The Determinants of Early Cessation of Breastfeeding in Bangladesh

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Abstract

Early cessation of breastfeeding is a cause of significant concern in many developing countries. Premature discontinuation of breastfeeding is known to be associated with avoidable childhood morbidity and mortality as well as high levels of parity and avoidable pregnancies. Using a publicly available demographic dataset from Bangladesh, we applied a life table and Cox's proportional hazard model to investigate the duration and predictors of breastfeeding. The observed mean duration of breastfeeding was 27.5 months regardless of the level of parity. The results showed that age, age at the time of marriage, religion, the level of education of the mother, the geographic region of residence, employment status, parity and the use of contraceptives are important predictors of early cessation of breastfeeding.

Introduction

According to a World Health Organization report (WHO 1985), breastfeeding duration refers to the age of the child in months at the time of complete weaning, regardless of when consumption of other food began. Breastfeeding has been the subject of interest in developing countries because of its implications not only for the improved health of children, but also for lowering the fertility of the mothers (Abada et al. 2001; Sivakami 2003). Extended breastfeeding lengthens the period of reduced risk of conception and thus lengthens the interval between consecutive births, which in turn

indirectly reduces fertility (Huffman 1984; Thapa and Williamson 1990). Moreover, breastfeeding plays an important and influential role in child survival by providing immunological protection against early mortality. Age, education and socio-economic status of mothers are reported to be the main determinants of breastfeeding. Younger mothers are most likely to terminate breastfeeding earlier than older ones. Increased risk of early termination of breastfeeding has been associated with a higher level of education (Aryal 2007; Chaudhry et al. 2002). Empirical evidence indicates that rural women are more likely to breastfeed than urban women (Akin et al. 1981; Dow 1977; Jain and Bongaarts 1981; Kent 1981; Mohiuddin 1986; WHO 1985).

In Bangladesh, only 14% of infants are exclusively breastfed up to the age of 3 months (Haider et al. 1999). The study of the determinants of breastfeeding is important for the success of nutrition programs, which rely on the identification of factors susceptible to interventions. Although a number of studies have been carried out on breastfeeding patterns in Bangladesh, most of these studies have relied on old data and focused on one child (Ahmed et al. 1999; Giashuddin and Kabir 2003, 2004; Haider et al. 1999; Mannan and Islam 1995; Talukder 1992; Thapa and Williamson 1990). None of these studies attempted to relate the duration of breastfeeding to the level of parity, nor did they examine various demographic characteristics as potential determinants of breastfeeding. This study uses recent data and considers parity-specific breastfeeding patterns in an attempt to identify the predictors of the duration of breastfeeding.

Methods

Data and Sampling

Data for the present study were collected from Bangladesh Demographic and Health Survey (BDHS), which compiled information throughout the country from January to May 2004. BDHS (Mitra et al. 2005) employed a two-stage probability sample design to select respondents. The survey included 11,440 women between 10 and 49 years of age from 10,500 households covering 361 sample points. The sample points were composed of 122 urban and 239 rural areas that finally yielded 5,366 mothers who breastfed their children up to 36 months. Data for this study were analyzed using SPSS for Windows (Version 16.0), Statistica (Version 6.0) and Microsoft Excel.

Statistical Tools

Life-table and multivariate statistical techniques were employed to examine breastfeeding patterns. To determine factors affecting the duration of breastfeeding, we also used Cox's proportional hazard model (Cox 1972; Lawless 1982), which is a powerful tool for analyzing time-to-event data.

A life table was constructed by pooling completed and censored cases of breastfeeding (Lee 1993; Sivakami 2003). The completed cases were those in which breastfeeding had stopped and the exact duration of breastfeeding was known. The censored cases, on the other hand, were those in which the children were still being breastfed at the time of the survey. Using the following parameters, life tables were constructed from the month-wise probabilities of terminating breastfeeding.

N = Number of live births,

 N_0 = Number of children ever breastfed,

 d_i = Number of children for whom breastfeeding had stopped during the *i*th month since birth, for i = 1, 2, 3, ...,

 c_i = Number of children who were being breastfed at the time of survey, with child in the *i*th month at the time of survey, for i = 1, 2, 3, ...,

 w_i = Number of children who were breastfed until death in the *i*th month, for i = 1, 2, 3, ...,

Then, N_i = Number of children being breastfed at the end of the *i*th month since birth,

$$= N_{i-1} - d_i - c_i - w_i$$
, for $i = 1, 2, 3, ...,$

 q_i = Probability of discontinuing breastfeeding during the *i*th month,

$$q_i = \frac{d_i}{N_{i-1} - 0.5(c_i + w_{ij})}$$
, for $i = 1, 2, 3, ...,$ and

 P_i = Proportion of continuing breastfeeding at least up to the end of the *i*th month = $(1 - q_i) P_i$ -1, for i = 1, 2, 3, ...,

Where

 P_0 = Proportion ever breastfed = N_0 / N

A small adjustment to the above assumption was required when babies died immediately after birth, before breastfeeding could be initiated. If the number of such deaths is n; then P_0 is given by $N_0 / (N-n)$ instead of N_0 / N . From the computed values of P_i , the mean length of breastfeeding was obtained by the following standard life-table formula:

Mean length =
$$[\frac{1}{2}(P_i, 0 + P_i, 36) + 3(P_i, 1 + P_i, 2 + ... + P_i, 35)]$$

Cox's Proportional Hazard Model

The net contribution of socio-demographic variables on cessation of breastfeeding was assessed by using Cox's proportional hazard model, which combines the features of life-table and regression (Cox 1972; Lawless 1982). The advantage of using such a multivariate model is that censored data resulting either from survival or death of the child are accommodated in the model. For this reason, the model has been shown to be appropriate for analysis of the duration of breastfeeding (Huffman et al. 1987). As such, the model is similar to regression analysis but is more useful in analyzing survival time, during which termination of breastfeeding can occur at any time. This model estimates the influences of a set of variables on the likelihood of terminating breastfeeding. The hazard function at time t (i.e., the time of termination of breastfeeding), denoted by $\lambda(t,z)$ is expressed as

$$\lambda(t,z) = \lambda_0(t).\exp \sum X_i \beta_i$$

Where X_i is an explanatory variable, β_i is the regression coefficient and $\lambda_0(t)$ is the baseline hazard. The model assumes that independent variables exert an equal degree of hazard in each time interval (hence the term *proportional hazard*). The model is very useful in estimating the net effect of an independent factor on the likelihood of the termination of breastfeeding and the impact on other independent variables. The hazard ratio (odds ratio) for breastfeeding and its 95% confidence interval (CI) were calculated for the socio-demographic factors associated with breastfeeding. The independent variables used in the study include residence (urban vs. rural) region (six divisional cities), religion (Muslims vs. non-Muslims), education (illiterate, primary, secondary and higher), work status (does not work vs. works), mother's age (≤ 24 , 25-34, ≥ 35 years), mother's age at marriage (≤ 14 , 15-19, ≥ 25 years), parity (≤ 2 , 3-5, ≥ 6) and use of contraceptives (never used vs. used) by the respondents.

Results and Discussion

Demographic Characteristics of the Study Population

The demographic profile of participants is given in Table 1. Of the 5366 participants, the vast majority (69%) lived in rural areas, whereas only 31% lived in urban areas. Altogether, 91% were Muslims and 9% were non-Muslims (Hindu, Christian and Buddhist). More than two thirds of participants had only a primary school education or none at all, and only 6% had been educated beyond the secondary school level. More than 80% were housewives, while less than 20% were gainfully employed. About one half of respondents were ≤24 years at the time of survey and had been married at the very early age of ≤14 years.

Table 1. Demographic characteristics of the study population (N = 5366)

Characteristics		Frequency (N = 5366)	%	
Residence	Urban	1684	31.40	
	Rural	3682	68.60	
Region/Administrative division	Barisal	615	11.46	
	Chittagong	1109	20.67	
	Dhaka	1192	22.21	
	Khulna	728	13.57	
	Rajshahi	1085	20.22	
	Sylhet	637	11.87	
Religion	Muslim	4876	90.9	
	Non-Muslim	490	9.13	
Mother's education	No education	1866	34.77	
	Primary	1649	30.73	
	Secondary	1512	28.18	
	Higher	339	6.32	
Work status	Not working	4396	81.9	
	Working	970	18.10	
Respondent age (years)	≤24	2628	48.98	
	25–34	2175	40.53	
	35 and over	563	10.49	
Age at marriage (years)	≤14	2695	50.22	
	15–19	2301	42.88	
	20–24	320	5.963	
	25 and over	50	0.932	
Parity of mothers	≤2	2876	53.60	
	3–5	1928	35.93	
	6 and over	562	10.47	
Use of contraceptives	Never used	876	16.30	
	Used	4490	83.70	

Mean Duration of Breastfeeding

The mean duration of breastfeeding for Bangladeshi women under study was 27.5 months. Mitra et al. (2005) reported the average duration of breastfeeding to be 28.8 months, which is very close to our findings. Compared with Pakistan (Page et al. 1982), India (Rajaretnam 1994) and Sri Lanka (Mahler 1996), where the average duration of breastfeeding was 18.4, 21.8 and 23.2 months, respectively, the average duration of breastfeeding among Bangladeshi women seems considerably longer. In rural Guatemala the mean duration of breastfeeding, adjusted for different levels of parity, was found to be only 16.6 months (Aguirre and Jones 2005). In the present study the probability of breastfeeding is highest at 0 months (99%). This percentage decreases steadily as the time from birth increases (Figure 1). The probability of continuing breastfeeding declined substantially after 24 months.

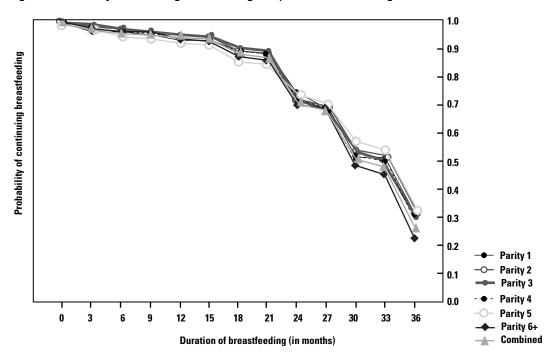


Figure 1. Probability of continuing breastfeeding for specific durations, Bangladesh

Termination of Breastfeeding

Table 2 shows the hazard coefficients and relative risk of termination of breastfeeding for each covariate. All predictor variables except the place of residence were found to have significant influence on the decision to terminate breastfeeding. The region of residence had a significant impact on the probability of terminating breastfeeding. Whereas mothers from Chittagong were 1.1 times more likely to terminate breastfeeding earlier than those from Sylhet, mothers from the Barisal, Dhaka, Khulna and Rajshahi regions were considerably less likely to terminate breastfeeding earlier than those from Sylhet. Mannan and Islam (1995), Mitra et al. (1997) and Giashuddin and Kabir (2003, 2004) have previously reported similar results.

Table 2. Estimates of relative risk of cessation of breastfeeding in women in Bangladesh from January to May, 2004

Explanatory variables (<i>X_i</i>)	Coefficient (eta)	Standard error of coefficient	P-values	Odds ratio	95% CI
Residence Urban (Rural)	0.02	0.03	0.57	1.02 1.00	0.96–1.08
Region Barisal Chittagong Dhaka Khulna Rajshahi (Sylhet)	-0.10 0.10 -0.08 -0.08 -0.13	0.06 0.05 0.05 0.06 0.05	0.08 0.05 0.14 0.16 0.01	0.90 1.11 0.93 0.92 0.88 1.00	0.80-1.01 1.00-1.22 0.84-1.03 0.82-1.03 0.79-0.97
Religion Muslim (Non-Muslim)	0.21 	0.05 	0.00	1.23 1.00	1.12–1.36
Educational level Illiterate Primary Secondary (Higher)	-0.27 -0.20 -0.14	0.07 0.07 0.06 	0.00 0.00 0.03	0.76 0.82 0.87 1.00	0.67–0.87 0.72–0.94 0.77–0.98
Work Status Does not work (Work)	0.13 	0.04	0.00	1.14 1.00	1.06–1.23
Mother's age (yrs) ≤24 25–34 (≥35)	0.66 0.30 	0.07 0.06 	0.00 0.00 	1.94 1.35 1.00	1.71–2.20 1.21–1.51
Age at marriage ≤14 15–19 20–24 (≥25)	-0.36 -0.31 -0.21	0.15 0.15 0.15 	0.02 0.04 0.17	0.70 0.73 0.81 1.00	0.52-0.93 0.55-0.98 0.60-1.09
Parity ≤2 3–5 (≥6)	-0.36 -0.09	0.07 0.06 	0.00 0.13	0.70 0.92 1.00	0.61-0.79 0.82-1.03
Use of contraceptives Never used (Used)	0.31 	0.04	0.00	1.37 1.00	1.26–1.48

CI = confidence interval.

Muslim mothers were 1.2 times more likely than their non-Muslim (Hindu, Christian and Buddhist) counterparts to terminate breastfeeding early. Non-Muslim mothers have previously been shown to breastfeed longer than Muslim mothers in other regions of the country as well (Giashuddin and Kabir 2003, 2004; Islam et al. 2006; Manna and Islam 1995). Education was found to have a significant negative impact on cessation of breastfeeding. Accordingly, the risk of early termination of breastfeeding for illiterate mothers and those with primary and secondary school education was 24%, 18% and 13%, respectively, lower than mothers with higher education. The association of higher education with shorter duration of breastfeeding was also noted in some earlier studies in Bangladesh (Giashuddin and Kabir 2003, 2004; Mannan and Islam 1995) and in other devel-

oping countries (Grummer-Strawn 1996). Notably, the situation in industrialized countries such as Denmark is quite the opposite (Vestermark et al. 1991).

Employment status outside the house was in general positively associated with the risk of terminating breastfeeding. The results indicate that women who do not work are 1.1 times more likely to terminate breastfeeding than working women. Previously, other studies have also shown that working women breastfeed longer than their non-working counterparts (Ahamed 1986; Mannan and Islam 1995; Sivakami 2003). The reason for this counter-intuitive observation might lie in the fact that most working women in Bangladesh take their babies with them to the workplace.

Maternal age was strongly associated with the risk of the termination of breastfeeding. Younger women (≤24 years and 25–34 years) had a significantly higher probability of terminating breastfeeding than those ≥35 years. These findings support the results of Mannan and Islam (1995) and Giashuddin and Kabir (2004), who showed that the risk of early weaning is lower among older mothers than younger ones.

Mothers' age at marriage also had a significantly negative correlation with the risk of early termination of breastfeeding. Women who were married at age \leq 14, 15–19 and 20–24 years were 30%, 27% and 19%, respectively, less likely to terminate breastfeeding than those who were married at age \geq 25 years. Parity also had a significantly negative effect on the duration of breastfeeding. Mothers with \leq 2 and 3–5 parities were 30% and 8%, respectively, less likely to terminate breastfeeding than those with \geq 6 parities. Not, surprisingly, the use of contraceptives was associated with a significantly lower risk of early cessation of breastfeeding.

Conclusion and Policy Implications

The duration of breastfeeding is an important topic in demographic research. The results of this study showed that breastfeeding is virtually universal and across the spectrum is prolonged in Bangladesh, averaging 27.5 months. The Cox proportional hazard model employed in this study identified correlates such as the region of residence, religion, maternal education, working status, maternal age, age at the time of marriage, parity and the use of contraceptives as significant determinants of the duration of breastfeeding among Bangladeshi women. In view of these findings, the following policy considerations are suggested. First, policy makers should institute health education programs to promote and facilitate optimal breastfeeding practices. Based on the findings of various studies, programs should be implemented to identify women who are highly susceptible to frequent pregnancies. Targeted programs in rural and urban areas should be developed to promote contraception measures and prolongation of breastfeeding when possible. Second, extensive media coverage of these issues should be promoted to highlight the benefits of breastfeeding in terms of improving child health and lowering susceptibility to pregnancy.

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