea patterns. These include the prevalence/incidence method, the life tables method and the current status method. The prevalence/incidence method does not make full use of typically available data. Moreover, the results obtained by this method depend on the assumption that the number of births per month has been constant during 'Z' years preceding the survey when 'Z' is the longest duration of postpartum amenorrhoea in the population [7]. The assumption of a constant flow of births per month may hold true as a broad characteristic, but it is unlikely to be so when a broad group is subdivided into smaller subgroups.

On the other hand, the life table method makes full use of the data typically available, but it is not possible to apply it directly when data are not available for all the births or when retrospective data are not reliable [4], thereby somewhat restricting its application. In the context of Bangladesh, the data on retrospectively reported duration of amenorrhoea show distinct peaks at multiples of six months, which is mainly due to reporting biases. In order to overcome the problem, the current status method is usually preferred because it utilizes only current status data which is usually much less prone to rounding of reports than retrospectively reported data. Moreover, in Bangladesh, the current status data of amenorrhoea has been found to be much less affected by recall bias than retrospective data.

Multivariate analysis was used to determine the independent effects of each of eight selected factors and postpartum amenorrhoea. Cox's [8] proportional hazards life table model with fixed covariates was used because at the time of the survey there were a large number of women whose menses had not yet returned and whose true periods of amenorrhoea were not known. These women were considered as censored cases for the analysis. The proportional hazard model assumes that all women with the same covariates have identical risks of resumption of menstruation over the course of study, but these risks may vary among groups with different covariates. The hazards function enables one to estimate the relative risk of each variable by exponentiating the regression coefficient, exp(b). For the variable which is coded as a dummy, each exponent of the coefficient exp(b) represents the effect of the covariate on the hazards function for the reference group. The category with the relative risk 1.00 represents the reference category for the categorical variables; a value greater than one indicates that the relative risk of resumption of menstruation is greater for this group as compared to the reference group, while a value less than one indicates a decrease in the risk [9]

The dependent variable used for the multivariate analysis was the time taken for the return of menses after delivery. Eight socio-economic and demographic factors were used namely, place of residence, administrative division, age of mother at birth of index child, parity, maternal education, current use of contraception, mother's current work status and religion. The duration of breast-feeding was used as a predictor because of its important role in fertility reduction.

Results and Discussion

Differential patterns of postpartum amenorrhoea.

Table 1: Estimates of mean duration of postpartum amenorrhoea by selected characteristics, BSF 1989

Characteristics	Mean Postpartum amenorrhoea (in months)
Bangladesh	12.6
Place of residence	
Rural	12.7
Urban	9.5
Administrative Division	
Chittagong	11.9
Dhaka	11.7
Khulna	12.8
Rajshahi	13.3
Mother's Education	
No Schooling	13.6
Lower Primary	12.2
Upper Primary	8.8
Higher	8.3
Mother's Age at Birth of Index Child	
15-24 Years	11.4
25-34 Years	13.8
35-39 Years	13.5
Parity	
1-2	10.7
3	13.2
4	14.8
5 or more	13.7
Religion	
Muslim	12.4
Non-Muslim	12.9
Current Work Status	
Working	14.7
Not Working	12.3
Current Contraceptive Use	
Yes	6.0
No	14.3

Table 1 presents the estimates of the average duration of postpartum amenhorrhoea as calculated by the current status method for women in the open birth interval by the selected indicators. The findings have been compared with those of earlier studies to indicate any change in the pattern of postpartum amenorrhoea in Bangladesh for different subgroups though the levels may differ due to differences in data sources and methods employed.

In Bangladesh, the average duration of postpartum amenorrhoea by the current status method was 12.6 months. Using the same method, the 1975 BFS value was 14.6 months [10].Chen and others [11] reported an average duration of 13 months (in 1974) in the Matlab area of Bangladesh while working in the same area, Ford and Kim [12] observed the median amenorrhoeic length to be 14.7 months (between 1975-79). Also using Matlab data, Huffman and his coworkers [13] found the median duration of amenorrhoea to be 15.5 months while in a more recent study, Salway and others [14] Salway observed that it fluctuated around 13 months for cohorts of births during 1978-83 and thereafter declined sharply to fall from 13.5 months for the 1982-83 cohort to 9.4 months for the 1988-89 cohort.

Table 1 also shows a strong differential in the duration of amenorrhoea by place of residence in that the average duration of amenorrhoea was 3.2 months longer for rural women than for urban women, being 12.7 and 9.5 months respectively. Among the, four administrative divisions, women of Rajshahi division reported the highest average duration of amenorrhoea (13.3 months) and those from the Dhaka division, the lowest (11.7 months) with women from Khulna and Chittagong reporting 11.9 and 12.8 months respectively. Further, education showed a negative association with the duration of amenorrhoea: the average length of postpartum amenorrhoea of women who had not had any schooling was 13.6 months and it decreased linearly to 8.3 months for those with higher education. This may be due to the fact that more educated women breast-feed their children for shorter durations and this, in turn, may speed up the return of menses. Huffman and others [13] also found that the median amenorrhoeic length of women in Matlab to decline linearly from 16.4 months for mothers with no education to 8.4 months for those with six or more years of schooling.

Table 1 also shows the woman's age at the time of the birth of the index child to be positively associated with the duration of postpartum amenorrhoea. Thus, women who were 15-24 years of age had an average amenorrhoeic duration of 11.4 months, which increased curvilinearly to 13.5 months for women 35-49 years of age. This may reflect a biological delay in the hormonal mechanisms responsible for ovulation. Older women are also known to take longer to conceive than younger women probably due to higher anovulatory rates among them. Huffman and others [13] also observed a similar association between maternal age and duration of postpartum amenorrhoea. Using 1975 BFS data,

Singh and Ferry [10] reported an average amenorrhoeic length of 13.6 months for mothers aged 15-24 years which increased linearly to 17.0 months for those aged 35 or more.

Parity was also observed to bear a positive relationship with the duration of postpartum amenorrhoea. As can be observed from Table 1, the average postpartum length of amenorrhoea for women with parity 1-2 was 10.7 months, which increased curvilinearly to 13.7 months for those with parity five or more. Huffmann and his coworkers have also reported similar findings. As regards religion, NonMuslim women reported a higher average duration of amenorrhoea (12.9 months) as compared to Muslim women (12.4) though the differential was not significantly so as reported by Huffman and his coworkers [13] (17.5 and 15.4 months respectively) probably due to cultural practices in Bangladesh where non-Muslim women breastfeed for shorter durations than Muslim women. Again, we observed longer average periods of postpartum amenorrhoea among women who were currently working (14.7 months) as compared to those who were not (12.3 months) as the former usually tend to breast-feed their infants for longer periods. And finally, current use of contraception exerted a strong negative influence on the length of postpartum amenorrhoea.

Multivariate analysis

The dependent variable in the analysis was the time (measured in months) to the return of menses postpartum. In the BFS; this information was obtained from questions asked to women about the last four births that had occurred six years prior to the time of the interview. The question asked was: "How many months after the birth of your last child did your period return?" [15] The women were asked to answer in months and were allowed to state if they had not resumed menstruation. A total of 7,514 women provided information about postpartum amenorrhoea following their last born child. Of these 5,535 (73.7 per cent) reported to have resumed menstruation and the remaining 1,979 (26.3 per cent) were still amenorrhoeic at the time of the interview.

Among the independent variables, the age of the woman was found to have a very strong relationship with parity. As a result, the coefficients might be misleading that is, they may have wrong signs and their significance levels may be inaccurate. In such a situation, it was considered wiser to include only one of the set of highly correlated variables, and therefore, maternal age was excluded from the final model. Again, when the proportional hazards assumption was examined in relation to religion, the plot showed that the effect of religion was not proportional, and its significance level did not test reliably in the model. Hence, religion was also excluded from the final model. A brief description of the seven independent variables used for the hazards analysis is given in Table 2.

Table 2: Description of Independent Variables Used for the Hazards Analysis, BFS 1989

Variable	Definition
Place of Residence	Place of Residence was entered as a single dummy variable (0=Rural, 1=Urban)
Maternal Education	The educational level of the mother was entered as a single dummy variable (Women with 'no schooling' were assigned a value of zero, and those with 'schooling and higher education' were assigned a value of one
Parity	The number of children ever born (or parity) was entered as a continuos variable
Breast-feeding Duration	This was entered as a continuos variable
Administrative Division	The administrative division was entered as three dummy variables (0=Chittagong; 1=Dhaka; 2=Khulna; 3=Rajshahi)
Current Work Status	The Current Work Status of the women was entered as a single dummy variable (0=not working and 1=working)
Current Use of Contraception	The Current Use of Contraception was entered as a single dummy variable (0=No; 1=Yes)

The covariates included in the hazards model analysis were considered to be statistically significant on the basis of the Wald statistic. Table 3 presents the hazards coefficients, their standard errors, relative risks of resumption of menstruation, the partial correlation coefficient for each covariate with the dependent variable, and 95 per cent confidence intervals for each covariate.

The results indicate that the duration of breast-feeding was significantly associated with the duration of postpartum amenorrhoea. The magnitude of 'R' also indicates that it is the principal determinant of amenorrhoea. The place of residence had a significant effect on the risk of resumption of menstruation: an exp(b) of 1.146 for urban women denoting that the relative risk of resumption of menstruation was 14.6 per cent greater than that of rural women or that urban mothers had shorter durations of postpartum amenorrhoea than rural mothers. However, the administrative division from which the woman hailed had a statistically insignificant effect on the risk of resumption of menstruation. Women of Dhaka, Khulna and Rajshahi divisions had longer durations of postpartum amenorrhoea than those of Chittagong division.

Table 3: Propotional Hazards Regression of the Risk of Resuming Menstruation on Some Selected Covariates (Model 1)

Variable	Coefficient (B)	S.E.	R.R	R	95% C.I.	
					Lower	Upper
Duration of Breast-feeding	-0.029*	0.002	0.971	-0.088	0.967	0.975
Place of Residence						
Rural	-	-	1.000	-	-	-
Urban	0.316**	0.055	1.146	0.013	1.027	1.279
Maternal Education						
No Schooling	-	-	1.000	-	-	-
Schooling and Higher Education	0.026	0.027	1.026	0.000	0.9773	1.082
Parity	-0.043*	0.009	0.957	-0.028	0.939	0.976
Administrative Division						
Chittagong	-	-	1.000	-	-	-
Dhaka	-0.011	0.041	0.988	0.000	0.911	1.057
Khulna	-0.029	0.053	0.970	0.000	0.874	1.076
Rajshahi	-0.030	0.044	0.969	0.000	0.889	1.115
Current Work Status						
Not Working	-	-	1.000	-	-	-
Working	-0.012	0.080	0.987	0.000	0.843	1.155
Current Contraceptive Use						
No	-	-	1.000	-	-	-
Yes	0.257**	0.052	1.294	0.032	1.167	1.433

Maternal education was also positively associated with the risk of resumption of menstruation - some schooling or higher education had a positive effect on the resumption of menstruation as compared to no schooling. This means that maternal education had a negative impact, though not significant, on the duration of postpartum amenorrhoea. On the other hand, the woman's current work status had a negative and insignificant impact on the return of menses. An exp(b) of 0.987 for working women indicates that the relative risk of resumption

of menstruation for working women was only 1.3 per cent less than that for non-working women.

Parity or the number of children ever born was also significantly though negatively associated with the risk of resumption of menstruation - an exp(b) of 0.957 indicates that an increase in parity by one child results in a 4.3 per cent reduction in the risk of resumption of menstruation. Current use of contraception had a strong positive influence on the risk of resumption of menstruation. This means that current users of contraception were likely to have shorter periods of postpartum amenorrhoea than current non-users. A relative risk of 1.294 for women currently contracepting indicates that current users were 1.294 times more likely to resume menstruation than those not currently practicing contraception.

Summary and Conclusion

In Bangladesh, the average duration of postpartum amenorrhoea observed in our study was 12.6 months. The 1975 BFS reported a mean postpartum amenorrhoeic period of 14.6 months. This indicates that the average duration of amenorrhoea has fallen by about two months during the last 14 years. Significant differentials in postpartum amenorrhoeic periods were observed by urban/rural residence. Among the four administrative divisions, the duration of amenorrhoea ranging from a high of 13.3 months among women from Rajshahi division to a low of 11.7 months among those from Dhaka. The length of amenorrhoea was also observed to decrease linearly from 13.6 months for women who had had no schooling to 8.3 months for those with higher education. Postpartum amenorrhoeic duration also increased curvilinearly from 11.4 months in 15-24 year old women to 13.5 months in 35-49 year-old women. Likewise, it also increased with parity (from 10.7 to 13.7 months among women of parity 1-2 to 5 or more respectively) but was negatively associated with current use of contraception. Further, non-Muslim women reported a longer average duration of amenorrhoea (12.9 months) than Muslim women (12.4 months), and so did working women (14.7 months) than did those who were not currently working (12.3 months).

The proportional hazards analysis to assess the key socio-demographic determinants of postpartum amenorrhoea identified breast-feeding duration as the principal determinant. However, the impact of breast-feeding duration is likely to be underestimated due to the exclusion of large numbers of women who were continuing to breast-feeding their babies at the time of interview and whose true duration of breast-feeding were not known. Among other factors, current use of contraception, parity and place of residence had a significant impact on the duration of postpartum amenorrhoea. Urban women and women with some schooling or higher education were at a higher risk of resumption of

menstruation than were rural and illiterate women respectively. Women of Dhaka, Khulna and Rajshahi divisions were also at lower risk as compared to women of Chittagong division. Increase m parity was associated with a decreasing risk of resumption of menstruation. Working women were also less likely to resume menstruation than those who were not currently working.

The findings of this study are expected to be useful to policy makers. Delaying the resumption of menstruation as a means of birth spacing should be reconsidered in light of the differential socio-economic and demographic patterns prevalent in Bangladesh. Changes taking place in demographic and socio-economic characteristics of the population will have implications for fertility levels. These relationships should be considered in developing an integrated approach to reducing fertility.

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