A study of determinants of infant feeding practices in a resettlement colony of Delhi, India

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ABSTRACT

Background: Optimal infant and young child feeding practices, especially exclusive breastfeeding for the first 6 months, could contribute significantly in reducing childhood malnutrition and improving child survival. The present study is designed to assess the prevalence of feeding practices among the mothers in an urban resettlement colony of Delhi

Methods: A community based cross-sectional study was carried out in a resettlement colony of East Delhi among mothers with infants less than 6 months of age. Mothers were enrolled from Anganwadi Centres using systematic random sampling and a questionnaire was used to record information on feeding practices. Statistical analysis used: Chi square test, t test and multiple logistic regression analysis was done.

Results: A total of 350 children were included. Breastfeeding (BF) was initiated within 1 h of birth in 51.7% of children. Pre-lacteal feeds were given by 18.5% of mothers. The prevalence of exclusive BF (EBF) for less than 6 months was 42% (147/350). One third (117/350) of mothers gave artificial feeding to their infants. Exclusive breastfeeding decreased with increasing age of infants and was significantly lower in families with higher income and who gave pre-lacteal feeding. Similarly, introduction of artificial feeding was significantly higher in families with higher income and working mothers

Conclusions: In the present study the infant feeding practices in the resettlement colony were not satisfactory. There is need for skilled, sustained and practical help to the pregnant and lactating mothers by skilled counsellors at health facilities.

Keywords: Artificial feeding, Exclusive breastfeeding, Initiation of breastfeeding

INTRODUCTION

The current under-five mortality rate (U5MR) of India is 40 per 1000 live-births. More than 2 million out of 6.5 million under-5 child deaths each year are in South Asia, out of which 1.4 million are contributed by India alone. Exclusive breastfeeding during the first six months and continued breastfeeding for two years and beyond could contribute significantly in reducing childhood malnutrition and improving child survival. Study shows that predominantly breastfed 0-5 months infants had 48% more risk of mortality; and it was almost threefold higher in partially breastfed infants and 14-fold higher in infants who were not breastfed. Breastfeeding provides protection against non-communicable diseases, particularly obesity, diabetes and high systolic blood pressure.
Breastfeeding also improves IQ, educational attainment and monthly income with increasing breastfeeding duration.9

In spite of the crucial role of optimal Infant and Young Child Feeding in preventing child mortality, NCDs and malnutrition, the situation of IYCF practices in India remains dismal. Although the timely initiation of breast feeding and exclusive breastfeeding has increased from 24.5% to 44.6% and 46.4% to 65% in eight years between National Family Health Survey-3(NFHS-3) and (Rapid Survey on Children) RSOC 2013-14;out of 26 million babies born in India annually, 14.5 million are not able to get optimal feeding practices during first year of life.10,11 There are few available data on the status of IYCF practices in urban poor population. This study is aimed to assess the feeding practices among mothers in an urban resettlement colony of Delhi.

METHODS

A community based cross-sectional study was carried out in a resettlement colony of East Delhi among mothers with infants less than 6 months of age. Considering the prevalence of exclusive breastfeeding as 34.5% (NFHS-3) in Delhi and with an absolute difference of 5% on either side, with a confidence interval of 95%, a sample size of 350 was calculated using the Epi Info Software. The area has 5 blocks and 4 sub-blocks in each block; for a sample size of 350, 70 subjects from each block were included. The subjects were selected from Anganwadi centres (AWCs). There are total 45 AWCs in the area. With an average of 2 AWC in each sub block, from each sub-block 1 AWC was randomly selected. List of mothers of children less than 6 months of age group was obtained from the selected AWC. By systematic random sampling, every second child was selected, and the mother was contacted at home. Premature born infants or those with chronic diseases or any birth defects such as congenital heart disease, cleft lip/cleft palate and Down’s syndrome were not included in the study. The study was conducted from April 2015 to July 2015.

Data on socio-demographic status, obstetric factors, current feeding practices and factors associated with breastfeeding were collected using a pre-tested and semi-open-ended structured questionnaire by trained investigators. Age of the child was calculated in completed months on the date of interview. The prevalence of exclusive breastfeeding was determined by 24 hours recall method (based on recall of the previous day) as suggested by WHO.12 In the present study exclusive breastfeeding was defined as giving the infant no other food or drink; not even water except breast milk or expressed breastmilk from his or her mother, but allowing the infant to receive oral rehydration solution, drop and syrup (vitamin, mineral and medicine) as per the WHO definition.13

Statistical analysis

Data were entered into MS Excel and statistical analysis was done by using SPSS version 20.0 software package. To identify associated factors, first a bivariate analysis using Chi square test was performed for each independent variable with the outcome of interest. The age of the child was analyzed as a continuous variable and thus ‘t’ test was done for the bivariate analysis. Finally, multivariable logistic regression was done to determine independent predictors of exclusive breastfeeding.

Ethical clearance was obtained from Institutional Ethics Committee. Prior to interview, written informed consent was obtained from the mothers. The participants were also assured about the confidentiality of the data.

RESULTS

Socio-demographic characteristics of mothers

A total of 350 mothers with children less than 6 months of age were included for analysis. The mean age of the mothers was 25.6 years (SD=3.9 years). 45.4% (159/350) of the mothers were in the age group of 20-25 years, 46% (161/350) mothers were educated up to middle or higher school. Majority, 96.8% (339/350) of the mothers were house-makers, 64.2% (225/350) belonged to the schedule castes or schedule tribes. About half (175/350) of the mothers belonged to households with a monthly income of ≥10000 while 38.5% (135/350) were from those with income between 5001-9999. Out of the total respondents, 59.1% (207/350) had a joint family. The mean age of the infants was 3.1 months (SD±1.6), 182 (52%) were male and 168 (48%) were female (Table 1).

58.8% (206/350) of the respondents were multiparous. 98.2% (344) of the mothers had received antenatal care during their pregnancy. 54.3% (187/350) registered in their first trimester and 86.6% (298/344) had more than four ANC visits. However, only 50.8% (178) were advised or informed about breastfeeding during their ANC visits or pregnancy. 87% (155/178) of those who were advised or informed got the information from doctors, 6.1% (11/178) from nurses or ANM, 2.8% (5/178) from AWW and 3.9% (7/178) from mothers-in-law or relatives. Regarding the place of delivery 87.7% (307/350) mothers delivered at health institutions, 71.1 % (249/350) in government health facilities and 16.5% (58/350) in the private health facilities while 12.2% (43/350) delivered at home. 76% (266/350) of mothers delivered vaginally and 24% (84/350) of mothers had a caesarean section. In the present study, 48.5% (170/350) infants had normal birth weight, 28.5% (100/350) had low birth weight while 22.8% (80/350) of mothers were not aware of the birth weight.
Feeding practices

In the present study, 98.2% (344/350) of mothers initiated breastfeeding. However, out of these mothers only 51.7% (178/344) initiated breastfeeding within one hour of birth. 18.5% (65/350) mothers gave pre-lacteal feed to their infants. Animal milk 32.3% (21/65), infant formula 27.6% (18/65) and Janam Ghutti 10.7% (7/65) were the most commonly used pre-lacteal feeds. 42% (147/350) of mothers reported practicing exclusive breastfeeding as per previous day recall. The exclusive breastfeeding rate dropped from 67.5% (52 /77) in infants aged less than one month to 46.1% (48 /104) at less than 4 months and 27.8% (47/169) at less than 6 months of age (Figure 1). The mean age duration of exclusive breastfeeding was 3.1 months. (SD±1.6) Perception of insufficient milk supply is the most frequently cited reason by the mothers for not practicing EBF.

One third (117) of mothers gave artificial milk to their infants, out of these 76.9% (90/117) gave animal milk and 23% (27/117) infant formula in last 24 hours. 92.2% (83/90) of infants received diluted animal milk.

Regarding the advice on artificial feeding, 59.2% (16/27) of the mothers who used infant formula were advised by the health professionals while 58.8% (53/90) mothers self-decided to use animal milk. Majority (88.8%) of mothers used bottle for artificial feeding.

Factors associated with exclusive breastfeeding (EBF)

In bivariate analysis, other than mother’s family income and pre-lacteal feeding none of the factors were associated with EBF at 0.05 level of alpha (Table 2). Odds of EBF was 3 times higher among mothers with

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Table 1: Socio-demographic characteristics of mothers (n=350).

| Variables                      | Frequency | %  |
|-------------------------------|-----------|----|
| **Age of mothers (years)**    |           |    |
| <20                           | 28        | 8.0|
| 20-25                         | 159       | 45.4|
| 26-30                         | 129       | 36.8|
| >30                           | 34        | 9.7|
| **Maternal education**        |           |    |
| Illiterate                    | 53        | 15.1|
| up to primary level           | 37        | 10.5|
| Middle & High school          | 161       | 46 |
| More than high school         | 99        | 28.2|
| **Occupation of mothers**     |           |    |
| Non-working                   | 339       | 96.8|
| Working                       | 11        | 3.1 |
| **Caste**                     |           |    |
| SC & ST                       | 225       | 64.2|
| OBC                           | 59        | 16.8|
| General                       | 66        | 18.8|
| **Household monthly income**  |           |    |
| < 50000                       | 22        | 6.2 |
| 5001-9999                     | 135       | 38.5|
| ≥10000                        | 175       | 50.0|
| Don’t know                    | 18        | 5.1 |
| **Types of family**           |           |    |
| Nuclear                       | 143       | 40.8|
| Joint                         | 207       | 59.1|

Figure 1: Trend of exclusive breastfeeding in infants less than six months of age.
family income less than Rs. 5000 per month as compared to family income more than Rs. 5000 per month. (COR=3.03; 95% CI: 1.26-7.30). Similarly, those mothers who did give pre-lacteal feeds to their infants were 2.15 less likely to exclusively breastfeed compared to those who did not give pre-lacteal feeds (COR = 2.15; 95% CI: 1.19, 3.90).

Table 2: Bivariate and multivariate analysis of factors associated with exclusive breastfeeding among mothers with children less than 6 months of age.

| Variables                  | Exclusive breastfeeding | Unadjusted OR with 95% CI | P-value | Adjusted OR with 95% CI | P-value |
|----------------------------|-------------------------|---------------------------|---------|-------------------------|---------|
| **Given**                  |                         |                           |         |                         |         |
| Mother’s age               |                         |                           |         |                         |         |
| <20                        | 15 (53.6)               | 13 (46.4)                 | 1.65(0.60-4.52) | 0.332                   | 2.51 (0.71-8.82) | 0.151 |
| 21-25                      | 65 (40.9)               | 94 (59.1)                 | 0.99(0.47-2.09) | 0.975                   | 1.05 (0.40-2.70) | 0.918 |
| ≥30                        | 53 (41.1)               | 76 (58.9)                 | 0.99(0.46-2.147) | 0.992                   | 1.12 (0.45-2.77) | 0.795 |
| Mother’s education         |                         |                           |         |                         |         |
| Illiterate                 | 18 (34.0)               | 35 (66.0)                 | 0.67(0.36-1.24) | 0.194                   | 0.81(0.39-1.71) | 0.596 |
| Literate                   | 129 (43.4)              | 168 (56.6)                | 1.0     |                         | 1.0     |
| Mother’s occupation        |                         |                           |         |                         |         |
| House maker                | 145 (42.8)              | 194 (57.2)                | 3.36(0.72-15.80) | 0.087                   | 4.64(0.83-25.86) | 0.080 |
| Working outside            | 2 (18.2)                | 9 (81.8)                  | 1.0     |                         | 1.0     |
| Monthly income             |                         |                           | 0.013*  | 0.086                   |         |
| <5000                      | 15 (62.5)               | 9 (37.5)                  | 3.03(1.26-7.30) | 0.014*                  | 2.92 (1.09-7.83) | 0.033* |
| 5001-9999                  | 67 (46.9)               | 76 (53.1)                 | 1.60(1.02-2.50) | 0.039*                  | 1.43 (0.81-2.50) | 0.208 |
| ≥10000                     | 65 (35.5)               | 118 (64.5)                | 1.0     |                         | 1.0     |
| Type of family             |                         |                           |         |                         |         |
| Nuclear                    | 67 (46.9)               | 76 (53.1)                 | 1.40(0.91-2.16) | 0.127                   | 1.38(0.78-2.43) | 0.259 |
| Joint                      | 80 (38.6)               | 127 (61.4)                | 1.0     |                         | 1.0     |
| Parity                     |                         |                           |         |                         |         |
| Primipara                  | 59 (41.0)               | 85 (59)                   | 1.0     |                         | 1.0     |
| Multipara                  | 88 (42.7)               | 118 (57.3)                | 1.08(0.70-1.66) | 1.35 (0.77-2.37) | 0.294  |
| Type of delivery           |                         |                           |         |                         |         |
| Normal                     | 112(42.1)               | 154 (57.9)                | 1.02(0.62-1.67) | 0.943                   | 1.08(0.60-1.94) | 0.787  |
| Caesarean                  | 35 (41.7)               | 49 (58.3)                 | 1.0     |                         | 1.0     |
| Place of delivery          |                         |                           | 0.113   | 0.241                   |         |
| Home                       | 12 (27.9)               | 31 (72.1)                 | 0.55(0.24-1.28) | 0.164                   | 0.46(0.16-1.29) | 0.144  |
| Govt Institute             | 111 (44.6)              | 138 (55.4)                | 1.14(0.64-2.03) | 0.659                   | 0.98(0.50-1.92) | 0.971  |
| Pvt Institute              | 24 (41.4)               | 34 (58.6)                 | 1.0     |                         | 1.0     |
| No of ANC visits           |                         |                           | 0.160   | 0.624                   |         |
| none                       | 1 (16.7)                | 5 (83.3)                  | 1.0     |                         | 1.0     |
| 1 to 3 visits              | 10 (31.2)               | 22 (68.8)                 | 2.27(0.23-22.07) | 0.479                   | 1.37(0.11-15.85) | 0.799  |
| ≥4 visits                  | 136 (43.6)              | 176 (56.4)                | 3.86(0.45-33.46) | 0.220                   | 2.00 (0.20-19.80) | 0.551  |
| Counselling during pregnancy/ANC Check-ups | | | | | |
| Yes                        | 79 (44.4)               | 99 (55.6)                 | 1.22(0.80-1.87) | 0.358                   | 1.22(0.75-1.99) | 0.420  |
| No                         | 68 (39.5)               | 104 (60.5)                | 1.0     |                         | 1.0     |
| Pre-lacteal feeding given  |                         |                           |         |                         |         |
| Yes                        | 18 (27.6)               | 47 (72.3)                 | 2.15(0.19-3.90) | 0.011*                  | 0.40(0.20-0.80) | 0.010* |
| No                         | 129 (45.2)              | 156 (54.7)                | 1.0     |                         | 1.0     |
| Infant age in months*      |                         |                           |         |                         |         |
| Mean age (SD)              | 2.54 (1.66)             | 3.56 (1.41)               | 0.66(0.57-0.76) | 0.61(0.52-0.721) | <0.001 |

*p<0.05, Figures in parentheses indicate percentages; T test; was used to study association of EBF with age.
On multivariable regression analysis after adjusting for other variables in the model, family monthly income and no pre-lacteal feeding remained the independent predictors of exclusive breastfeeding. (AOR=2.92; 95% CI: 1.09-7.83), (AOR=0.40; 95% CI: 0.20-0.80)

The odds of EBF was 4.64 times higher among the homemakers as compared to working mothers but was not statistically significant due to small number of working mothers (AOR=4.26; 95% CI: 0.83-25.86). EBF showed a negative association with age, the mean age of EBF infants was 2.54 months as compared to 3.56 months in those not EBF (p<0.005). With increase in one month of age a decrease of 34% in exclusive breastfeeding rate was observed on bivariate analysis which increased to 38% on multivariate analysis.

Mothers with family income of Rs. 10000 or more were more likely to give artificial feed (animal milk /infant formula) as compared to those with lesser income (P=0.009). Introduction of artificial milk was higher among the working mothers as compared to non-working mothers (P<0.05).

### DISCUSSION

In the present study, the prevalence of exclusive breastfeeding among mothers with infants less than six months of age was 42%. This is lower compared to that reported in RSOC 2013-14 at national level (64.9%) and studies from Delhi (56%-57%) and Kolkata (66.7%),. While the studies conducted in Gujarat (37%) and Tamil Nadu (34%) report lower prevalence than present study. However, the finding was similar to the community-based study done in Medak district in Andhra Pradesh (41%) and the NFHS-3 Figures. The prevalence of exclusive breastfeeding declined with increasing infant age, from 67.5% at less than one month to 27% at four to five months which is similar to that observed in NFHS-3. The possible reason cited for decline in rate of exclusive breastfeeding by the mothers was their perception of inadequate quantity of breastmilk which may be due to lack of confidence in breastfeeding so they added artificial milk. Similar findings were also reported by...

### Table 3: Factors associated with introduction of artificial feeding at less than 6 months.

| Variables                  | Artificial feeding (animal milk/infant formula) in last 24 hrs | Chi-Square | P-Value | Odds Ratio | 95% confidence Interval |
|----------------------------|--------------------------------------------------------------|------------|---------|------------|-------------------------|
| Variables                  | Given (n=117)                                                | Not given (n=233) |
| Mother’s education         |                                                              |            |         |            |                         |
| Illiterate                 | 18(34.0)                                                     | 35(66.0)   | 1.03    | 0.56-1.91  |                         |
| Literate                   | 99(33.3)                                                     | 198(66.7)  | 0.008   | 0.929      | 1.0                     |
| Mother’s occupation        |                                                              |            |         |            |                         |
| House maker                | 110 (32.4)                                                   | 229 (67.9) | 4.66    | *0.031     | 3.64                    | 1.04-12.71               |
| Working outside from home  | 7 (63.6)                                                     | 4 (36.4)   | 0.001   | 3.37       | *0.12                   | 0.24-20.4                |
| Monthly Income             |                                                              |            |         |            |                         |
| <5000                      | 4 (16.7)                                                     | 20 (83.3)  | 1.0     | 0.80       |                         |
| 5001-9999                  | 39 (27.3)                                                    | 104 (72.7) | 9.504   | *0.005     | 1.88                    | 0.60-5.83                |
| ≥10000                     | 74 (40.4)                                                    | 109 (59.6) | 3.39    | *0.009     | 1.12                    | 10.34                   |
| Type of family             |                                                              |            |         |            |                         |
| Nuclear                    | 40 (28.0)                                                    | 103 (72.0) | 0.66    | 0.41-1.04  |                         |
| Joint                      | 77(37.2)                                                     | 130 (62.8) | 3.24    | 0.072      | 1.0                     |
| Types of delivery          |                                                              |            |         |            |                         |
| Normal                     | 83(31.2)                                                     | 183(68.8)  | 0.67    | 0.40-1.11  |                         |
| Cesarean                   | 34(40.5)                                                     | 50(59.5)   | 2.467   | 0.116      | 1.0                     |
| Place of delivery          |                                                              |            |         |            |                         |
| Home                       | 17(39.5)                                                     | 26(60.5)   | 0.93    | 0.42-2.07  |                         |
| Govt Institute             | 76(30.5)                                                     | 173(69.5)  | 3.31    | 0.191      | 0.62                    | 0.35-1.12                |
| Pvt Institute              | 24(41.4)                                                     | 34(58.6)   | 1.0     |            |                         |
| Counselling during pregnancy/ ANC Check-ups |                                                            |            |         |            |                         |
| Yes                        | 53(29.8)                                                     | 125(70.2)  | 1.0     |            |                         |
| No                         | 64(37.2)                                                     | 108(62.8)  | 2.172   | 0.14       | 1.40                    | 0.90-2.18               |

*p<0.05
Sinhababu et al and Taneja et al.\textsuperscript{19,23} Out of 33.4% of infants who were artificially fed majority (76.9%) received animal milk and 23% received infant formula. Majority (91.2%) of infants received diluted animal milk, similar to that reported by Bhanderi et al.\textsuperscript{24} In the present study, although 86.6% mothers had four or more antenatal visits, and 50.8% mothers received advice regarding breastfeeding during their antenatal visits or pregnancy but these two factors did not show any significant association with prevalence of EBF. The possible explanation for such finding could be that mothers need ‘confidence building, support and skilled counselling’ from IYCF trained health care providers and not just advice on breastfeeding or delivering messages. Similar finding was also observed by Chudasama et al and Singh el al.\textsuperscript{15,25} Mother’s family income was significantly associated with exclusive breastfeeding in this study. EBF was more among the mothers with lower family income as compared to higher family income. Several other studies have also shown a higher prevalence of exclusive breastfeeding amongst the mothers with the lower monthly family income.\textsuperscript{26-28} Consumption of artificial feeding (animal milk/infant formula) was higher among the mothers who belonged to higher family income as compared to those belonging to lower family income. The reasons might be that mothers of higher income group may have more opportunity to get exposed to the markets and social media, which is major influence these days. Secondly these mothers could also afford buying artificial milk. Further research is needed to understand the factors influencing mothers’ attitudes and perceptions on infant feeding. Previous studies have also found socio-economic factors to be significantly associated with infant formula.\textsuperscript{29,30} Another factor that was shown to have a significant association with EBF is pre-lacteal feeding. Those mothers who did not give pre-lacteal feeds to their infant were more likely to exclusively breastfeed compared to those who gave pre-lacteal feeds. This is also consistent with a study finding from Ethiopia.\textsuperscript{31} An explanation could be that introduction of pre-lacteal feed may cause decrease in infants ability to suckle their mothers’ breast which may cause decrease in milk production and which will in-turn compel mothers to introduce artificial pre-lacteal feeding early.

Exclusive breastfeeding was higher among the mothers who were homemakers (42.8%) than in working mothers (18.2%) but was not found statistically significant due to smaller number.

On the other side, the consumption of artificial feeding was significantly associated with working mothers. The frequency was higher among the working mothers (63.6%) as compared to homemakers (24.8%). A study from Rajasthan has also highlighted that mother’s employment compromises infant feeding and care.\textsuperscript{32} An increase in number of women joining work outside home without appropriate support mechanisms for breastfeeding is yet another major cause of starting artificial feeds.\textsuperscript{33} This could be because of mother’s perception that she has to give artificial feed when she is away from home for work and lack of family and health professionals support to give skilled help to these working mothers about how to give EBF.

**CONCLUSION**

In the present study feeding practices in the mothers of the resettlement colony were not satisfactory; the prevalence of exclusive breastfeeding was lower than the national figure. The practice of giving artificial feeds was common with majority of the mothers giving diluted feeds. The only factors related to exclusive breastfeeding was family income and pre-lacteal feeding while for artificial feeding family income and working status of the mothers were found to be significant. There is a need for sustained and practical help to the pregnant and lactating mothers by skilled counsellors at the community level for alleviating the poor feeding practices so as to improve EBF.

**Funding:** No funding sources

**Conflict of interest:** None declared

**Ethical approval:** The study was approved by the Institutional Ethics Committee

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Cite this article as: Thakur N, Gupta A, Chhabra P, Dadhich JP. A study of determinants of infant feeding practices in a resettlement colony of Delhi, India. Int J Community Med Public Health 2016;3:3357-63.