

Prevalence and predictors of exclusive breastfeeding in urban slums, Bihar

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ABSTRACT

Objective: Various socio-cultural factors influence infant feeding practices and thus early childhood nutrition and child survival in India. This study aimed to examine the prevalence of exclusive breastfeeding, its promoters and barriers in urban slums of Bihar, India. **Methods:** We conducted a community based cross-sectional survey involving 297 mothers living in slum settlements in Bihar. Data were collected using structured questionnaire on exclusive breastfeeding practices, and the factors that could influence this. Descriptive analysis was done to estimate the prevalence of exclusive breastfeeding and regression model was performed to identify the predictors of exclusive breastfeeding. **Results:** Only 23% of mothers initiate breastfeeding within 1 hour of delivery and 27.6% mothers practise exclusive breastfeeding up to six months. Mother's education was found to be associated with duration of exclusive breastfeeding (OR 11, 95% CI 2-59). Term babies were more likely to be breastfed exclusively for six months than pre-term babies (OR 8.6, 95% CI 1.6-47.6). Antenatal care visits and completing immunization were significantly associated with duration of exclusive breastfeeding ($P < 0.001$). The majority of mothers acquire exclusive breastfeeding knowledge through television/radio (OR 68, 95% CI 5.5-832.5) and newspaper advertisements (OR 14, 95% CI 2.6-76). **Conclusion:** Prevalence of exclusive breastfeeding up to six months of age and early initiation of breastfeeding remains low in slums of Bihar. Exclusive breastfeeding and early initiation of breastfeeding rates could be improved by educating and counselling mothers during health facility contacts by primary care providers.

Keywords: Breastfeeding, childhood nutrition, exclusive breastfeeding, socio-cultural practices, urban slums

Introduction

Exclusive breastfeeding (EBF) is defined as feeding only human milk to the baby, not even water is given, but the baby is allowed to receive drops and syrups including vaccines, vitamins, minerals and medicines.^[1] World Health Organization (WHO) recommends EBF for the first six months of a baby's life. EBF for the first six months provides the best nutrition and optimum immunological protection to babies and improves their health and overall wellbeing. Data from the National Family Health

Survey (NFHS) of India shows that EBF rate in India has improved from 46.4% in the third NFHS to 54.9% in the fourth NFHS.^[2,3] In Bihar, a similar trend is observed, with the latest report indicating an increase of EBF rate from 28% (NFHS-3) to 53.5% (NFHS-4).^[2,3] Improvement is less in urban area (46.8%) as compared to rural area (54.2%).^[2,3] However, these improvements failed to decrease infant mortality rate (IMR) as per expectation, IMR remains high, at 42 per 1000 live births in Bihar.^[4] Diarrhea and pneumonia remain the main cause of the high under-five mortality rate and IMR in Bihar.^[5]

Several studies show that diarrheal episodes in early childhood could be prevented by promoting EBF and other healthy infant feeding practices, particularly among vulnerable groups by first health contacts. Primary care physicians are often first point of

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contact as caregivers in urban slums. According to the WHO and UNICEF, appropriate EBF practices can avert child deaths, caused by diarrheal diseases, by a third.^[6] An earlier study shows that breastfeeding and child feeding practices in India, and especially in urban slums, are heavily influenced by religion, socio-cultural beliefs, customs and traditions.^[7,8] Slum communities repose their faith in family physicians and hence, they are in position to easily promote and support exclusive breastfeeding and also address prevalent socio-cultural malpractices around child feeding.

However, we do not know what factors currently influence exclusive breastfeeding decisions in slums of Bihar. A study on the factors influencing breastfeeding practices in urban slums of India reports that only 7.8% of mothers in slums of central India practice exclusive breastfeeding.^[9] However, the study was done more than a decade ago, and the situation might have changed, in terms of EBF practices, due to recent penetration of mass media and other health services which cater particularly to vulnerable groups. As Bihar lags behind on many health indicators, breastfeeding practices related data could contribute to the strategies for healthy development. Some grey literature cites beliefs and lack of knowledge as the potential barriers to EBF uptake in Bihar, but these reports do not provide enough insight for us to understand and appreciate the extent and magnitude of the impact that beliefs could have on breastfeeding. It is for these reasons that the present study was carried out.

Thus, the aim of our research work was to estimate the prevalence of exclusive breastfeeding, its promoters and barriers in slums of Bihar.

Materials and Methods

Study design

A community-based cross-sectional study design was adopted to collect and analyze quantitative data to achieve the research aims.

Study setting and period

Bihar has a population of around 125 million having 68.7% literacy rate with huge gender-based variation. Patna being the Capital of Bihar attracts people from all parts of the state. Around 152 slums are registered in Patna Municipal Corporation where approximately 77,000 people live; therefore, Patna was selected as the study site.^[10] The study was conducted between May 2016 and September 2016.

Study population and sampling

The study population were mothers with at least one child <24 months and living in slums of Patna. The lower age limit for babies was decided as six months for adequate evaluation of EBF as per WHO definition. The upper age limit was set at 24 months to fully evaluate the duration of breastfeeding, and to avoid recall bias.

Based on the prevalence of EBF for six months in Patna, the prevalence of EBF in its slums was anticipated as 20%.^[10] With

95% confidence level and 5% acceptable error, a sample size of 246 was calculated using SPSS SamplePower ~3 software. However, expecting a 20% non-response, we targeted to survey a total of 310 mothers. To select the mothers for our study, we adopted a multi-stage sampling technique. First, 31 slums from the list of 152 slums of Patna urban were selected by simple random sampling. Lists of mothers with at least one child alive in the age group of <24 months was prepared for the selected 31 slums, utilizing data from Auxiliary Nurse Midwives' (ANM) registers catering to these areas. From these lists, 10 mothers were randomly selected from each slum to reach estimated sample size (i.e., 10 x 31 = 310 mothers).

Ethics and informed consent

The study received ethics approval from a recognized Institutional Ethics Review Board (Reference number: HART22-008554, 2016). Informed consent was obtained from all the participants using participant information sheet and a consent form.

Confidentiality

No personal identifier like name or address were collected during the study process and each participating mother was assigned a unique number. All study data were encrypted while entering in computer software.

Study tool

A structured interview was developed and used to conduct interviews. The survey questionnaire had pre-coded questions with few partially coded ones to add any further information generated during the interview process. The questionnaire was pre-tested, refined and adapted to the local context.

Data collection

The lead researcher along with two female volunteers (FV) administered the survey questionnaires to all participants in their homes. FVs had previous experience in data collection with WHO, but they further received two-day training on data collection tools for current study and to develop proper understanding informed consent process as per research ethics.

Data analysis

The data were analyzed using the Statistical Package for the Social Sciences version-22.0 (SPSSv22.0). The data was entered by the lead researcher and double-checked by one of the co-authors to address any entry errors. Descriptive analysis was performed to estimate the prevalence of EBF. To determine the predictors of EBF, we conducted bivariate and multivariate analysis. Multivariate logistic regression established whether sociodemographic and personal factors are associated with EBF practices. In multivariate analysis, we included only the variables that showed significant impact in the bivariate analysis.

Results

During the study period, 310 mothers were approached to participate in the survey, out of which 297 mothers consented to participate. Table 1 presents the socio-demographic characteristics in which majority of the study participants (44%) were aged 18 to 23 years. 43% of the participants were aged between 24 and 29 years, and only 13% were aged above 30 years. 58% of mothers did not receive any formal education, and less than a third (30%) had completed primary grade-1 level of formal educational. Almost 90% of the mothers were housewives, and the remaining 10% were engaged in some forms of paid jobs. 55% of fathers in surveyed households were illiterate with no formal education.

The study found that socioeconomic status of >90% of the families was below poverty line, of which around 30% were in the extreme poverty category. Table 2 presents pregnancy and child related characteristics of the mothers. Use of maternal health

service was low, with a significant proportion of mothers (46%) reportedly not attending antenatal checkup (ANC). Most of the mothers were multiparous (63%), and about 37% reported that they were pregnant for the first time. About 64% of the babies weighed above 2.5 Kg, and 36% were classified as low birth weight (LBW) at birth. We found that only 31% of babies received full immunization and 27% never received any immunization in their life.

Prevalence of exclusive breastfeeding

Descriptive analysis result showed that only 27.6% of mothers practiced EBF for six months as per the WHO recommendation. Only water was given as pre-lacteals to 6.4% of babies while honey or sugary syrup were given to 13.8%. The majority of mothers (78.5%) reported that their babies received the first milk (Colostrum) immediately after birth. The rest of the mothers reported that they were asked to discard

Table 1: Baseline Characteristics of Participating Families

Characteristics	Number (n=297)	Percentage
Mother's Education		
No formal Education	171	57.6
Primary (Grade I-V)	89	30
Middle (Grade VI-VIII) or above	37	12.5
Father's Education		
No formal Education	164	55.2
Primary (Grade I-V)	65	21.9
Middle (Grade VI-VIII) or above	68	22.9
Mother's Age in years		
18-23 years	132	44.4
24-29 years	127	42.8
>=30 years	38	12.8
Mothers' Occupation		
Housewife	259	87.2
Some job	38	12.8
Fathers' Occupation		
Unemployed	12	4
Regular job	148	49.8
Irregular job	137	46.2
Religion		
Hindu	267	89.9
Muslim	30	10.1
Type of family		
Nuclear	161	54.2
Joint (Nuclear + husband's relatives)	136	45.8
Socio-economic status of family		
Extreme poverty line card holder	184	62
Below poverty line card holder	96	32.3
Above poverty line	17	5.7
Caste		
Other backward caste	90	30.3
Extreme backward caste	207	69.7
Number of children in family		
1	110	37
2-3	133	44.8
>3	54	18.2

Table 2: Pregnancy and Child-Birth Related Characteristics of Participants in the Study

Characteristics	Number (n=297)	Percentage
Number of Ante-natal Check-up visits during pregnancy		
0	136	45.8
1-2	137	46.1
>=3	24	8.1
Duration of pregnancy		
Pre-term	69	23.2
Term	228	76.8
Type of delivery		
Normal	234	78.8
Caesarean section	63	21.2
Place of delivery		
Home	84	28.3
Government Hospital	149	50.2
Private Hospital	64	21.5
Parity		
Primiparus	110	37
Multiparus	187	63
Age of baby in months		
6-11 months	99	33.3
12-18 months	147	49.5
19-24 months	51	17.2
Weight of baby in grams		
<2500 gm	107	36
>=2500 gm	190	64
Gender of baby		
Male	145	48.8
Female	152	51.2
Birth order		
1 st	110	37
2 nd	130	43.8
3 rd or more	57	19.2
Immunization status		
Fully Immunized	93	31.3
Partially Immunized	124	41.8
No Immunization	80	26.9

this milk, because it was considered unclean and should not be given to babies.

Predictors of exclusive breastfeeding for six months

Bivariate analysis: Table 3 presents the results of the bivariate analysis, which was performed to explore the factors associated with EBF practice. The results are presented as odds ratio (OR) and 95% confidence interval (95% CI). Overall, fourteen variables were found to have significant association with EBF in the bivariate regression model. The most decisive pregnancy related factors that influenced 6 months duration of EBF were number of ANC visits, parity, place of delivery and whether a baby was born full-term or pre-term. The results show that the mothers who completed 3 or more ANC visits were more likely to prolong EBF practice up to six months (OR 151, 95% CI 21-537). Bivariate analysis found that the weight of the baby, gender, and immunization status were strong predictors of EBF practice. Fully immunized babies were 4.3 times more likely to be exclusively breastfed compared with the partially immunized babies or those with no vaccination history. LBW babies had 43% chances of receiving exclusive breastfeeding for six months than normal birth weight babies. Surprisingly, gender of the babies strongly predicted their chances of receiving EBF for six months. The results showed that male babies had 2.5 times higher chance of being breastfed exclusively for the 6 months duration than their female counterparts (OR 2.44, 95% CI 1.4-4.1). Other factors which had significant effect on EBF included timing of initiation of breastfeeding within 1 hour (OR 12.8, 95% CI 5.2-31.6), receiving counseling at hospital (OR 4.2, 95% CI 2.3-7.7), television/radio news (OR 6.2, 95% CI 2.4-16.2), and household workload. The mothers who reported engaging in minimal work at home were more likely to practise six months duration of breastfeeding compared to those who did most of the household chores (OR 0.50, 95% CI 0.3-0.9).

Multiple logistic regression analysis: The results from the multivariate model showed that nine variables remained strong predictors of EBF for six months [Table 4]. Maternal education for middle grade compared to illiterate (OR 11, 95% CI 2.2-58.8), and ANC visits when three or more compared with lesser visits (OR 98, 95% CI 11.5-710) remained as the most important predictors of EBF. Detailed results of the multiple logistic regressions are presented in Table 4.

Discussion

From available reports, EBF rate, up to six months duration in India, ranges from 8% to 55%.^[3,9-12] Our study reports only 27.6% of mothers in Patna slums practise EBF up to six months, which is low but falls within the national range.^[10] A decade old survey by the WHO also reported similar figure (EBF rate of 28%) in Bihar.^[13] This latest finding although is restricted to slums, demonstrates that there has not been much improvement in EBF rate in Bihar over the last past ten years. This study further noticed that the prevalence of early initiation (within 1 hour of delivery) of breastfeeding among urban slum was 23% which

Table 3: Results of Simple* Logistic Regression for Predictors of Exclusive Breastfeeding (EBF)

Variable	P	OR	95% CI
Mother's Education	<0.001		
Middle (Grade VI-VIII) or above	<0.001	5.5	2.5 11.9
Primary (Grade I-V)	0.899	1.0	0.4 2.1
No formal Education†			
Father's Education	0.041		
Middle (Grade VI-VIII) or above	0.191	1.5	0.8 2.7
Primary (Grade I-V)	0.012	2.9	1.3 6.5
No formal Education†			
Mother's Occupation	0.336		
Paid job	0.336	1.5	0.7 3.4
Housewife†			
Father's Occupation	0.082		
Regular Job	0.144	0.7	0.4 1.1
Irregular Job	0.178	2.3	0.7 7.4
Unemployed†			
Religion of Family	0.461		
Hindu	0.461	0.7	0.3 1.7
Muslim†			
Type of Family	0.687		
Nuclear	0.687	1.1	0.7 1.9
Joint†			
Socio-economic Status of Family	0.062		
Extreme poverty line	0.75	0.8	0.3 2.4
Below poverty line	0.132	0.4	0.1 1.3
Above poverty line†			
Caste of Family	0.422		
Other backward caste	0.422	0.8	0.5 1.4
Extreme backward caste†			
Number of Ante-natal check-up (ANC) visits	<0.001		
1-2 ANC visits	0.01	37	4.9 333.3
>=3 ANC visits	<0.001	151	21 537
0 ANC visits†			
Duration of Pregnancy	<0.001		
Term/post-term	<0.001	11.6	3.6 38.5
Pre-term†			
Type of Delivery	0.045		
Normal	0.045	2.1	1.0 4.2
Caesarean section†			
Place of Delivery	0.01		
Home	0.001	7.3	2.3 22.7
Government Hospital	0.048	0.5	0.3 1.0
Private Hospital†			
Parity	0.026		
Multiparous	0.026	1.9	1.1 3.3
Primiparous†			
Weight of Baby in grams at birth	0.005		
>=2500 gm/normal weight	0.005	2.3	1.3 4.1
<2500 gm/low birth weight†			
Gender of Baby	0.001		
Male	0.001	2.4	1.4 4.1
Female†			
Immunization Status	0.01		
Fully Immunized	<0.001	4.3	2.0 9.3
Partially Immunized	0.032	2.3	1.1 4.8

Contd...

Table 3: Contd...

Variable	P	OR	95% CI	
No Immunization [†]				
Was Colostrum given	0.997			
Yes	0.997	1.0	0.2	1.0
No, it was discarded because it is unclean [†]				
When did you start breastfeeding	<0.001			
Within 1 h	<0.001	12.8	5.2	31.6
2-6 h	<0.001	7.3	3.1	17.0
After 6 h [†]				
Time when weaning started	0.744			
4-5 month	0.997	1.0	1.0	1.0
6 months	0.442	0.7	0.4	1.6
7 or more months [†]				
Did you receive any help in hospital for BF	<0.001			
Yes, from nurse/health staff	<0.001	4.2	2.3	7.7
No one helped [†]				
Media which influenced your breastfeeding decision	0.001			
Newspaper/hoardings	0.031	3.8	1.1	12.8
TV/Radio	<0.001	6.2	2.4	16.2
Others	0.418	2.1	0.4	12.1
No effect of media [†]				
Is household work a hindrance in breastfeeding [‡]	0.014			
Yes	0.014	0.5	0.3	0.9
No [†]				

*Separate simple logistic regression models were run with EBF as dependent variable and each enlisted variable in the table as independent variable. OR=Odds Ratio; 95% CI: 95% Confidence interval.

[†]Reference

is lesser compared to a cross-sectional study done in southern India which had reported early initiation of breastfeeding to be as high as 97.5%.^[14] The south Indian study was done within the catering zone of the rural health center of a medical college. This population might have received multiple counselling on best practices for breastfeeding from the community healthcare workers of the medical college. Many other studies done earlier on breastfeeding reported higher EBF rates if breastfeeding was started within 6 hours of birth.^[14-16] Effect of television and radio was found to have maximum impact on EBF rates among mass media, followed by those who read newspaper or hoardings. However, we found that parent's occupation did not have any significant impact on duration of EBF and impact of mother's age on EBF was insignificant. We also explored impact of penetration of social media in influencing breastfeeding decisions and found that platforms like YouTube, Facebook, etc. do not affect these decisions at all among slum dwellers of Bihar.

In our study, mothers who received formal education were more likely to practice EBF, compared with those with no formal education. While one study found that educated mothers were more likely to discontinue EBF than their non-educated counterparts, our study results are in agreement with other studies where authors generally reported that educated mothers are more likely to adopt and continue EBF.^[9,17-19] It is widely known that after the implementation of National Health Mission in India, key health messages are regularly communicated during each health facility or frontline health workers contact. Therefore, it

Table 4: Results of Multiple* Logistic Regression for Predictors of Exclusive Breastfeeding (EBF)

Variable	P	OR	95% CI	
Mother's Education	0.001			
Middle (Grade VI-VIII) or above	0.004	11.4	2.2	58.8
Primary (Grade I-V)	0.867	1.1	0.3	5.0
No formal Education [†]				
Father's Education	0.093			
Primary (Grade I-V)	0.477	0.6	0.1	2.8
Middle (Grade VI-VIII) or above	0.159	2.5	0.7	9.3
No formal Education [†]				
Number of Ante-natal check-up (ANC) visits	<0.001			
>=3 ANC visits	<0.001	98	11.5	710
1-2 ANC visits	0.003	43.5	3.6	500
0 ANC visits [†]				
Duration of Pregnancy	0.013			
Term/post-term	0.013	8.6	1.6	47.6
Pre-term [†]				
Type of Delivery	0.067			
Normal	0.067	3.8	0.9	15.9
Caesarean section [†]				
Place of Delivery	0.018			
Home	0.25	0.3	0.0	2.2
Government Hospital	0.077	3.2	0.9	11.3
Private Hospital [†]				
Parity	0.033			
Multiparous	0.033	3.4	1.1	10.3
Primiparous [†]				
Weight of Baby in grams at birth	0.142			
>=2500 gm/normal weight	0.142	0.4	0.1	1.3
<2500 gm/low birth weight [†]				
Gender of Baby	0.011			
Male	0.011	4.0	1.4	11.3
Female [†]				
Immunization Status	<0.001			
Fully Immunized	<0.001	33.7	6.0	190.1
Partially Immunized	0.005	8.5	37.9	37.9
No Immunization [†]				
When did you start breastfeeding	0.002			
Within 1 h	0.001	21.8	3.7	127
2-6 h	0.001	13.2	2.8	61.9
After 6 h [†]				
Did you receive any help in hospital for BF	0.277			
Yes, from nurse/health staff	0.277	1.9	0.6	6.3
No one helped [†]				
Media which influenced your breastfeeding decision	0.002			
Newspaper/hoardings	0.002	14.1	2.6	76.2
TV/Radio	<0.001	67.7	5.5	832.5
Others	0.826	1.4	0.1	24.5
No effect of media [†]				
Is household work a hindrance in breastfeeding	0.545			
Yes	0.545	0.7	0.2	2.2
No [†]				

*Separate Multiple logistic regression models were run with EBF as dependent variable and each enlisted variable in the table as independent variable. Nagelkerke R²=0.785; OR: Odds ratio; 95% CI: 95% Confidence interval; [†]Reference

was not surprising to find that frequent antenatal visits during pregnancy was a strong predictor EBF. Several other studies that

investigated EBF practices also reported similar findings.^[9,11,16,19,20] An important finding of this study was that mothers giving birth in government hospital were three times more likely to practise EBF compared with those giving birth in private set-up. While it is difficult to understand why this is the case, one explanation could be that many government hospitals in India have been designated as baby-friendly compared with their private counterparts. The Baby-Friendly Hospital Initiative (BFHI) was initiated by the WHO and UNICEF in 1991, following the Innocenti Declaration of 1990. The initiative was adopted by WHO in 2009 as a global effort to implement best practices that protect, promote and support breastfeeding. In hospitals where BFHI initiative has been adopted and widely practised, increased rate of early initiation of breastfeeding and EBF have been documented.^[21-23] The current finding highlights the critical need to push BFHI in all hospitals in India, especially the private and other non-governmental healthcare facilities.

Contrary to studies conducted in slums of central India which reported that that pre-term babies were more likely to be breastfed, our study found that term babies rather than pre-term babies have a higher chance to receive EBF. The differences in the findings of these two studies stems from the fact that many government hospitals in India now have Newborn Care Corner (NCC) where pre-term babies are kept for the initial few days, and subsequently given mixed feeding: breast milk and artificial formula food.^[24] These NCCs were non-existent 10 years back, and thus, mothers were encouraged to practise EBF regardless of babies' gestational age at the time of birth. In addition to the above finding, our study further found that EBF practice had a positive correlation with institutional delivery, and this also agrees with findings from other previous studies.^[9,25]

Having correct knowledge about EBF was identified as a very strong independent predictor of exclusive breastfeeding ($P < 0.001$), and this is similar to what another study.^[26] Furthermore, in our study, household work was a hindrance in prolongation of exclusive breastfeeding, which is a new finding compared with other studies in India on the topic. It is obvious that when mothers are over-burdened with household work or receive minimal support immediately following birth, they will have less time for breastfeeding.^[27] Mothers in India have to perform many household chores to keep their husbands happy and thus breastfeeding is often neglected.^[8,27]

Contrary to previous studies that found no difference in EBF rates by gender, our study found gender variation in EBF rates.^[9,28] We found that male babies are almost four times more likely to be breastfed. Reason for this difference may be attributed to preference for male child in the patriarchal family set-up in India.^[29] It is highly likely that mothers who are more inclined to have a male child would adhere to breastfeeding guidelines received from healthcare workers if they give birth to a male child. Similar to previous studies, immunization was identified as a significant predictor of EBF. Fully immunized children were 34 times and partially immunized children were

nine times more likely to receive exclusive breastfeeding as compared with unimmunized counterparts which was very much in resonance with many past studies.^[14,20,30] Further, we found that if breastfeeding was started within 1 hour of delivery, the odds of EBF were 22 times more than those infants who were breastfed after 6 hours.

Limitations

The study questionnaire had all pre-coded responses, because of this in-depth understanding of sociocultural practices that may have influenced exclusive breastfeeding decisions could not be developed. A qualitative study to supplement the findings of current study and to plan a customized community engagement and communication plan to improve breastfeeding practices in Bihar's slums would be needed.

Conclusion

Prevalence of exclusive breastfeeding up to six months of age and early initiation of breastfeeding is low in Patna slums. Exclusive breastfeeding rates could be improved by promoting mother's education and counseling of families on health facility contacts like antenatal check-ups and immunization visits which is often managed by primary care physicians. The findings will help the primary healthcare physicians to understand the important issues that needs to be considered when planning antenatal care services, to increase uptake. Further, this study brings a very important sociocultural issue to the table, which is gender bias and preference of male child over female. Government and civil societies need to work to eliminate such prevalent evil practices from the community.

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Conflicts of interest

There are no conflicts of interest.

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