Factors Predicting Successful Exclusive Breast-Feeding Practices among Mothers of Northern Karnataka, India

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ABSTRACT

Breast feeding is a common and widespread phenomenon among mothers in India. But successful breast-feeding practices like exclusive breast feeding (EBF), feeding colostrum and avoiding prelacteal feeds is not prevalent due to the influence of bio-socio-cultural factors. Improvements in breastfeeding rates and advocacy of successful breastfeeding practices as per WHO recommendations are critical for reducing child mortality and improving maternal health. In view of this a study was conducted to study the bio-socio-cultural factors predicting the exclusive breastfeeding practices among mothers of Northern Karnataka, India. The target population of the study was 900 mother –infant dyads. The infants in the age group of 3 months to 24 months and their mothers from rural as well as urban area of Dharwad, Vijayapura and Bagalkot district of Northern Karnataka based on District Level Household and Facility Survey-4 (DLHS-4). A self-structured questionnaire was used to collect the demographic profile, maternal and child parameters. The Iowa infant feeding attitude scale (de la Mora, et al. [1]) was utilized to measure maternal attitudes toward infant feeding methods and Aggarwal,2005 was used to measure SES of the families. The results revealed that the likelihood of exclusive breastfeeding (EBF) for first six months, was high among rural mothers, mothers in the range of 21-30 years, home makers. Mothers who had educational qualification of graduation and above had lower odds of EBF and among mothers belonging to middle and high SES. With respect to maternal and child health indicators (Table 1), it was observed that higher odds of breastfeeding were observed with female children, normal weight children, later born children and singleton babies. Male children, low birth weight babies, firstborn and twins had lower odds of breastfeeding. Also, that low percentage of EBF was observed among mothers who had instrumental delivery and caesarean delivery.

Keywords: Exclusive Breast Feeding; SES; Knowledge; Attitude; Bio-Socio-Cultural

Abbreviations: EBF: Exclusive Breast Feeding; DLHS-4: District Level Household and Facility Survey-4

Introduction

Breastfeeding has been recognised as the most important intervention for supporting healthy child growth and development and lowering newborn mortality. The most beneficial infant and young child feeding pattern includes being placed to the breast within an hour of birth, exclusive breastfeeding for 6 months, continued breastfeeding along with complementary foods up to 2 years of age or beyond, and avoidance of any pre lacteal feeds and bottle-feeding. Although breastfeeding is widespread in India, exclusive breastfeeding (EBF) and suitable weaning practices are far from optimal. This characteristic is influenced by a variety of sociocultural influences, which differ by region's socio-cultural factors influence this aspect and these factors vary from region to region. Breastfeeding is possible for almost all mothers virtually if they have proper knowledge and the support of their family, the health-care system, and society as a whole. According to WHO fact files from 2015, 44% of children under the age of five die within the first 28 days of life. According to the NFHS-4 report released in 2015-16, the infant mortality rate in India is 41/1000 live births and 28/1000 live births in Karnataka.

(http://rchiips.org/ NFHS/pdf/NFHS4/India.pdf). Although breastfeeding is a prevalent phenomenon in India, it is typically initiated after 3-4 days, and prelacteal feeds such as honey, sugar water, gutti (a prelacteal feed created by rubbing almonds and other herbs), water, and so on are frequent. Breastfeeding is culturally acceptable but insufficiently practiced, owing in part to ignorance.

Lack of awareness, prevalent misunderstandings, and cultural taboos all contribute considerably to suboptimal nursing practices such as delayed initiation and colostrum disposal. A report by Rashmi [2] in the popular daily newspaper Deccan Herald only 46.90 per cent children are breastfed within one hour of their birth in Bengaluru, according to survey conducted by Ministry of Health and Family Welfare. The results revealed that, though the prevalence of institutional delivery is 84 per cent, not all newborns are breastfed. The reasons for not feeding were women from few communities wait for honey to be given to the child first and it was also found that at institutes not all staff is trained to put the child on the mother's milk soon after birth. The knowledge and attitude of mothers regarding exclusive breast feeding is found to be poor in India and variables associated exclusive breastfeeding included strong cultural belief, use of prelacteal feeds, working status of mothers, support of family members and health personnel (Arya, et al. [3-5]) (Ahmed et al., 2014).

Subbaiah and Jegannathan [6] observed that 56.50 per cent breastfed only for five minutes as they thought longer duration causes soreness of the nipple. 42.50 per cent avoided night feeding for the reason that it causes colic to the baby. Joshi, et al. [7] revealed that the prevalence of EBF in Mirzapur (36 %) was lower than the national figure (64 %). Parveen, et al. [5] also found that, majority of mothers (62.30 %) did not practice exclusive breastfeeding. Onah, et al. [8] noted that the practice of EBF (33.50 %) was very low in Nnewi, south-east Nigeria. EBF practice decreased with increasing infant age and low maternal education, high socio-economic class, mode of delivery (caesarean) and infants first feed were important maternal predictors of EBF practice. Improvements in breastfeeding rates and advocacy of successful breastfeeding practices as per WHO recommendations are critical to the attainment of the Millennium Development Goals and Post-2015 Sustainable Development Goals, especially to achieve the millennium development goals of reducing child mortality and improving maternal health. Adequate breastfeeding counselling and support are essential for mothers and families to initiate and maintain optimal breastfeeding practices. In view of this, the present study was conducted with the objective to study the factors predicting successful breast-feeding practices among mothers of Northern Karnataka, India.

Methodology

Population and Sample

The target population of the study was mother –infant dyads. The infants in the age group of 3 months to 24 months and their mothers from rural as well as urban area of Dharwad, Vijayapura and Bagalkot district of Northern Karnataka based on District Level Household and Facilty Survey-4 (DLHS-4) fact sheets (Anon [9]) were selected. Among the seven districts of northern Karnataka, Vijayapura had the lowest level (59.40 %) of prevalence of exclusively breastfeeding among children of 0-5 month's age group, while Dharwad had medium level prevalence (75.70 %) and Bagalkot had the highest prevalence (81 %). Hence these districts were purposively selected and two taluks from each district and two villages from each taluk were randomly selected.

The samples of mother-infant dyads were selected using purposive proportionate random sampling from four villages each in Dharwad, Vijayapura and Bagalkot districts and their urban areas. 50 mother-infant dyads from each village and 100 mother-infant dyads from urban area were selected for the study. 300 mother–infant dyads from rural area and 100 from urban area were selected from each district. So, the final sample included in the study was 600 mother–infant dyads from urban area and 300 mother- infant dyads from rural area.

Tools Used for the Study

Self-Structured Questionnaire: A self- structured questionnaire was developed which consisted of three parts. The first part consisted of items to collect personal information of mothers regarding age, marital status, age at marriage, occupation, parity, type and place of delivery, plurality, haemoglobin of mother at the time of delivery, BMI, father's education, occupation, size and type of family, locality income and of the family. The second part of the schedule had items to collect information of the child regarding age, gender, breastfeeding patterns, prevalence, practices and beliefs The third part consisted of items to measure the knowledge and attitude level of the mothers towards breastfeeding.

Category of Breastfeeding Practices -Infants were classified as exclusively breast fed up to six months, predominant breastfeeding, complementary feeding and bottle feeding based on classification by WHO (Anon [10]).

Mother's Knowledge, Attitude Towards Breastfeeding: Knowledge of mothers on breastfeeding was measured by 28 knowledge statements which were included in self-structured questionnaire based on extensive review of literature (Vaaler, et al. [11]) (Ahmed et al. 2014). The statements were scored on three-point scale as Agree, Do not know, Disagree scoring as 3, 2, 1 respectively. Negative statements were reverse scored. The mothers were classified based on knowledge level as follows. The study participants who scored between 28-46 were categorized as low, medium (47-65) and High (66-84).

The IOWA Infant Feeding Attitude Scale: The Iowa infant feeding attitude scale (de la Mora et al. [1]) was utilized to measure maternal attitudes toward infant feeding methods (e.g., breastfeeding,

formula- feeding, etc.). The scale covers various dimensions of infant feeding like costs of infant feeding, nutrition, convenience and infant bonding. The scale consists of 17 statements where respondents are asked to indicate the extent to which they agree with each statement, on a five-point Likert scale ranging from "strongly disagree" to "strongly agree" with scores ranging from 1-5. The statements are worded in such a way that approximately half of the questions are favourable towards breastfeeding and the remaining questions favourable toward formula-feeding. Negative statements regarding breastfeeding are reverse scored. These scores are then computed so that a high score reflects a preference for breastfeeding. Based on the scores the mother's attitude was classified as poor (17-40), neutral (41-64) and favourable (65-85).

Socio- Economic Status (SES): SES was measured using socio-economic status scale developed by Aggarwal, et al. [12]. The

scale consists of 22 statements which assess caste, education, occupation and monthly per capita income from all sources, type of house and location, family possessions and possessions of earning members in the family, number of children and possessions of agricultural and non-agricultural land along with animals and social status of the family. A pilot study was conducted on 30 samples to check the reliability of the questionnaire. The reliability of the overall questionnaire was 0.571 (Cronbach's alpha) and for the knowledge questionnaire was 0.749 (Cronbach's alpha). The Guttmann split-half co-efficient was 0.848 for overall questionnaire. The reliability for IOWA was 0.893 (Cronbach's alpha) and the Guttmann split-half co-efficient was 0.704. Data was entered in CSPro (6.3) version and analysed using SPSS 16.0 Version. The study was approved by ethical committee of University of Agricultural Sciences, Dharwad. Informed oral consent of the participants was taken from the study participants for the conduct of study.

Table 1: Bivariate analysis of maternal and child health factors associated with exclusive breast feeding.

Variables	Exclusive Breast Feeding				OR (95 % CI)	P-Value
	Yes		No			
	n	%	n	%		
1. Gender of the child						
Male	206	43.90	263	56.10	1.00	0.008**
Female	174	40.40	257	59.60	1.28 (1.06,1.53)	
2. Birth Weight of the child (g)						
Low	31	46.70	75	70.75	1.00	0.004*
Normal	349	44.00	445	56.00	1.897 (1.22,2.95)	
3. Birth order of the child						
First born	151	40.30	224	59.70	1.00	
Second born	158	44.10	200	55.90	1.48 (1.21,1.82)	0.568
Third and above	71	42.50	96	57.50	1.27 (1.03,1.56)	
4. Plurality						
Singleton	01	5.90	16	94.10	1.00	0.002*
Twins	379	42.90	504	57.10	12.03 (1.59,91.12)	
5. Type of delivery						
Instrumental	02	33.30	04	66.70	1.00	
Caesarean section	114	39.40	175	60.60	1.29 (1.10,1.52)	0.45
Normal	264	43.60	341	56.40	1.54 (1.21,1.58)	
6. Place of delivery						
Home	07	26.90	19	73.10	1.00	
Hospital (public)	178	42.20	244	57.80	2.71 (1.14,6.46)	0.266
Hospital (private)	195	43.10	257	56.90	1.37 (1.13,1.66)	
7. Hb level of mother (g/dl)						
7-11 (moderate anaemia)	332	41.60	466	58.40	1.00	0.001**
> 11 (Non-anaemic)	48	47.10	54	52.90	1.40 (1.22,1.62)	

Note: *- Significant at 5% level ** - Significant at 1 %level

N= 900

Results

The familial characteristics of sample (mother-child dyad) selected for study indicates that equal proportion of sample (300 each) is selected from each district viz. Dharwad, Vijayapura and Bagalkot. 66.67 per cent were from rural area and 33.33 per cent from urban area. With regard to religion, majority of the subjects were Hindu (87.11 %), followed by Muslims (11.89 %). Christians and Jains were only 0.33 per cent and 0.56 per cent respectively. Regarding family type, 51.78 per cent respondents were from nuclear family and 48.22 per cent were from joint family. Most of the subjects belonged to middle SES, followed by poor and high category (Table 2). The logistic regression analysis (Table 3) indicates that the rural mothers (OR = 1.12, 95 % CI = 0.84, 1.48) had 1.12 times of higher odds of practicing

exclusive breastfeeding compared to urban mothers, but the association was not found significant. Mothers in the age group of 21-25 years (OR = 1.74, 95 % CI = 1.08, 2.79) had higher odds of exclusively breastfeeding (EBF) followed by 26-30 years (OR = 1.52, 95 % CI = 1.26, 1.82), 31-35 years (OR = 1.17, 95 % CI = 0.92, 1.48) and 18-20 years (reference category). Mothers in the age group of 36-40 years had lower odds of EBF compared to other lower age groups. However, the results were not found significant at 5 per cent level. Regarding education of mother the bivariate analysis indicated a significant association with breastfeeding practices. With illiterate mothers as reference category, it was observed that the odds of EBF was higher among mothers with primary/secondary education (OR = 2.05, 95 % CI = 1.21, 3.47), followed by mothers having PUC/diploma education (OR = 1.33, 95 % CI = 0.91, 1.95).

Table 2: Familial characteristics of the sample.

Category	District			
	Dharwad	**Vijayapura**	**Bagalkot**	**Total**
	n=300	**n=300**	**n=300**	**N=900**
1. Locality				
Rural	200 (66.67)	200 (66.67)	200 (66.67)	600 (66.67)
Urban	100 (33.33)	100 (33.33)	100 (33.33)	300 (33.33)
2.Religion				
Hindu	258 (86.00)	260 (86.70)	266 (88.70)	784 (87.11)
Muslim	38 (12.66)	36 (12.00)	33 (11.00)	107 (11.89)
Christian	02 (0.67)	0 (0.00)	1 (0.30)	3 (0.33)
Jain	02 (0.67)	4 (1.33)	0 (0.00)	5 (0.56)
4.Family Type				
Nuclear	133 (43.33)	130 (43.33)	203 (67.67)	466 (51.78)
Joint	167 (55.67)	170 (56.67)	97 (32.33)	434 (48.22)
5. SES of the Family				
High	33 (11.00)	37 (12.33)	30 (10.00)	89 (9.89)
Middle	241 (80.33)	85 (28.33)	115 (38.33)	308 (34.22)
Poor	26 (8.67)	47 (15.67)	33 (11.00)	106 (11.78)

Note: Figures in parenthesis indicate percentages.

Table 3: Bivariate analysis of socio-demographic factors associated with exclusive breast feeding.

Variables	Exclusive breast feeding for first six months				OR (95 % CI)	P-Value
	Yes		**No**			
	n	**%**	**N**	**%**		
1. Locality						
Urban	132	44.00	168	56.00	1.00	0.45
Rural	248	41.30	352	58.70	1.12 (0.84,1.48)	
2. Age of mother (yrs)						
18-20	27	36.50	47	63.50	1.00	0.182
21-25	190	39.70	288	60.30	1.74 (1.08,2.79)	
26-30	127	46.20	148	53.80	1.52 (1.26,1.82)	

31-35	31	51.70	29	48.30	1.17 (0.92,1.48)	
36-40	05	38.50	08	61.50	0.94 (0.56,1.55)	
3. Education of mother						
Illiterate	34	31.20	75	68.80	1.00	
Primary/secondary	204	41.10	292	58.90	2.05 (1.21,3.47)	
PUC/diploma	76	48.10	82	51.90	1.33 (0.91,1.95)	0.019*
Graduation and above	66	48.20	71	51.80	1.003 (0.63,1.59)	
4. Status of mother						
Working	60	37.50	100	62.50	1.00	
Home maker	320	43.20	420	56.80	1.31 (1.14,1.52)	0.001**
6. Family type						
Nuclear	190	40.80	276	59.20	1.00	
Joint	190	43.80	244	56.20	1.20 (1.1,1.3)	0.001**
7. SES of the family						
Low	27	25.50	79	74.50	1.00	
Middle	290	42.60	390	57.40	1.67 (1.11,2.48)	0.000**
High	63	55.30	51	44.70	3.61 (2.04.6.40)	
8. Religion						
Hindu	322	41.10	462	58.90	1.00	
Muslim	54	50.50	53	49.50	1.435 (1.244, 1.654)	
Christian	01	100.00	0	0.00	0.983 (0.981, 1.672)	0.001***
Jain	02	40.00	03	60.00	0.657 (0.251,1.50)	

Note: * - Significant at 5% level ** - Significant at 1% level *** - Significant at < 1 %level

N= 900

Mothers who were graduates and above had lower odds of EBF (OR = 1.003, 95 % CI = 0.63, 1.59) when compared with less educated mothers. With respect to status of mother, mothers who were not working were 1.31 times likely to practice EBF (OR = 1.31, 95 % CI = 1.14, 1.52) when compared with working mothers and the association was found to be significant at 1 per cent level. The family type indicates a significant association showing that the mothers in joint family (OR = 1.20, 95 % CI = 1.10, 1.30) had 1.20 times higher odds to practice EBF compared with mothers from nuclear families. A highly significant association was found between SES of the family and EBF indicating that mothers from high SES family (OR = 3.61, 95 % CI = 2.04, 6.40) had higher odds of EBF, followed by mothers belonging to middle (OR = 1.67, 95 % CI = 1.11, 2.48) and low SES (reference category) families. Regarding religion it was observed that the Muslims had higher odds of EBF (OR = 1.435, 95 % CI = 1.244, 1.654) followed by, Hindus (reference category), Christians (OR = 0.983, 95 % CI = 0.981, 1.672) and a very low odds of EBF was found in Jains (OR = 0.657, 95 % CI = 0.251,1.50).

The association between maternal and child health factors and exclusive breastfeeding up to six months is represented in Table 1. The female child was 1.28 times more likely (OR = 1.28, 95 % CI = 1.06, 1.53) to be exclusively breast fed compared to male child and babies born with normal birth weight (OR = 1.897, 95 % CI = 1.22, 2.95) had higher odds of EBF compared with low-birth-weight babies. With respect to birth order of the child the second born (OR = 1.48, 95 % CI = 1.21, 1.82) and later born (OR = 1.27, 95 % CI = 1.03, 1.56) babies had higher odds to be exclusively breast fed compared to first born babies. Singletons had 12.03 times higher odds to be EBF (OR = 12.03, 95 % CI = 1.59, 91.12) compared to twins. Regarding type of delivery, the higher odds of EBF was observed in mothers having normal delivery (OR = 1.54, 95 % CI = 1.21, 1.58, followed by mothers having caesarean (OR = 1.29, 95 % CI = 1.10, 1.52) and mothers having instrumental delivery (reference category) With respect to place of delivery, the mothers who delivered their babies in government/public hospitals had higher odds of EBF (OR = 2.71, 95 % CI = 1.14, 6.46), when compared to mothers who delivered in private (OR = 1.37, 95 % CI = 1.22, 1.62) hospital and at home (reference). The Hb level of mother indicates that mothers The bivariate analysis of breastfeeding knowledge and attitude of mothers associated with exclusive breastfeeding (Table 4) clearly defines association between breastfeeding knowledge and attitude of mothers with exclusive breastfeeding practices. Mothers who had medium (OR = 9.71, 95 % CI = 5.62, 16.71) and high knowledge (OR = 3.18, 95 % CI = 1.90, 5.31) had higher odds

of practicing exclusive breastfeeding the infants for first six months compared to mother having low knowledge. Similarly, mothers with neutral attitude had higher odds (OR = 9.07, 95 % CI = 5.24, 15.68) of practicing exclusive breastfeeding. Table 5 represents the variables that significantly predict the breastfeeding practices of mother. The hierarchical multiple regression analysis was performed where exclusive breastfeeding upto six months was the dependent variable and maternal factors (age, age at marriage, education, knowledge, attitude, delivery type, Hb level and working status –Model I), maternal and child factors (Child factors like gender, birth order, birth weight, plurality added to maternal factors-Model II) and maternal, child and familial factors (familial factors like family type,size and SES added to maternal and child factors -Model III) as independent factors.

Table 4: Bivariate analysis of breast -feeding knowledge and attitude of mother associated with exclusive breast feeding for first six months.

Variables	Exclusive breast feeding for first six months				OR (95 % CI)	P-Value
	Yes		No			
	N	%	N	%		
1. Knowledge						
Low	80	23.90	255	76.10	1.00	
Medium	233	48.91	243	51.10	9.71 (5.62,16.71)	0.000**
High	67	75.30	22	24.70	3.18 (1.90,5.31)	
2. Attitude						
Poor	58	21.50	212	78.50	1.00	
Neutral	260	47.90	283	52.10	9.07 (5.24,15.68)	0.000*
Favourable	62	71.30	25	28.70	2.70 (1.65,4.42)	

Note: * - Significant at 1% level   ** - Significant at 5 %leve

Table 5: Predictor variables of breast-feeding practice.

Table 5a: Model I: Maternal factors.

Model I	Un-standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.115	0.204		10.387	0.000
Age of the mother	-0.005	0.004	-0.036	-1.042	0.298
Age at marriage	0.004	0.006	0.028	0.739	0.460
Marital status	-0.046	0.090	-0.016	-0.514	0.607
Mother's education	0.043	0.022	0.077	1.927	0.054
Working status	0.060	0.041	0.047	1.453	0.147
Delivery type	0.077	0.033	0.076	2.348	0.019
Hb level of mother	0.009	0.014	0.021	0.660	0.510
Breast feeding knowledge	-0.013	0.003	-0.299	-4.153	0.000
Breast feeding attitude	-0.004	0.003	-0.095	-1.321	0.187

Table 5b: NOVA.

Model I	Sum of squares	df	Mean square	F	Sig.
Regression	27.533	9	3.059		
Residual	192.023	890	0.216	14.179	0.00
Total	219.556	899			

Note: Predictors: (Constant), Breast Feeding Attitude, Working Status, Delivery Type, Marital Status, Hb level of mother, Age, Age at Marriage, Mother's Education, Knowledge

Dependent Variable: Exclusive Breast Feeding

Table 5c: Model Summary.

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.354[a]	0.125	0.117	0.464

Table 5d: Model II: Maternal and child factors.

Model II	Un-standardized coefficients		Standardized coefficients	T	Significance
	B	Std. Error	Beta		
(Constant)	1.801	0.255		7.051	0.000
Age of the mother	-0.004	0.005	-0.035	-0.884	0.377
Age at marriage	0.004	0.006	0.028	0.695	0.487
Marital status	-0.044	0.089	-0.016	-0.493	0.622
Mother's education	0.043	0.022	0.078	1.937	0.053
Working status	0.058	0.041	0.045	1.394	0.164
Delivery type	0.056	0.033	0.055	1.688	0.092
Hb level of mother	0.015	0.015	0.033	1.007	0.314
Breast feeding knowledge	-0.013	0.003	-0.303	-4.238	0.000
Breast feeding attitude	-0.004	0.003	-0.090	-1.256	0.210
Birth weight of child	-4.312E-5	0.000	-0.045	-1.326	0.185
Gender of child	0.033	0.031	0.033	1.048	0.295
Birth order of child	-0.007	0.023	-0.012	-0.325	0.746
Plurality	0.364	0.118	0.100	3.084	0.002

Table 5e: ANOVA.

Model II	Sum of squares	df	Mean square	F	Sig
Regression	30.658	13	2.358		
Residual	188.898	886	0.213	11.061	0.000
Total	219.556	899			

Note: Predictors: (Constant), Breast Feeding Attitude, Working Status, Delivery Type, Marital Status, Hb level of mother, Age, Age at Marriage, Mother's Education, Knowledge, Gender of child, Plurality, Birth weight, Birth order.

Dependent Variable: Exclusive Breast Feeding.

Table 5f: Model Summary.

Model	R	R square	Adjusted R square	Std. error of the estimate
II	0.374[b]	0.140	0.127	0.462

Table 5g: Model III: Maternal, child and familial factors.

Model II	Un-standardized coefficients		Standardized coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	1.834	0.260		7.044	0.000
Age of the mother	-0.005	0.005	-0.035	-0.892	0.373
Age at marriage	0.005	0.006	0.031	0.776	0.438
Marital status	-0.041	0.089	-0.015	-0.463	0.643
Mother's education	0.052	0.024	0.092	2.176	0.030
Working status	0.052	0.042	0.040	1.249	0.212
Delivery type	0.059	0.033	0.058	1.758	0.079

Hb level of mother	0.016	0.015	0.037	1.122	0.262
Breast feeding knowledge	-0.013	0.003	-0.299	-4.165	0.000
Breast feeding attitude	-0.004	0.003	-0.084	-1.147	0.252
Birth weight of child	-4.080E-5	0.000	-0.042	-1.246	0.213
Gender of child	0.033	0.031	0.033	1.042	0.298
Birth order of child	-0.004	0.024	-0.006	-0.154	0.877
Plurality	0.367	0.118	0.101	3.106	0.002
Family type	-0.013	0.042	-0.013	-0.300	0.764
Family size	-0.004	0.008	-0.023	-0.514	0.607
SES	-0.002	0.002	-0.043	-1.050	0.294

Table 5h: ANOVA.

Model III	Sum of squares	df	Mean Square	F
Regression	31.184	16	1.949	9.136
Residual	188.372	883	.213	
Total	219.556	899		

Note: Predictors: (Constant), Breast Feeding Attitude, Working Status, Delivery Type, Marital Status, Hb level of mother, Age, Age at Marriage, Mother's Education, Knowledge, Gender of child, Plurality, Birth weight, Birth order, Family type, SES, Family Size.

Dependent variable: Exclusive breast feeding.

Table 5i: Model summary.

Model	R	R square	Adjusted R square	Std. error of the estimate
III	0.377c	0.142	0.126	0.462

In model-I, ANOVA results indicate that the maternal factors significantly influenced exclusive breastfeeding practice and accounted for 12.50 per cent of variance on breastfeeding practices. Within the model-I mother's education, type of delivery and mother's knowledge on breastfeeding were the significant factors predicting breastfeeding practice. In model-II when child factors were added to maternal factors, ANOVA results indicated a significant influence on exclusive breastfeeding practice and accounted for 14 per cent variance adding only 1.50 per cent to maternal factors. Within model-II, when child factors were added, type of delivery no longer influenced the breastfeeding practice, but mother's education and knowledge on breastfeeding were still found to be the predicting factors. Adding to it, plurality of the child was found to be significantly influencing breastfeeding practices. In model –III, when familial factors were added to mother and child factors, mother's education and knowledge on breastfeeding, as well as plurality were found to still influence significantly, whereas the familial factors did not influence independently. But the ANOVA revealed that the model III significantly influenced breastfeeding practices and accounted for 14.20 per cent variance, adding only 0.20 per cent to the mother and child factors. Therefore, it can be concluded that maternal factors are the important predictors of breastfeeding practices, followed by child and family factors.

Discussion

It can be observed in the present study (Table 3) that the likelihood of exclusive breastfeeding (EBF) for first six months, was high among rural mothers, mothers in the range of 21-30 years. However, the results were not found statistically significant. Mothers who had educational qualification of graduation and above had lower odds of EBF than mothers having primary/secondary education, PUC/diploma and illiterates indicating that higher the education of mothers, lower the odds of EBF. The mothers who were home makers had 1.31 times higher odds of practicing EBF compared to working mothers. With respect to SES, the percentage of EBF was higher among mothers belonging to middle and high SES. The higher odds of EBF were found among Muslim mothers, followed by Hindu mothers and Christians. With respect to caste the SC/ST mothers were more likely to practice EBF, when compared with forward caste mothers. With respect to maternal and child health indicators (Table 1), it was observed that higher odds of breastfeeding were observed with female children, normal weight children, later born children and singleton babies. Male children, low birth weight babies, firstborn and twins had lower odds of breastfeeding. Also, that low percentage of EBF was observed among mothers who had instrumental delivery and caesarean delivery. The families were extra cautious about male chil-

dren and had many myths towards breast feeding them which clearly depicts the patriarchal family belief system. Mothers expressed in the present study that they were afraid to hold the LBW babies and they were in NICU which further delayed the breast feeding process for a week or more.

The results were very promising with respect to mothers who delivered in government/public hospitals, where it was found that these mothers were more likely to practice EBF for first six months. This is because the doctors and nurses in government hospitals encouraged mothers to exclusively breast fed. The qualitative interviews revealed formula feeding in the first week was advised by doctors in private hospitals for reasons like jaundice in baby, mother having caesarean delivery, etc. Most of the mothers expressed that the doctors encouraged immediate initiation of breastfeeding even when baby was in ICU by allowing mothers to feed at regular intervals or feeding the child by nipple or other means by expressing the breast milk. However, the association between exclusive breastfeeding and place of delivery was not found to be statistically significant. A significant association between haemoglobin level of mothers and breastfeeding practices was found. The mothers with no anaemia had higher odds (OR=1.4, 95 % CI=1.22, 1.62) when compared with mothers having moderate anaemia. Table 5 indicates the role of three models to identify the predictor variables of breastfeeding practices. The Model I comprising maternal factors like mother's age, age at marriage, education, occupation, knowledge, attitude, delivery type and Hb level significantly accounted for 12.50 per cent variance in breastfeeding practices. And within model only mother's education, type of delivery and breastfeeding knowledge were the predictor variables of breastfeeding practices in mothers. The Model II (Maternal + Child factors) significantly accounted for 14 per cent variance, where child factors like gender, birth order, birth weight, plurality were added only 1.50 percent variance to maternal factors. Within the model II, delivery type lost its significance and it was found that mother's education, breastfeeding knowledge and plurality of child were the significant predictors of breastfeeding practices.

Model III (mother + child + familial factors) indicated that none of the familial factors like family type, size and SES did not significantly influence the breastfeeding practices. Mother's education, breastfeeding knowledge and plurality of child continued to significantly account for 14.20 per cent variance adding only 0.20 per cent to mother and child factors. Thus, the results indicate that maternal characters, especially mother's education and breastfeeding knowledge are the predictors of adequate breastfeeding practices. However, plurality of infants is also an important predictor, where mothers of singletons practice successful breastfeeding practices. The results of previous studies also are in agreement with the present study except for family type and delivery place. The extant research available indicates that the practice of exclusive breastfeeding is higher among mothers from nuclear families and mothers who had delivery in private hospitals. However, the present findings contradict the earlier research, where

it indicates that mothers from joint family and mothers who delivered in government hospitals were more likely to exclusively breast feed the infants. This can be observed in the earlier research results by Garag, et al. [13] in his study in Meerut (U.P) found that exclusive breastfeeding (EBF) was given by 56.80 per cent mothers who were below 25 years, 26.10 per cent illiterate mother, 26.10 per cent primary to high school educated and 47.70 per cent high school and above exclusively breast fed their children. Housewives, multipara mothers, mothers from nuclear type and high SES family practiced EBF. A study conducted in Nepal by Adhikari, et al. [14] revealed that mothers having higher education (OR 2.56), secondary education (OR 1.91) and primary education (OR 1.69) were more likely to initiate early breastfeeding than women with no education. Mothers belonging to relatively disadvantaged Janjatis (OR 1.43) were more likely to initiate breastfeeding than relatively advantaged ethnic groups. Mothers who were involved in agriculture (OR1.51) were more likely to initiate breast feeding during the first hour of childbirth. Health facility delivery had a positive influence on early initiation of breastfeeding.

Titaley, et al. [15] found that increased odds of delayed initiation of breastfeeding included caesarean-section deliveries and deliveries in government-owned facility and mothers with obstetric complication at childbirth. Meedya, et al. [16] conducted a systematic review of online literature and the results revealed that the biophysical factors affecting breastfeeding were women's birth experiences like caesarean (negative association), difficulties in feeding (nipple problems), perception of insufficient milk supply (50 % of the studies reported). Kingsley, et al. [17] studied on 658 children less than 6 months of age in Nigeria and it was found that mothers who made four or more antenatal visits were significantly more likely to engage in EBF. Female infants were more likely to be exclusively breastfed than male infants. Mc Queen, et al. [18] revealed that variables associated with any and exclusive breastfeeding at 8 weeks included household income, intended breastfeeding duration, plan to exclusively breastfeed, perception of meeting their planned duration goal and partner support was associated with exclusive breastfeeding at 8 weeks. Onah, et al. [8] found that EBF practice decreased with increasing infant age and maternal education, socio-economic class, mode of delivery and infants first feed were important maternal predictors of EBF practice. Similarly, Adhikari, et al. [14] indicated that mother's age at pregnancy, maternal education, maternal occupation, number of ANC visits, place of delivery, ethnicity, birth order, baby size, development region and ecological region were statistically significant in univariate analysis. Kumar, et al. [19] indicated that delay in initiation of breastfeeding was significantly associated with maternal age, literacy, socio-economic status and place of delivery. The better knowledge and favourable attitude of mothers towards breast feeding (Table 4) predicted high odds of practicing exclusive breast feeding the child. The present study is consistent with results of Garg, et al. [13] who reported that the breastfeeding knowledge, attitude and practices about exclusive breastfeeding were poor among mothers of urban area in Meerut.

Mothers having better knowledge about the benefits of breastfeeding practiced exclusive breastfeeding. Similar results were observed by Mekuria, et al. [20], Ahmed et al. (2014) and Onah, et al. [8,21]. Hence it is clear from the study that bio-socio-cultural factors like age, education, occupation, parity, obstetrical complications, antenatal care received in mother and child characters like gender, age, birth weight, birth order and family characteristics like family type, size, SES, locality, maternal knowledge and attitude towards breast feeding determine the successful exclusive breastfeeding practices.

Conflict of Interest

None.

Acknowledgement

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