Infant and Young Child Feeding Practices in India: A Comparison of Empowered Action Group (EAG) and non-EAG States

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Abstract

This study attempts to understand the infant and young child feeding practices among children under five years of age in Empowered Action Group (EAG) and non-EAG states of India. It looks into the children who received colostrum, breastfed within 24 hours after birth and age at which they start receiving semi-solid or solid food. Data from District Level Household and Facility Survey-3 conducted during 2007-08 among ever-married women aged 15-49 years have been used. Bi-variate, cox proportional hazards and logistic regression have been used to see the effect of background characteristics of mother and child on the feeding practices. The study finds that about three-fourths of the children were given solids food when they completed one year. The mean length of breast feeding was higher in rural areas than urban areas. Infant feeding practices in EAG states were of poor quality and breast feeding had not started immediately after birth. Counselling and advice to women during ANC and delivery for infant feeding practices are urgently needed.

Key words: Infant and young child feeding practices, antenatal care

I. Introduction

Infant and young child feeding practices directly impact the nutritional status, morbidity and ultimately the survival of children under-five years of age (Goudet, 2011; Hien & Kam, 2008; Iversen et al., 2012). Therefore, improving the practices of infant and young child feeding is critical to ensure optimal health and childhood development. The period from birth to two years of age is particularly important because of the rapid physical and brain development that occurs during this time (Arnold, 1993; Gengler et al., 1999). Breast milk is the preferred source of nutrition for healthy new-born infants. Breastfeeding benefits preterm infants from nutritional, gastrointestinal, immunological, developmental and psychological perspectives and results in both short-term and long-term benefits to children including protection from acute and chronic disorders (WHO, 2003). Breastfeeding confers protection from diarrhea and pneumonia of which artificially fed children have an increased risk. Besides, there are long-term diseases including asthma and other ailments, diabetes, celiac diseases, increased blood pressure atherosclerosis which occur in later adulthood (Goudet, 2011; Wall, 2003). Artificial feeding is also associated with a greater risk of childhood leukemia. Breastfeeding is the normal way to feed an infant and ideally all babies should be exclusively breastfed for the first six months of life (Li et al., 2005).

Creating awareness among mothers about the correct breastfeeding practices is one of the important components of RCH programme. Infant feeding practices have a significant role in the health of both mother and child. Breast feeding is a universal procedure in the world which improves the nutritional status of young child and reduces both morbidity and mortality. Breast
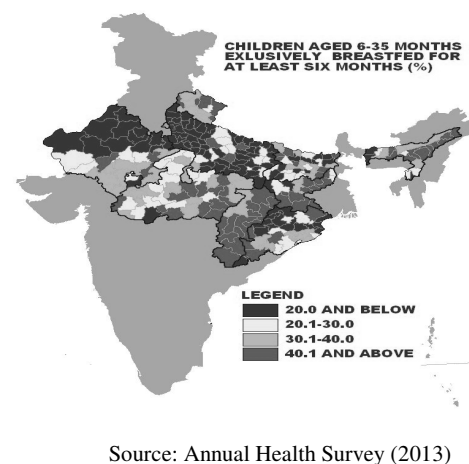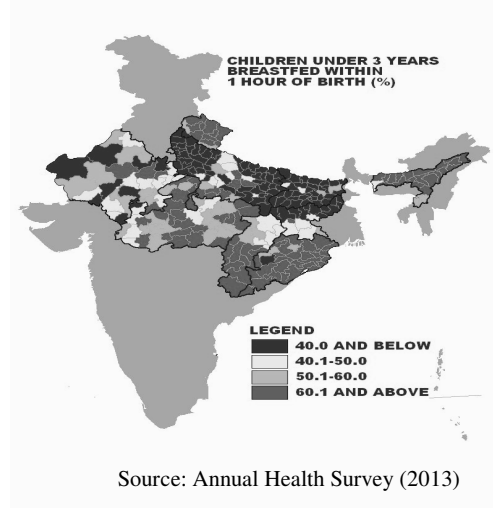
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feeding should be initiated immediately after child birth and continued exclusively up to six months.

In a recent Annual Health Survey (AHS) conducted in India from 2010 to 2013 covering all the 284 districts (as per 2011 census) of eight Empowered Action Group (EAG) States (Bihar, Uttar Pradesh, Uttarakhand, Jharkhand, Madhya Pradesh, Chhattisgarh, Odisha and Rajasthan) and Assam, the percentage of children breastfed within one hour of birth was observed to vary from 30 per cent in Bihar and Uttar Pradesh to around 70 per cent in Assam and Odisha. Children exclusively breastfed for at least 6 months ranged from 17.7 per cent in Uttar Pradesh to 47.5 per cent in Chhattisgarh. Complementary feeding is introduced in only 53 per cent infants between 6–8 months, with only about 44 per cent of breastfed children being fed at least the minimum number of times recommended. Overall, only 21 per cent of breastfeeding and non-breastfeeding children are fed in accordance with the infant and young child feeding (IYCF) recommendations.

Source: Annual Health Survey (2013)   Source: Annual Health Survey (2013)

II. Literature Review

National Family Health Survey-3 of India reported that overall 21.5 per cent children aged under three years were breastfed within one hour of birth, almost 48 per cent of the children aged zero to five months were exclusively breastfed, and 53.8 per cent children aged six to nine months received solid or semi-solid food and breast milk (IIPS, 2007). World Health Organization (WHO) suggests that the yellowish milk, known as colostrum, should be given to baby immediately after birth because it provides protection against infection. Colostrum acts as a natural laxative to help clear conium (the dark sticky stool that is made while the baby is in the uterus) from the baby's intestines. Breastfeeding should continue with the addition of supplementary foods throughout the second half of the first year. Breastfeeding beyond the first year offers considerable benefits to both mother and child, and should continue as long as mutually desired (Bahl et al., 2005). Supplementary foods are commodities intended to supplement a general ration and used in emergency feeding programmers for the prevention and reduction of malnutrition and mortality in vulnerable groups. Breastfeeding is mainly influenced by social environment, especially by maternal grandmothers and other elderly women in the community. Although breastfeeding is acceptable to all, infants are first introduced to sugary water after birth around the third or fourth day after delivery (Awumbila, 2003). This is to avoid the colostrum (first milk) that is generally discarded by the mother as it is considered heavy, thick, coarse, dirty, toxic and harmful to children's health (Legesse et al., 2015). Exclusive breastfeeding is not practiced as breast milk alone is considered inadequate (Frota et al., 2013; Hackett et al., 2015). However, this is rarely implemented for two main reasons: (a) very close birth spacing (once a woman discovers she is pregnant she stops breastfeeding), and (b) an increasing trend of mothers working outside the home, resulting in early separation from the infant.

In some situations, for health or convenience, expressed breast milk is required and infants fed this way still fall within the definition of exclusive breastfeeding (Webb et al., 2006). The management of some maternal conditions such as engorgement or mastitis may also include the expression of breast milk. In addition, there has been an increasing interest in breast milk expression and pasteurization as a means of preventing mother to infant transmission of the HIV virus (Jeffrey et al., 2001; Saadeh, 2005). Human milk's superiority over artificial milk is reflected in the WHO feeding choices hierarchy which states that 'where it is not possible for the biological mother to breastfeed, the first alternative, if available, should be the use of human breast milk from other sources. Human milk banks should be made available in appropriate situations (Leibowitz, 1980). This hierarchy of feeding preferences reflects evidence that whilst mothers' own milk is always superior to its alternatives, donor milk contains many of the immune protective and bioactive properties lacking in artificial baby milk, and is thus the next best option for feeding full-term and pre-term infants alike (Labbok & Krasovec, 1990; McGuire et al., 2009; Tully et al., 2004). The most decisive period in a child's life is the first five years in which most of the physical and mental growth takes place (Joshi et al., 1996). However, in India, approximately 1.72 million children die every year prior to reaching their first birthday, which represents one of the greatest wastages of human potential in the country (Bajpai et al., 2005). Socio-economic and household factors have a major contribution to child nutrition in developing countries. Poverty, breast feeding, lack of sanitation and health facilities, mother's education are important factors associated with child nutrition (Unicef, 2000).

The appropriate infant and young child feeding practices in the early age of life are widely identified as an important factor for the ideal child growth. Every year approximately eleven million under-five children die in the world among whom 2.4 million alone are from India (WHO, 2003). Due to poor feeding practices and repeated infections, approximately 30 per cent of under-five children in the world are stunted (WHO, 2003). The beneficial effects of breastfeeding depend on the initiation of breastfeeding, its duration and the age of complementary feeding (Victora et al., 1987). Feeding practices during infancy are critical for the growth of a child, and his health during the first five years of life as well as also importance for the early prevention of chronic degenerative diseases. Progress in improving infant and young child feeding practices in the developing world has been remarkably slow due to several factors like poverty and poor hygienic conditions. Good care practices can mitigate the negative effects of poverty and low maternal schooling on children's nutritional status (Commission & Macro, 2000; Haddad et al., 1999). This positive association could be due to communication of the importance of breastfeeding by healthcare providers to mothers during antenatal visits (Malhotra et al., 2008). The present study is an attempt to understand the infant and young child feeding practices in EAG and non-EAG states using the District Level Household Survey (DLHS-3) conducted in 2007-2008. The focus has been on whether the children receive colostrum after birth, whether they are breastfed within 24 hours after their birth and age at which they start receiving semi-solid/solid food.

Need for the Study

One of the goals set by India's national policies and a strategy of the government to reduce infant mortality is the promotion of initiation of breastfeeding which is a most important intervention for reducing the infant mortality rate. Malnutrition, poor maternal and adolescent nutrition are the major challenges (Black et al., 2013; Mora & Nestel, 2000). In India every second child suffers from malnourishment and every fourth child suffers from low birth weight. Health professionals need to further explore the ways in which relationships may be developed and sustained that provide the range of support required by adolescent mothers to enable them to continue breastfeeding. The latter, otherwise too, is known to have many health benefits right from lower rates of infections among babies to reduced chances of breast cancer for mothers. Therefore, this paper examines the infant and young child feeding practices in EAG and non-EAG states. Its broad objective is to understand the current scenario of breastfeeding in these states using the data from DLHS-3. The specific objectives are to examine the association of socio-economic determinants with the initiation of breast feeding, to study the duration of breast feeding by socio-

economic characteristics and also to study the pattern of semi-solid and solid food given to children by their ages.

III. Data and Methodology

DLHS-3 provides information on various issues including awareness about initiation of breast feeding, pattern of semi-solid and solid foods given to children, etc. At the national level, from the total of 7,20,320 households, 6,43,944 ever married women aged 15-49 years were selected for the interview. The focus of DLHS-3 has been on the utilization of basic child health services such as coverage of antenatal care (ANC) and immunization services indicators which influence infant and child mortality. DLHS is one of the largest ever demographic and health surveys carried out in India with a sample size of about seven lakh households covering all districts of the country. DLHS-3, like other two earlier rounds, is designed to provide estimates on maternal and child health, family planning and other reproductive health services.

Logistic Regression Model

Logistic regression analysis has been used to identify the determinants and facilitating factors for colostrum feeding and initiation of feeding (Domínguez-Almendros et al., 2011). Dependent variables colostrum feeding and first breastfeeding of the child have been taken into two categories 'yes/no'. The independent variables are residence, sex of child, religion, caste, age of mother, working status, educational status and wealth index. These independent variables are further divided into sub categories: residence by rural and urban areas; sex (boys and girls); religion (Hindu, Muslim and Others including Christian, Sikh, Buddhist and Jain); caste groups into four categories, i.e., scheduled castes, scheduled tribes, other backward classes and others ('Others' are considered those who are not reported as SCs, STs, and OBCs); working status of women divided into working and not working; educational status divided in four categories – no education, primary, secondary and higher secondary education; and wealth index divided in five categories, that is, poorest, second, medium, fourth and richest.

Cox Proportional Hazards

A nonparametric approach to survival data was first introduced by Cox in the year 1972. Cox proportional hazard analysis is used for finding the survival status of children less than five years of age who are still breast feeding. Cox (1972) model was proposed as appropriate for the analysis of duration of breast feeding (Huffman et al., 1985; McDonald, 1981). A survival curve is a statistical picture of the survival experience of children age? who are still breast feeding. A survival curve cannot be summed up with a single number such as the median survival or the five-year survival, despite all too frequent attempts to do so. A survival curve shows fraction of the mean age of children who are continue breast feeding in the group surviving over time. The benefit of using hazard model is censoring of nursing by either survival or deaths of the children. This technique is similar to regression analysis but it is also useful to analyze the process of survival in which termination of breast feeding may occur at any point of time. In the following analysis, the primary aim is to estimate the net effect of the termination of breast feeding. The analysis is carried for independent variable among EAG and non-EAG states. It should be reiterated that this study has been designed to investigate the effect of those factors which are involved in the termination of breast feeding. The focus is on the effect of duration of breastfeeding. The hazard function at the time point t (here) it is stopping of breastfeeding or termination of breastfeeding) denoted by h (t)

$h(t) = h_0(t) \exp(\beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 \ldots \ldots + \beta_i x_i)$

Where, $i = 1, 2, 3, 4 \ldots \ldots \ldots$ n

Variable t denotes the duration (time) of the studied variable.

h(t) is the hazard rate at which an event occurs,

$h_0(t)$ is the baseline hazard function that varies only with t and for which no specific function is assumed, x is a vector of independent variables and β is a vector of regression parameters which indicates the discontinuation of breastfeeding.

If $\beta > 1$ it means that the covariate has the effect of raising the hazard rate, if $\beta < 1$ then one has the opposite effect and if $\beta = 1$ then it is neutral and exerts no effect. Where Xi are explanatory variables, βi are regression coefficients and $h_0(t)$ is a baseline hazard. It is assumed that the explanatory variables influence the hazard by the same degree at each time point (hence the term "proportional hazards"). This Method is useful to assess the net effect of an explanatory factor on the hazard of termination (stopping of breastfeeding) of a process controlled for the effects of other factors.

IV. Results and Discussion

Initiation of breastfeeding by background characteristics

The timing and type of supplementary foods introduced in an infant's diet have significant effects on the child's nutritional status. The WHO suggests that the yellowish milk (colostrum) should be given to the baby because it provides protection from many infections such as diarrhea and pneumonia. Table 1 depicts the percentage of children receiving colostrum in EAG and non–EAG States. Colostrum received by children are more in non-EAG states as compared with EAG states. The percentage of children receiving colostrum is slightly higher in urban than rural areas. Mother's education has a positive association with children receiving colostrum. Further, it can be seen that the percentage of children receiving colostrum increases with increase in wealth. It is encouraging to note that there is a negligible difference among children receiving colostrum by sex. More or less the same pattern prevails in EAG and non-EAG states.

Infant feeding practices have significant effects on the health of both mothers and children. Mothers are affected through breastfeeding in the period of postpartum infertility, and hence on fertility levels and the length of birth intervals. These effects vary according to the duration and intensity of breastfeeding. Proper infant feeding, starting from the time of birth, is important for the physical and mental development of the child. Breastfeeding improves the nutritional status of young children and reduces morbidity and mortality. Breast milk not only provides important nutrients but also protects the child against infection.

Effect of background characteristics on feeding

Table 2 indicates the result of logistic regression analysis which shows that colostrum received by infants is more among those born to women aged 20-34 years in both EAG and non-EAG states as compared with women aged 15-19 years. In the case of residence, opposite pattern of colostrum received by infants in EAG and non-EAG states can be seen. With an increase in the mother's educational level, there is an increase in colostrum received by children. After controlling independent variables, non-working women are less likely to give colostrum to children as compared with working women

Breastfeeding by background characteristics

Table 3 presents the bi-variate analysis of initiation of breastfeeding by background characteristics. Sixty-nine per cent children were breastfed within 24 hours of birth (including children whose mothers started breastfeeding within one hour after birth) in EAG states, whereas, 87 per cent children were breastfed within 24 hours of birth in non-EAG states. Clearly, infant feeding practices are better in non-EAG states than EAG states. The same is also observed across the background characteristics of the child. More percentage of children belonging to urban families, educated mothers and those belonging to upper wealth quintiles are breastfed immediately after birth. Although breastfeeding is common in India, its early initiation is not always done. Mother's age shows the negative pattern of breast feeding in case of immediate initiation after child birth in EAG states while the reverse is true in non-EAG states. Children belonging to 'Other' religions are more breastfed immediately after birth in both EAG and non-EAG states. Among those who received advice for breastfeeding during the time of delivery, 46

Table 1: Distribution of children receiving colostrum immediately after birth in EAG and non-EAG states by background characteristics, DLHS 2007-08

Background characteristics	EAG states	Non-EAG states
Age of mother (years)		
15-19	68.8	82.6
20-24	75.3	86.2
25-29	75.4	87.8
30-34	72.4	87.5
35-39	69.7	86.4
40-44	67.4	84.3
45-49	64.6	84.1
Residence		
Rural	73.5	85.9
Urban	74.6	88.3
Education		
No education	69.2	81.2
Up to 5 years	75.2	84.7
6-10 years	80.2	88.9
11 or more years	86.3	91.7
Religion		
Hindu	74.7	86.1
Muslim	65.4	86
Others	84.1	89.8
Caste		
Scheduled castes	72.5	85.4
Scheduled tribes	83.5	86.4
Other backward classes	70.5	87.5
Others	76.4	86.9
Working status		
Working	80.3	86.7
Not working	86.1	87.1
Wealth index		
Poorest	72.1	81.3
Second	71.7	84.2
Middle	73.1	85.9
Fourth	75.2	87.1
Richest	79.2	89.9
Advice given about breastfeeding		
Advice given	83.7	89.6
Not given	69.6	82.9
Sex of child		
Boy	73.8	86.6
Girl	73.6	86.9
N=6,43,944	3,08,025	3,35,919
Total	73.7	86.7

per cent and 58 per cent breastfed immediately in EAG and non-EAG states respectively. There is no difference in breastfeeding by sex of the child between EAG and non-EAG states.

Results of Cox regression model

Table 4 presents the odds ratios based on Cox regression analysis for initiation of breastfeeding within 24 hours of birth as the dependent variable. It is found that the odds of initiation of breastfeeding within 24 hours of birth increase with the increase in age of mothers in non-EAG states, whereas the age of the mother is not showing any impact in EAG states. Women in the urban areas are less likely to breastfeed children within 24 hours as compared with women in rural areas in EAG states. Education of women is found to consistently increase the odds of

Table 2: Odds ratios of logistic regression for colostrum given to children with background characteristics of women in EAG and Non-EAG states, DLHS-3

Background characteristics	EAG states	Non-EAG states
	Exp(B)	Exp(B)
Age of mother (years)		
15-19®		
20-24	1.51***	1.28***
25-29	1.46***	1.36***
30-34	1.32***	1.33***
35-39	1.07	1.41***
40-44	0.95	1.23
45-49	1.19	1.46
Residence		
Rural®		
Urban	0.67***	1.15***
Education		
No education®		
Up to 5 years	1.28***	1.25***
6-10 years	1.56***	1.78***
11 or more years	2.67***	2.31***
Religion		
Hindu®		
Muslim	1.00	0.81***
Others	0.57***	0.97
Caste		
Scheduled castes®		
Scheduled tribes	1.05	0.97
Other backward classes	1.09	0.98
Others	1.11	1.03
Working status		
Working women®		
Not working women	0.62***	0.83***
Wealth index		
Poorest®		
Second	0.87	1.18
Middle	0.70	1.27***
Fourth	0.77	1.14
Richest	0.68	1.27***
Sex of child		
Boy®		
Girl	1.15***	0.99
Advice given about breast feeding		
Advice given®		
Not given	1.81***	1.51***

Level of significance: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$ and ® = Reference category.

initiation of breastfeeding within 24 hours of birth in both the groups of states. Similarly, in both of them the odds of initiation of breastfeeding within 24 hours of birth is significantly low for those women who have not received any advice about the breastfeeding during the delivery.

Table 5 presents the feeding patterns of children below three years of age in EAG and non-EAG states. We see that among the children whose age is below two months, 65.5 per cent are totally dependent on breastfeeding while only two per cent are fully weaned. After the age of five months, the percentage of children who are exclusively breastfed declines sharply and these percentages are very low after the age of eight months. Among children who are two to three years old, more than 50 per cent are fully weaned. There are about 16 per cent children whose mothers started giving them plain water when they were less than two months old and only a small percentage (0.8) of children were given plain water after they completed the age of one year. About

30 per cent children were given semi-solid foods when they were six to eight months old and about 26 per cent children were given solid foods in this age group. A large percentage of children (73) were given solid foods when they completed the age of one year.

Table 3: Percentage of children under three years of age whose mothers started initiation of breastfeeding after the birth with their background characteristics in EAG and non-EAG states, DLHS-3.

Background characteristics	EAG states			Non-EAG states		
	Immediately	Within 24 hours	After 24 hours	Immediately	Within 24 hours	After 24 hours
Age of mother (years)						
15-19	32.0	33.8	34.2	51.9	32.5	15.7
20-24	36.4	34.4	29.2	54.5	31.6	13.9
25-29	36.4	34.1	29.5	55.6	31.9	12.5
30-34	32.8	34.1	33.1	56.2	32.6	11.3
35-39	29.7	33.9	36.4	57.2	32.4	10.4
40-44	25.4	32.7	41.9	56.7	31.0	12.3
45-49	25.8	31.5	42.7	62.5	28.2	9.20
Residence						
Rural	34.0	34.1	31.9	56.1	31.3	12.6
Urban	39.2	34.1	26.7	52.6	34.0	13.4
Education						
No education	29.3	34.1	36.6	52.1	31.4	16.5
Up to 5 years	37.1	34.6	28.3	55.8	31.4	12.8
6-10 years	43.8	34.4	21.9	57.4	31.6	11.0
11 or more years	47.4	32.6	20.0	54.9	34.1	11.0
Religion						
Hindu	36.1	33.7	30.2	54.0	31.8	14.2
Muslim	22.7	34.3	43.0	53.9	33.7	12.4
Others	41.5	44.7	13.8	60.4	30.9	8.70
Caste groups						
SCs	32.9	33.7	33.5	52.8	32.1	15.1
STs	46.9	36.1	17.0	61.6	29.7	8.8
OBCs	29.5	34.2	36.3	56.5	29.5	14.0
Others	40.1	32.8	27.1	50.5	36.0	13.4
Working status						
Working	49.0	32.2	18.8	49.7	35.6	14.7
Not working	48.5	34.6	16.8	52.7	32.7	14.7
Wealth index						
Poorest	32.3	34.4	33.3	55.1	32.1	12.8
Second	31.2	35.0	33.8	57.3	29.9	12.9
Middle	35.4	33.6	30.9	58.2	29.3	12.5
Fourth	38.4	33.3	28.3	55.8	31.5	12.8
Richest	42.4	33.2	24.4	51.0	35.9	13.1
Advice about breast feeding						
Advice given	45.7	34.1	20.2	57.6	31.4	11.0
Not given	29.4	33.7	36.8	49.6	34.2	16.2
Sex of child						
Boy	34.8	34.2	31.0	54.9	32.0	13.0
Girl	34.6	34.0	31.4	55.6	31.8	12.6
Total	34.7	34.1	31.2	55.3	31.9	12.8

Note: The terms SCs denotes scheduled castes, STs denote scheduled tribes, OBCs denotes other backward classes.

Survival function for continuing breast feeding for rural and urban areas is given for EAG and non-EAG states of India (Figure 1). The Y axis gives the cumulative survival of still breast feeding children in which the value is a fraction which runs from one at the top to zero at the bottom (representing 100 per cent survival to zero per cent survival at the bottom). The often-actual percentage is used rather than a proportion. The X axis gives the time after the start of the experiment. The age of the child in months is taken in this axis). Table 4 provides the estimated value (β) of Cox regression analysis where the estimated value of the coefficient β is the discontinuation of breast feeding. The exp(β) gives the relative risk of discontinuation of breast feeding (relative to the risk for reference category). The analysis has been carried out separately for

both EAG and non-EAG states. Women from urban areas have a significant effect on stopping breast feeding. The mean length of breast feeding is higher in rural areas than urban areas. Education has a significant effect on still breast feeding of children in both EAG and non-EAG states. It decreases smoothly from top to bottom in non-EAG states (Figure 2).

Table 4: Cox regression of breastfeeding within 24 hours after birth by child's background characteristics in EAG and non-EAG states, DLHS-3

Background characteristics	EAG states Exp (B)	Non-EAG states Exp (B)
Age of mother (years)		
15-19®		
20-24	1.02	1.15**
25-29	1.09	1.30***
30-34	1.19	1.32***
35-39	0.98	1.31***
40-44	0.92	1.52***
45-49	0.70	1.43
Residence		
Rural®		
Urban	0.72***	1.01
Education		
No education®		
Up to 5 years	1.30***	1.28***
6-10 years	1.54***	1.47***
11 or more years	1.90***	1.55***
Religion		
Hindu®		
Muslim	0.65***	1.05
Others	1.13	1.22***
Caste		
Scheduled castes®		
Scheduled tribes	1.01	1.53***
Other backward classes	0.84**	1.28***
Others	1.05	0.97
Working status		
Working women®		
Non-working women	1.07	1.03
Wealth Index		
Poorest®		
Second	0.99	1.11
Middle	1.10	1.21
Fourth	1.03	1.07
Richest	1.01	0.89
Sex of child		
Boy®		
Girl	0.98	1.06**
Advice given about breast feeding		
Advice given®		
Not given	0.72***	0.73***
Total	N=85,347	N=61,472

Level of significance: *** p < 0.01; ** p < 0.05; * p < 0.10 ® = Reference category.

There is not much difference in the mean age of the still breast feeding by caste. The mean length of still breast feeding of children is higher in 'other' religious groups (Sikh, Jain and Buddhist) in EAG states. In non-EAG states, OBCs show the significant effect on breast feeding. The age of mother is significant on still breast feeding of the baby in both groups of states. Those women belonging to (45-49) age group have less likely chance of survival with respect to the
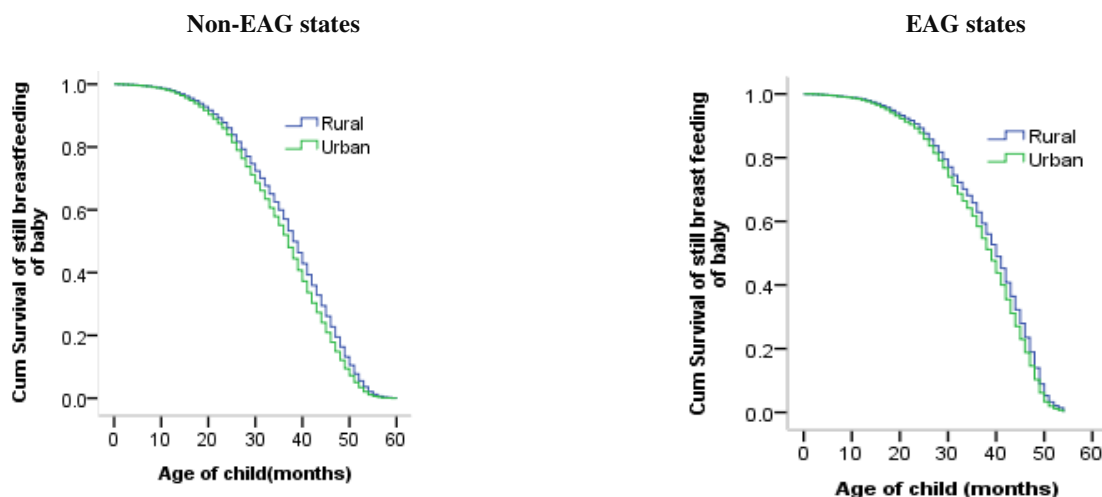
Table 5: Feeding pattern of children below three years of age in EAG and non-EAG states, DLHS-3

Age in months	No breast feeding		Exclusive breast feeding		Plain water		Other fluids		Semi solid food		Solid food	
	EAG states	Non-EAG states	EAG states	Non-EAG states	EAG states	Non-EAG states	EAG states	Non-EAG states	EAG states	Non-EAG states	EAG states	Non-EAG states
< 2	2.0	2.4	65.5	60.3	16.0	10.7	10.4	23.8	0.5	0.2	2.2	2.2
2-3	2.9	2.6	53.0	46.0	16.8	10.1	18.9	37.3	1.9	1.0	3.4	2.7
4-5	4.1	4.0	32.6	30.6	16.5	10.3	28.5	45.2	9.6	6.0	6.5	3.3
6-8	5.6	4.4	8.6	10.8	7.2	5.4	21.0	32.1	30.0	31.5	26.2	15.2
9-11	9.1	6.4	1.4	1.9	2.1	1.2	4.9	8.6	22.4	28.9	58.9	52.2
12-17	17.5	11.1	0.6	0.5	0.8	0.4	1.3	1.9	5.0	6.8	73.3	77.8
18-23	31.5	19.2	0.1	0.1	0.5	0.2	0.6	0.8	1.8	2.9	62.6	74.2
24-35	51.4	36.8	0.1	0.1	0.2	0.1	0.3	0.3	0.6	0.8	43.2	57.1
Total	10.8	9.0	2.3	3.3	1.0	0.9	1.6	4.0	1.8	2.7	12.3	17.7

reference category (Figure 3). The mean length of still breast feeding of children is higher among Hindus as compared with other religions in EAG states, but there is not much difference in non-EAG states. Mean age at which semi-solid and solid foods are given to children is examined by line graphs. The independent variable is charted on the horizontal axis while the dependent variable is plotted along the vertical axis. The pattern of other liquids given to children in EAG states is on an average one and a half months below in comparison with children living in non-EAG states.

There is not much difference in age at which semi-solid food is given to children in EAG and non-EAG states. In the case of solid food given, children in non- EAG states have it earlier than in EAG states. Early initiation of breast feeding within the first hour of birth, exclusive breast feeding for the first six months followed by continued breast feeding for up to two years and beyond with appropriate complementary foods after completion of six months is the most appropriate feeding strategy.

Figure 1: Survival function for continuing breast feeding with rural and urban areas in non-EAG and the EAG states of India

Non-EAG states **EAG states**

Conclusion

There is a positive association between education and early initiation of breast feeding in both EAG and non-EAG states. In the case of EAG states, around one-third children were breastfed within 24 hours after birth whereas this percentage was more than 50 for non-EAG states. Exclusive breast feeding was the major means of child nutrition among children of age less than

two months in EAG states whereas consumption of supplementary food was more prevalent among children of age two to three years in non-EAG states. About 32 per cent children were given semi-solid foods when they were six to eight months old and the same percentage of children was given solid foods in the same age groups in other states. About three-fourths of the children were given solids foods when they completed one year of age.

Figure 2: Survival function for continuing breast feeding with mother's education in non-EAG and the EAG states of India, DLHS-3
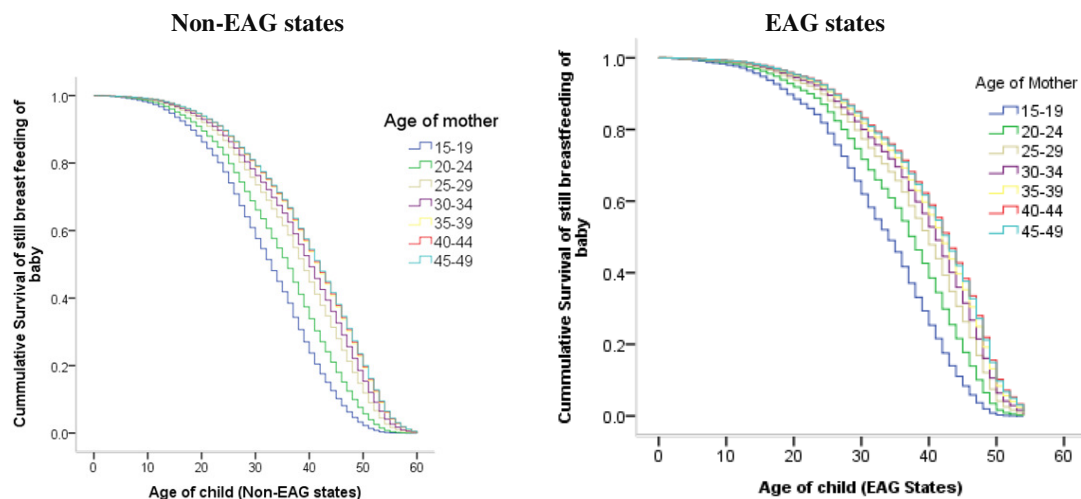

Figure 3: Survival function for continuing breastfeeding with mother's age in EAG and non-EAG states of India, DLHS-3

The mean length of breast feeding is higher in rural areas than urban areas. Mother's education has a significant effect on still breast feeding of the baby. After the completion of one year, the pattern of solid food intake also increases. The patterns of semi-solid foods are consistent up to three years. The pattern of other liquids given to the child in the EAG states is on an average one and a half months below in comparison with children living in non-EAG states. In the case of solid foods given to the children, children in non-EAG states have it earlier than in EAG states. Infant feeding practices in EAG states were of poor quality as less number of children were given

colostrum and breast feeding was not started immediately after birth. Moreover, children were given other fluids early and solid food supplement was given late to the children. These practices may be having a negative impact on reducing infant mortality in these states. Mother's education and age have a significant effect on still breastfeeding of the baby in EAG states. Solid food intake increases after the completion age one year of age among the children. The patterns of intake of semi-solid foods are consistent up to three years. Mother's characteristics had a significant effect on still breast feeding in EAG states. Colostrum received by children was more in the non-EAG states as compared with EAG states. Counseling and advice to women at the time of ANC and delivery about infant feeding practices are an urgent need in the EAG states. In addition, micro-nutrient supplementation to infants, and anemia control for adolescent girls, and pregnant and lactating mothers are advocated.

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