

Original Article

FACTORS AFFECTING LATE INTRODUCTION OF COMPLEMENTARY FOOD: A KAPLAN MEIER ANALYSIS

V M Holambe¹, N A Thakur²**Financial Support:** None declared**Conflict of interest:** None declared**Copy right:** The Journal retains the copyrights of this article. However, reproduction of this article in the part or total in any form is permissible with due acknowledgement of the source.**How to cite this article:**

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E-mail: drnandini_dole@rediffmail.com**Date of Submission:** 21-02-14**Date of Acceptance:** 26-03-14**Date of Publication:** 31-3-14

ABSTRACT

Introduction: Late introduction of complementary food is associated with malnutrition and in India about 47% of children are given complementary food at age ≥ 6 months. The present study was conducted to estimate the age at introduction of complementary food and factors affecting it.**Aim and objectives:** To estimate the age at introduction of complementary food and some socio-demographic and reproductive factors affecting it by Kaplan-Meier survival analysis.**Methodology:** This was a cross sectional study conducted in Government Medical College, Latur (Maharashtra, India) during 1st May 2013 to 30th June 2013. The study population consisted of 197 mother-infant pairs attending the Immunization Clinic. Data was collected by direct interview using predesigned and pretested questionnaire. The data was analyzed using Kaplan Meier procedure. Informed consent was taken from all the study subjects.**Results:** Out of the 69 infants in whom complementary food was introduced, 32(46.38%) were given it at appropriate age and 37 (53.62%) were late. Age of mother, parity and education of mother were significantly associated with delayed introduction of complementary food.**Conclusion:** There was a definite delay in starting complementary feeding. Late introduction of complementary food is associated with maternal age, education and parity.**Key words:** Delayed introduction of complementary food, Kaplan Meier analysis, Maternal factors, Survival analysis.

INTRODUCTION

The most cost effective intervention to reduce infant mortality in developing countries like India would be appropriate infant feeding. Estimated reduction of infant mortality by promoting exclusive breastfeeding is 13% [1]. In developing countries feeding practices are of public health importance because of risk of diarrhoeal diseases from contaminated complementary food and malnutrition from delayed introduction of complementary food. Stunting gradually increases as introduction of complementary food is postponed to age ≥ 6 months and in India about 47% of children are introduced of complementary food at age ≥ 6 months [2]. The present study was conducted to estimate the age at introduction of complementary food and factors affecting it.

OBJECTIVES

To estimate the age at introduction of complementary food and some sociodemographic and reproductive factors affecting it.

METHODOLOGY

This was a cross sectional study conducted in Immunization Clinic of Government Medical College, Latur (Maharashtra, India). With EBF prevalence of 53%, sample size of 151 was calculated by using the formula for cross-sectional studies. The confidence level of 95% and power of 85%, i.e 5% of alpha error and 15% of beta error was considered while calculating sample size. The study was planned with purposive sampling. All the mothers attending immunization OPD with their infants (age of baby < 12 months) during 1st May 2013 to 30th June 2013 were included in the study. Thus, the final sample size was 197 mother-infant pairs. Informed consent was obtained from mothers. Response rate was 100%. Resident doctors personally interviewed the mothers of infant.

Structured questionnaire was used as a tool for data collection. The questionnaire included sociodemographic data like age of mother, education and occupation of parents, socioeconomic status and some obstetric factors like age at marriage, parity and spacing.

The mother was asked about the breastfeeding practices. If the mother was not exclusively breastfeeding to her infant (i.e. partially breastfeeding), the age at introduction of complementary food was noted in complete months.

Dependent variable in the study was cessation of exclusive breast feeding. Individual independent variables i.e. sociodemographic and reproductive factors were transformed to categorical data and analyzed by Kaplan Meier method.

Ethical clearance was obtained from local institutional ethical committee.

RESULTS

Out of the 197 infants 101(51.27%) were males and 96 (48.73%) were females. The median age of infants was 4 months with range from 1 day to 12 months. The mean age of mothers was 24.17 years (SD=3.60 years).Majority of the parents had at least secondary school education with one fourth of the mothers and one third of the fathers having education upto graduation and above. 91.37% mothers were housewives while main occupation of fathers was clerical/shop owner/farmer (32%) followed by unskilled labourers (25%).Majority of the families belonged to class IV Socioeconomic status (44.66%) by Modified Kuppuswamy's Classification. 17% of the mothers were married at <18 years of age. More than half of the mothers (58.37%) married between the age of 18-21 years. Of the 197 study subjects, 103 (52.28%) were primiparous and 94 were multiparous (47.72%).

Out of the 197 infants,128 (64.98%) were censored cases i.e. they were exclusively breastfed at the time of interview; while in 69 (35.02%) infants event of interest had occurred i.e. complementary feeding was started .

Table 1 shows the mean and median survival time. The mean and median survival time for exclusive breastfeeding was 6.946 and 7.000 months respectively. It represents skewness of the given data.

In present study, as duration of exclusive breastfeeding was time to event data, we have used Kaplan Meier test which is a non parametric test to describe such data. Kaplan Meier test describes the survivorship of study population with graphical presentation. Comparison between two groups is added advantage of the curves obtained by Kaplan Meier test.

Figure 1 shows the Kaplan-Meier survival estimates for the duration of exclusive breastfeeding. All the infants were exclusively breastfed up to 6 months, thus fraction surviving before 6 months is 100% as seen in the graph. Majority of the censored cases are seen before this period. At 6 months of age 32 mothers had started weaning. Thus the first "step" of the Kaplan-Meier curve is seen at 6 months. The subsequent "steps" in the curve represent the occurrence of final event. i.e.complementary food was started which is seen at 7 and 8 months. Out of the 69 infants in whom complementary food was started, 32(46.38%) were started at appropriate age and 37 (53.62%) were late.

To find association of time of introduction of complementary food with various variables, analysis was restricted to the 69 infants in whom complementary food was started. Age of mother, parity and education of mother were significantly associated with delayed introduction of complementary food (Table 2). The Kaplan Meir survival curve showed significant association of delayed introduction of complementary food with age of mother, parity and education of mother as evident in figure 2-4.

Table 1: Means and Medians for Survival Time

Estimate	Std. Error	Mean ^a		Estimate	Std. Error	Median	
		95% Confidence Interval				95% Confidence Interval	
		Lower Bound	Upper Bound			Lower Bound	Upper Bound
6.946	.113	6.725	7.167	7.000	.179	6.649	7.351

a. Estimation is limited to the largest survival time if it is censored.

Table 2: Odds ratio of sociodemographic variables on cessation of exclusive breastfeeding

Step 1 ^a	Wald	Sig.	OR	95% C.I.for OR	
				Lower	Upper
ageofmother(1)	3.979	.046	.261	.070	.977
educatioofmother	1.851	.604			
educatioofmother(1)	.127	.721	1.789	.073	43.828
educatioofmother(2)	1.453	.228	2.614	.548	12.467
educatioofmother(3)	.015	.903	1.092	.264	4.514
educationfather(1)	1.757	.185	.360	.080	1.630
occupationmother(1)	.226	.634	.695	.155	3.116
SES	1.062	.786			
parity(1)	3.383	.066	3.424	.922	12.710
Constant	.317	.574	1.821		

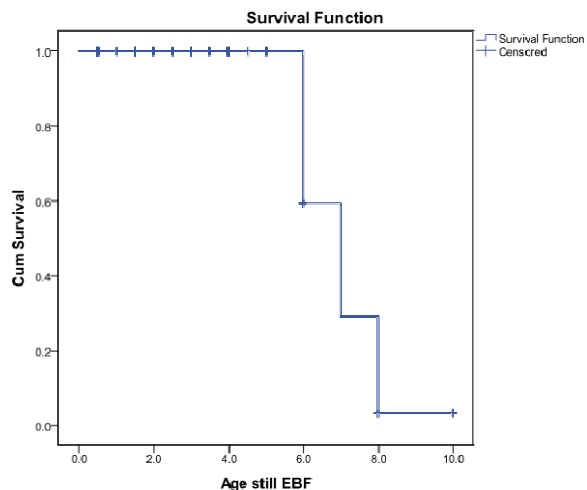


Figure 1: Kaplan Meier Curve of exclusive breast feeding

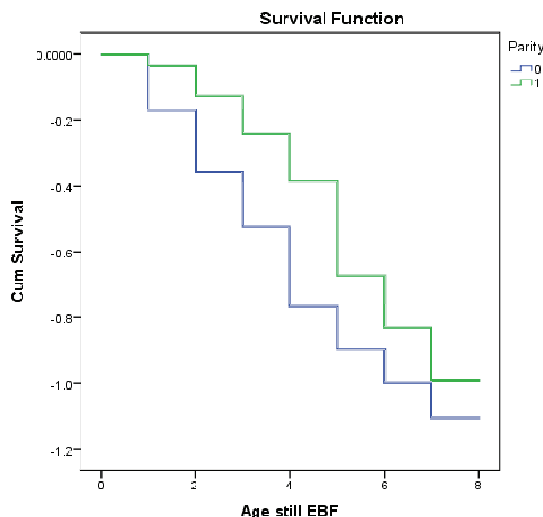


Figure 4: comparison of parity with delayed introduction of complementary food

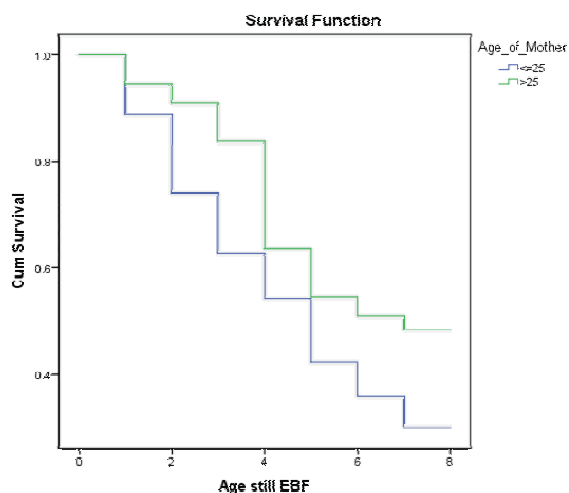


Figure 2: Comparison of age of mother with delayed introduction of complementary food

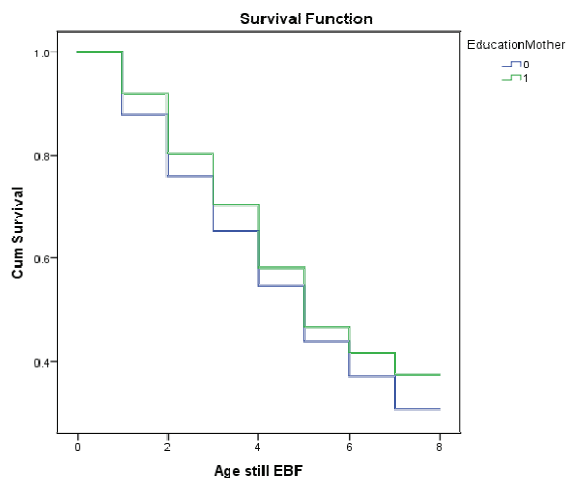


Figure 3: comparison of education of mother with delayed introduction of complementary food

DISCUSSION

The primary reason for high rates of malnutrition in India is not poverty but the behaviors of delayed initiation of breastfeeding, early introduction of water and liquids, and delay in complementary feeding results in a period of “perpetual hunger for the child [3].

Children for whom weaning was started at the recommended age of 4-6 months were found to be significantly less malnourished on anthropometric measurements as compared to the other set in which weaning was started at an earlier or later age [4].

Although there are many reasons for the delay in introduction of complementary foods including income level and education, beliefs can influence the timing. One study of poor families in five states reported that mothers delayed weaning because they perceived that the child is not interested [5].

The ‘start time’ is when breastfeeding starts i.e. at birth of a child and event of interest is ‘end of exclusive breastfeeding’ i.e. when complementary food is introduced and breastfeeding becomes partial if continues. Thus the women reporting continuation of exclusive breast feeding on the date of interview were considered as censored cases. Presence of censored data makes the conventional statistical techniques inappropriate. A statistical technique useful for such situation is survival analysis, which is a method of estimating time to event data in the presence of censored cases. Because of censored cases in present study Kaplan-Meier survival analysis would be the appropriate method.

Dependent variable in the study was cessation of exclusive breast feeding. Individual independent variables i.e. sociodemographic and reproductive factors were transformed to categorical data and analyzed by Kaplan Meier method. The study variables included were age of mother, education and occupation of par-

ents, socioeconomic status, age at marriage, parity and spacing.

In the present study, it was observed that out of the 197 infants, 128 (64.98%) were exclusively breastfed at the time of interview; while in 69 (35.02%) infants weaning was started. Out of the 69 weaned infants, 32(46.38%) were weaned at appropriate age and 37 (53.62%) were weaned late. Early weaning was not observed in the study.

Aggarwal A et al [6] noted that; Out of the 200 mothers, only 35 (17.5%) had started complementary feeding at recommended time i.e. 6 months of age. In 154 (77%), complementary feeding was delayed and 32 (16%) had not started CF at the age of 2 years. In the study from tea garden workers of Assam [7], introduction of complementary feedings was generally delayed. Out of the 48 infants aging ≥ 7 months 18 (37.5%) were exclusively breastfed. In a study from Vadodara by Bhavesh V et al [8], nearly 30% mothers were continuing exclusive breast feeding beyond 6 months, which is not desirable (19.10% for 7 months and 11.00% for > 7 months). While delayed weaning rate of 7.89%, 9.67% and 16% was observed in Nagpur [9], Bijapur [10] and Lahore [11] respectively.

In the present study; age of mother, parity and education of mother were significantly associated with delayed weaning. Similar findings were reported by study from Lahore that delayed commencement of weaning had a statistically significant relationship with education, occupation, income of the family, parity of mothers and also large family size ($p < 0.05$) [11]. Patrice L et al in their review has stated that the median age at introduction of complementary foods does not vary by urban/rural residence but does vary by education level of the mother, dropping when she has some primary education [12].

CONCLUSIONS

In the present study there was a definite delay in starting complementary feeding.

Late introduction of complementary food is associated with maternal age, education and parity.

REFERENCES

1. S. Umar and M. O. Oche. Breastfeeding and Weaning Practices in an Urban Slum, North Western Nigeria International Journal of Tropical Disease & Health 2013, 3(2): 114-25.
2. Sabu S Padmadas, IngeHutter and FransWillekens. Weaning initiation patterns and subsequent linear growth progression among children aged 2-4 years in India. International Journal of epidemiology 2002;31:855-863
3. Ghosh S. Integrated child development services programme – need for reappraisal. Indian Pediatr 1997;34:911-8
4. Shamim S, Naz F, Jamalvi SW, Ali SS. Effect of weaning period on nutritional status of children. J Coll Physicians Surg Pak. 2006 ;16(8):529-31.
5. Chirmulay D, Bhagwat IP. Factors influencing nutritional status of preschool children from selected areas in five states of India. Report No. IHPP/1. Pune, India: BAIF Development Research Foundation, 1997
6. Aggarwal A, Verma S, Faidi M, Dayachand. Complementary feeding--reasons for inappropriateness in timing, quantity and consistency. Indian J Pediatr. 2008;75(1):49-53.
7. G.K. Medhi, J. Mahanta. Breastfeeding, Weaning Practices and Nutritional Status of Infants of Tea Garden Workers of Assam. Indian Pediatrics 2004;41:1277-79.
8. Bhavesh V M, Baxi RK. Breast feeding and weaning practices of mothers and health profile of their children (6-59 months) attending well baby clinic at SSG Hospital, Vadodara
9. Bagul AS, Supare MS. The Infant Feeding Practices in an Urban Slum of Nagpur, India. Journal of Clinical and Diagnostic Research. 2012;6(9): 1525-27.
10. Yadavannavar MC and Patil SS. Socio cultural factors affecting breast feeding practices and Decisions in rural women. International Journal of Plant, Animal and Environmental Sciences. 2011;1(2):46-50
11. Razia Chaudhry and Naheed Humayun. Weaning practices and their determinants among mothers of infants. 2007; 23:120-24.
12. Patrice L. Engle. Infant Feeding Styles: Barriers and Opportunities for Good Nutrition in India. Nutrition Reviews. 2002; 60(5): S109-14.