

Differentials of Breastfeeding among Rural Women of Western Nepal: A Survival Analysis

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Abstract

Introduction	Breastfeeding (BF) has been a point of discussions because of its direct impact not only on the health of children but also for reducing fertility. Breast milk contains all types of nutrients and it is rich in antibody substances that protect the babies against diseases. It lengthens the period of non-exposure to the risk of conception and hence increased the interval between two consecutive births. However, its degree varies from society to society and it depends on the characteristics of mothers in the society.
Objectives	The objective of this paper is to investigate the differentials of BF in relation to some socio-economic, demographic and caste/ethnicity characteristics of mothers. Duration of BF is calculated.
Methods	The data are taken from a sample survey of Palpa and Rupandehi districts. A total of 851 mothers provided information on the duration of BF, of whom 11 (1.3 %) reported to have never breastfed, 231 (27.1 %) had already weaned and 609 (71.6 %) were still breastfeeding at the time of interview. The survival analysis technique has been used.
Results	Average duration of BF was found to be 30.7 months. As mothers with parity 1-2 breastfed for an average of 29.2 months, which is linearly increased to 32.0 months for parity 7+. A lower duration of BF was found for younger mothers than older. A significant positive association has been found with post-partum amenorrhoea (PPA) and open birth interval. The duration of BF increased with the increased age of the child. Education variable showed an inverse relationship with BF. Average duration of BF was higher for low socio-economic status (32.6 months) as compared to high socioeconomic category (24.7 months). The relationship with caste/ethnicity was found statistically significant.
Conclusion	Average duration of BF was found to be about 31 months. This study revealed that age of mother, education, occupation and socio-economic status of family showed statistically significant effect on the duration of BF. The duration of BF increased with the increased duration of PPA. Education, occupation, birth interval were found inversely related with the duration of BF whereas parity, age of mother and socio-economic status showed positive effect on the duration of BF.
Key words	Fertility, Post-partum amenorrhoea, Birth interval, Demographic variable, Parity, Suckling.

Introduction

Breastfeeding (BF) has been a point of discussions because of its direct impact not only on the health of children but also for reducing fertility. Breast milk contains all types of nutrients required for a child in right proportion with quality as well as good composition. It is rich in antibody substances and naturally protects the babies against diarrhoea, infections, food allergies etc. and finally reduces the rate of child mortality in the society^{1,2,3}. Several researchers have pointed out that infants who were exclusively breast-fed survive longer and healthier than artificially fed children^{4,5,6}. A number of studies have been

carried out to examine the effect of prolonged BF on fertility and they have identified that it lengthens the period of non-exposure to the risk of conception and hence increased the interval between two consecutive births^{7,8,9,10}. The effect of prolonged breastfeeding has been identified as one of the important factors to reduce pregnancy^{7,11}. Usually, BF is universal in most of the society. But its degree varies from society to society depending on the characteristics of mothers in the society such as education, occupation, availability of supplementary foods, socio-economic status, etc. Prolonged BF has been

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considered as a traditional feature, especially in Asian and African countries^{8,12}. It was documented that the longer and more frequent BF is used to ensure the survival of the child^{7,13}.

It has been acknowledged that breastfeeding practices affect the health of mother as well as their children. Breastfeeding has beneficial effects on the nutritional status, morbidity, and mortality of young children¹⁴. Early initiation of BF is advantageous for both mothers and children⁷. The initiation of the first breast milk is very important for the babies because it contains colostrums. It is also highly nutritious and full of antibodies, which protect the newborn babies from different diseases⁷. The practice of breastfeeding is common phenomenon and universal in Nepal. It was reported that about 98 per cent of children born having been breastfed at some time¹⁴. On this background the behaviour and differential of BF is very important in a society where the fertility, woman as well as child health is becoming a serious problem.

Therefore this study tries to touch these issues. The main objective of this paper is to investigate the differentials of BF in relation to some socio-economic, demographic and caste/ethnicity characteristics of mothers and child. The survival analysis technique is employed. Trimean has been calculated based on the survival analysis.

Methodology

The data has been taken from a sample survey entitled "Demographic Survey on Fertility and Mobility (DSFM) 2000: A case Study of Palpa and Rupandehi districts". A total of 851 women provided information on the duration of BF for their last born child, of whom 11 (1.3 %) reported to have never breastfed, 231 (27.1 %) had already weaned and 609 (71.6 %) were still BF at the time of interview. However, 13 mothers were found dead children, whose duration of BF was not available, and hence such cases are excluded from the analysis.

BF variable is taken as *dependent variable*. It has contains censored cases. It is measured in completed months. The duration of BF, which is grouped into the intervals of 0-6, 7-12, 13-18, 19-24, 25-30, 31-36, 37-42, 43-48 and 49+ months i.e. in nine categories.

The independent variables, all measured at the survey date, are grouped into three categories: demographic, socio-economic and cultural variables.

Demographic variables included are parity of mother (PARITY), current age of mother (AGEMOTH), age of mother at the birth of child (AGEMOTHCHB), post-partum amenorrhoea (PPA), open birth interval (OPENBI), current age of child (AGECH), and sex of child

(SEXCH). Socio-economic variables included are education of mother (EDUMOTH), education of husband (EDUHUSBN), working status of mother (OCUMOTH), socio-economic status of household (SOECOHH) and place of residence (RES). Caste/ethnicity (CASTE) is included as a cultural variable [see details for measurements of these variables in Aryal¹⁵].

The association of the duration of BF with other variables included in the model was checked by the chi-square statistic. Since chi-square statistic provided the test of the goodness of fit and to test the significance of the explanatory variables. Survival analysis (life table technique) has been applied for allowing the inclusion of both censored as well as non-censored cases. Mothers who were still BF by the survey date are considered as censored cases.

Life table technique is utilized to derive the survival distribution of the duration of BF by incorporating the complete as well as censored observations. Summary measure namely trimean based on the survival analysis are

calculated. Trimean is calculated as
$$T = \frac{q_1 + 2q_2 + q_3}{4}$$

where q_i ($i = 1, 2, 3$) is the i^{th} quartile of the distribution. Trimean gives a better estimate than other averages (mean and median) specially when data are censored and class interval is open ended¹⁶.

Results

The survival analysis and its related measures (mean, median, trimean, etc.) for the duration of BF by various characteristics of mother and child are given in Table 1.

Table 1: Survival Analysis of Breastfeeding according to the different characteristics of mothers

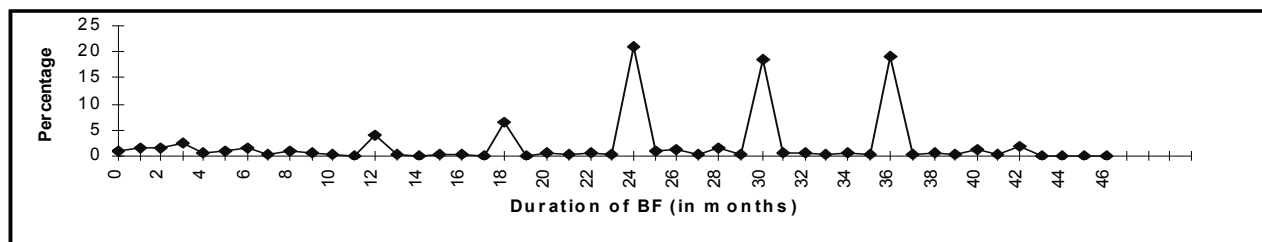
Variables	Category	% Non-censored cases	% Censored cases	% weaning of BF up to months				χ^2
				12	24	36	Trimean	
PARITY	1-2	27.9	72.1	10.3	42.1	73.1	29.6	54.5
	3-4	31.9	68.1	9.8	48.2	76.4	31.2	df=24
	5-6	33.9	66.1	11.4	43.2	75.9	32.2	p<.01
	7+	35.3	64.7	7.9	43.1	75.6	33.1	
AGEMOTH	<25	21.6	78.4	8.9	39.9	72.1	28.9	35.0
	25-34	36.1	63.9	12.1	47.1	76.5	30.3	df=16
	35-49	43.2	56.8	9.8	45.6	76.9	32.8	p<.01
AGEMOTHCHB	<25	28.5	71.5	9.9	44.2	76.5	30.1	14.7
	25-34	31.7	68.3	10.4	45.6	76.4	31.9	df=16
	35-49	35.1	64.9	8.3	42.6	71.5	33.3	p>.05
PPA	0-2	38.5	61.5	18.3	49.7	79.5	28.4	
	3-5	31.8	68.2	31.1	42.3	73.2	29.5	162.4
	6-8	34.6	65.4	12.9	47.8	75.9	30.8	df=56
	9-11	22.5	77.5	7.9	46.9	74.1	31.6	p<.01
	12-14	36.0	64.0	9.1	43.7	73.8	31.9	
	15-17	26.8	73.2	6.9	45.1	81.7	32.4	
	18+	46.5	53.5	6.88	42.3	79.8	33.5	
OPENBI	0-11	2.7	97.3	100.0			6.9	
	12-23	3.8	96.2	74.3	100.0		11.8	250.2
	24-35	20.8	79.2	6.9	35.9	100.0	27.9	df=32
	36-47	57.7	42.3	10.3	48.2	69.1	30.8	p<.01
	48+	87.9	12.1	15.2	39.1	82.3	32.8	
AGECH	<2	4.3	95.7	94.2	100.0		10.8	530.8
	2-3	21.9	78.1	9.8	34.4	100.0	24.5	df=40
	3-4	57.5	42.5	10.2	47.8	68.1	29.9	p<.01
	4-5	83.7	16.3	12.4	47.4	31.8	33.5	
	5+	94.6	4.4	16.7	46.2	82.3	33.4	
SEXCH	Male	29.8	70.2	11.4	44.5	75.2	31.6	7.2
	Female	31.2	68.8	11.1	44.8	74.9	30.9	df=8 p>.05
EDUMOTH	Illiterate	27.6	72.4	5.7	40.2	72.9	31.9	120.8
	Literate & Primary	32.5	67.5	7.9	46.1	76.8	31.8	df=24
	Mid-high school	35.1	64.9	90.8	49.2	78.5	27.5	p<.01
	Inter and more	41.6	58.4	15.9	66.8	74.3	20.6	
EDUHUSBN	Illiterate	29.3	73.7	6.5	39.2	76.3	32.9	111.0
	Literate & Primary	29.9	70.1	10.9	43.7	75.3	31.4	df=24
	Mid-high school	35.7	64.3	14.1	49.2	75.9	27.1	p<.01
	Inter and more	41.4	58.6	23.9	62.8	84.9	23.5	
OCUMOTH	House-wise Employed	28.9	71.1	12.2	46.7	77.3	29.9	23.9
		41.2	68.8	8.9	36.9	68.1	30.9	df=8 p<.05
SOECOHH	Low	24.8	75.2	7.1	41.2	72.4	32.6	97.7
	Middle	32.1	67.9	11.3	45.6	75.1	30.9	df=16
	High	45.2	54.8	21.4	51.4	85.9	24.7	p<.01
RES	Tarai	37.2	62.8	15.9	39.3	85.9	28.4	43.5
	Hills	28.9	71.1	13.4	37.9	86.0	31.2	df=8 p<.01
CASTE	Brahmin	28.0	72.0	10.8	45.8	76.7	30.8	36.1
	Cherty	30.2	69.8	11.1	39.8	67.5	31.9	df=16
	Dalits/Ethnics	31.4	68.6	11.4	42.5	83.1	31.5	p<.05
Total		29.2	70.1	-	-	-	30.7	-

Note: statistics, for the birth cohorts, is based on non-censored cases only.

The per centage distribution of terminating BF for up to 12 months, 24 months and 36 months are for various categories of the variables are also presented. Mean median and trimean

are also given. Figure 1 shows the distribution of BF. It is clearly indicated that the heaping has been found more or less at the multiple of six months.

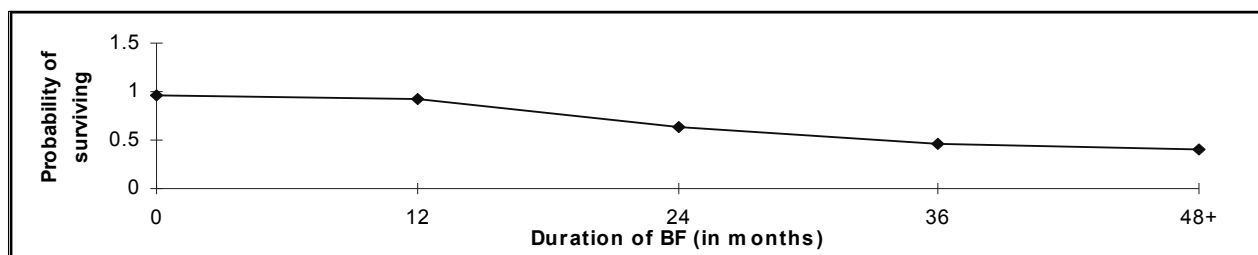
Figure 1 Distribution of breastfeeding



The survival probabilities are also presented in Figure 2, which clearly shows the survival chances of the duration of

BF, which is steadily decreasing after 12 months.

Figure 2 Survival curve of duration of breastfeeding



BF in relation to demographic variables

It was found that the duration of BF increased with the increased parity order. As mothers with parity 1-2 breastfed for an average of 29.2 months, which is linearly increased to 32.0 months for parity 7+. About 10, 42 and 73 per cent mothers with 1-2 parity were terminated BF up to 12, 24 and 36 months respectively while 8, 43 and 76 per cent mothers with 7+ parity were terminated BF at the same duration. An average duration of BF varied from a low value of 28.4 months for current age of mother <25 years to a high value of 32.4 months for mothers of age groups 35-49 years and the amount of variation was about 4 months. About 9, 40 and 72 per cent younger mothers were terminated BF up to 12, 24 and 36 months respectively whereas 10, 46 and 77 per cent older mothers were terminated BF at the same duration. Chi-square statistic revealed that parity order and current age of mother also exhibited a significant relationship with the distribution of BF.

The duration of BF for the different categories of PPA increased from a low value of 28.4 months (PPA for 0-2 months) to a high value of 34 months (PPA for 18+ months). Survival analysis showed that about 18 and 7 per cent of mothers terminated BF during first twelve months who had experience of 0-2 and 18+ months of PPA respectively whereas about 50 and 42 per cent of mothers terminated BF

during 24 months of PPA duration. It indicated that the longer is the duration of BF the longer is the duration of PPA. A significant positive association has been established with PPA, which is also confined with the chi-square value.

It was found that the duration of BF varied according to open birth interval. A low value of 6.9 months and a high value of 32.8 months were found for the open birth interval categories of 0-11 and 48+ months respectively. Chi-square value showed a statistically significant relationship with open birth interval. The duration of BF increased with the increased age of child. The duration of BF was very low (10.8 months) for younger children (up to 2 years) whereas it was very high (33.4 months) for older children (5 years and more). The mean duration of BF for female child was found slightly lower (30.9 months) as compared to male child (31.6 months).

BF in relation to socio-economic variables

Table 1 shows that mothers having no schooling were found to breastfeed on an average for 32 months, which decreased to 21 months for highly educated mothers. About 6 percent illiterate mothers were terminated BF within twelve months while about 16 percent educated mothers were terminated BF. Similarly about 40 percent illiterate mothers were

terminated BF within 24 months whereas about 67 percent educated mothers were terminated BF within the same duration. Education variable showed an inverse relationship with the duration of BF.

A slightly longer duration of BF was found for employed mothers (30.9 months) than housewife (29.9 months). About 9 and 12 percent mothers were terminated BF within twelve months those who were respectively employed and housewife whereas about 68 and 77 per cent mothers were terminated BF within 36 months.

As may be expected, mothers who residing *in Hills* have showed a longer duration (31.2 months) of BF than residing in *Tarai* (28.4 months) and the relationship was found statistically significant. The duration of BF was higher for low socio-economic status (32.6 months) whereas it was lower for high socioeconomic status family (24.7 months). About 72 and 86 percent mothers were terminated BF for low and high socioeconomic status mothers respectively within 36 months. Chi-square statistic exhibited a significant relationship between socioeconomic variables and the duration of BF.

BF in relation to caste/ethnicity variable

It was found that a slightly higher duration of BF was for Chhetri (31.9 months) and Dalits/Ethnic (31.5 months) than Brahmin (30.8 months) caste category. About 11, 46 and 77 percent Brahmin mothers were terminated BF up to 12, 24 and 36 months respectively whereas 11, 40 and 68 percent Chhetri mothers were terminated BF. The duration of BF and caste/ethnicity variable was found statistically significant.

Discussion

The study clearly showed a heaping pattern in the duration of BF at the multiple of six months among Nepalese mothers (Figure 1). A similar pattern of heaping in the duration of BF has also been reported in several other studies conducted in India^{17,18}, Bangladesh¹⁹, Indonesia²⁰, Africa²¹, and many other developed and developing countries^{10,22}. The heaping may be due to mis-reporting, culturally prescribed norms and traditions, and memory lapse as well as selection bias¹⁵. Nevertheless, it is difficult to detect the systematic tendencies of under reporting and over reporting in the duration of BF unless the errors are gross⁷. Over reporting in BF was noticed when the duration of BF exceeds the current age of the child or its age at death whereas under reporting would not result in any visible inconsistencies and therefore remained unnoticed^{18,21}. Survival curve of the duration of BF clearly showed the declining trend in survival probabilities where it was very slow up to the first twelve months and thereafter it starts steadily declining (Figure 2).

The present study revealed more or less consistent results of the duration of BF as that of MOH, where it was reported

as 28.9 months¹⁴. Trimean has been obtained based on the survival analysis. Trimean may be the most appropriate average value for the duration of the BF because it gives a better estimate than other averages specially when data are censored and the class interval is open ended¹⁶. The benefit for applying survival analysis for the study of BF is that it wholly considered both censored and non-censored cases and it also provide summary measure. The study revealed a higher duration of BF in case of higher proportion of censored events whereas lower duration of BF in case of higher non-censored cases. Theoretically, survival analysis provides a higher value of probabilities for lower proportion of censored cases and lower value of probabilities for higher value of censored cases due to censoring of the event under study²².

The duration of BF increased with the increased parity order. The study suggests that an average duration of BF varied according to age of mother, where a low value for younger and high value for older ages of mother. This may be due to (i) mothers of high parity may be older and they produce less milk but they may be more traditional in orientation, (ii) usually lower order births occur in quick succession than higher order births and hence the chance of voluntary termination of BF at an early age of child might be higher for the lower birth order babies than for the higher birth order. These findings are consistent with the other findings made by several authors^{23,26}. The duration of BF was increased with the increased duration of PPA. This finding is also consistent with other findings^{7,24,25}.

The duration of BF varied according to open birth interval, where a short duration BF for shorter birth interval and longer duration of BF for longer birth interval. A significantly positive relationship has been observed with birth interval^{18,21}. The duration of BF increased with increased age of child and a small difference in the duration of BF by sex was observed, which may be due to sex discrimination especially for female child in the society²⁷.

Education and occupation have been considered to measure socio-economic status of a woman¹⁸. Since in Nepal, more than 75 percent of the mothers were found illiterate with no earning sources. So, husband's education has also been included for the analysis. The education showed an inverse relationship with the duration of BF, which may be due to the fact that literate mothers probably start giving food supplements to their children earlier and so a shorter period of lactation. Similar, findings have also been obtained by other researchers based on data of developing countries^{23,25}. The duration of BF varied with caste/ethnicity. The variation in the duration of BF in relation to caste/ethnicity as well as religion variables has been documented in many developing countries like India and Bangladesh^{7,19}.

Conclusions

This study showed a universal phenomenon in breastfeeding in rural Nepal like many other developing countries. Behaviour of breastfeeding has been found related to some socio-economic and demographic characteristics of mothers. An early initiation of breastfeeding was found in rural Nepal. The study revealed that age of mother at the birth of child, education of mother, employment status of mother, occupation and caste/ethnicity showed significant effect on the duration of breastfeeding.

It was found that mothers of higher parity breastfed for a longer duration than lower parity. The duration of breastfeeding increased with the increased duration of post-partum amenorrhoea. Education and occupation for both mother and husband were found inversely related with the duration of breastfeeding and it was found statistically significant. The caste/ethnicity showed significant differentials in the duration of breastfeeding. This study also exhibited that mothers belonging to a high socio-economic status breastfed for a shorter duration than their counterparts. Age of mother at the birth of child showed positive effect for having its impact on duration of breastfeeding. This study may help the planners and policy makers for designing proper policy and programme to improve women and child health as well as for reducing the fertility in the country.

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