Brazilian Journal of Biometrics, **43**, 1–13 (2025)
doi:10.28951/bjb.v43i2.749

BRAZILIAN JOURNAL OF BIOMETRICS
ISSN:2764-5290

ARTICLE

Breastfeeding practices among institutionally delivered newborns: a single centre experience

Priyanshu Gupta, Ruchika Bhatnagar,* Abhishek Bharti, and Rakesh Gupta

Government Institute of Medical Sciences, Greater Noida, Gautam Buddha Nagar, Uttar Pradesh, India.
*Corresponding author. Email: ruchu.bhatnagar@gmail.com

(Received: June 30, 2024; Revised: August 19, 2024; Accepted: September 30, 2024; Published: April 3, 2025)

Abstract

With the rise in institutional deliveries, the responsibility of timely initiation and maintaining optimum breastfeeding practices has shifted from families and community health workers to doctors and nursing personnel. According to the National Family Health Survey - 5, there is significant rise in institutional births from 78.9 % to 88.6 % while early initiation of breastfeeding (EIBF) still ranges from 41.6% to 41.8%. The present study aimed to gain insights into the breastfeeding practices among institutionally delivered newborns, and determine the factors affecting it. This was a hospital based analytical cross-sectional study. After obtaining Institutional Ethics Committee approval and written informed consent, 375 postnatal mothers were interviewed within 24 hours of delivery. Breastfeeding practices were recorded and logistic regression analysis was performed to identify the determinants of EIBF and exclusive breastfeeding (EBF). Out of 375 respondents, only 143 mothers (39.2%) followed EIBF. Pre-lacteal feed was given by 112 mothers (30.7%), while EBF was practiced by 197 mothers (54%). On logistic regression analysis, mothers belonging to upper socio-economic status (p=0.001; AOR, 13.31; 95% CI, 2.8-62.5), normal vaginal delivery (p<0.001; AOR, 0.089; 95%CI,0.1-0.2) and multiparous mothers (p=0.006; AOR,2.494; 95% CI 1.3-4.7) were more likely to follow EIBF. Determinants of exclusive breastfeeding observed in this study was health seeking behavior of mothers as reflected through number of antenatal clinics attended (p=0.001; AOR, 5.298; 95%CI 0.3-0.7) and Caesarean delivery (p<0.001; AOR, 0.410; 95% CI, 0.3-0.7). Breastfeeding practices like timely initiation of breastfeeding and exclusive breastfeeding among the institutionally delivered newborns are comparatively low as opposed to the nation's average value. Socio-economic profile, mode of delivery, parity, and health seeking behaviour of mothers proved to be the significant factors determining the breastfeeding practices. Antenatal counselling needs to be strengthened with identified bottlenecks like primiparous women, economically underprivileged mothers and mothers with caesarean delivery.

Keywords: Breastfeeding, Infant, Logistic models, Newborn, Health surveys.

1. Introduction

Exclusive breastfeeding has improved in India but early initiation of breastfeeding is still the need of the hour. Early initiation of breastfeeding (EIBF), specifically within one hour of birth, refers to the best practice recommendation by the World Health Organization (WHO)(WHO, 2021).It is considered as a best start for every newborn, strengthens emotional bond of a mother baby duo and positively influence the duration of exclusive breastfeeding. The thick yellow milk produced during initial days also termed as colostrum, is an important source of nutrition and antibodies for the newborn. Therefore EIBF is one of the most urgent and non-negotiable indicator of nation's development. Globally, 67% newborn are exclusively breastfed for the first 2 days of birth, while EIBF is seen in only 46% newborn (UNICEF, 2023).With the rise in institutional deliveries, the responsibility of timely initiation and maintaining optimum breastfeeding practices has shifted from families and community health workers to doctors and nursing personnel. According to the National Family Health Survey (NFHS) - 5, India has witnessed significant rise in institutional births from 78.9% to 88.6% as an important health strategy to reduce maternal and neonatal mortality in India, while the similar surge has not been observed in early initiation of breastfeeding (EIBF) rate with meagre rise from 41.6% to 41.8% and small urban-rural disparity (44.7% vs 40.7%) (NFHS, 2021).Lack of knowledge, cultural practices of feeding other food to newborns, and shortfalls in the quality of care provided to mothers and newborns largely influence breastfeeding practices. With the change in place of delivery from home to hospital, the focus of research has now extended to study the breastfeeding practices in the healthcare settings, which often form a missing link as far as the initiation and continuation of breastfeeding is concerned. Literature search shows innumerable community based cross-sectional surveys on breastfeeding practices prevalent in our country which have provided valuable insights since ages but evidence from tertiary healthcare settings is lacking. In addition to maternal, neonatal and social determinants of exclusive breastfeeding (EBF), various healthcare delivery related factors also play an important role in facilitating optimum breastfeeding at an institutional level. These institute level factors might differ in various health care settings within the same country, with some factors being context-specific like availability of trained and skilled manpower, rationalised allocation of staff with ever increasing number of hospital deliveries. Thus identifying such barriers at an institutional level and formulating tailored interventions promoting breastfeeding are imperative. The present study was undertaken to gain insights into the breastfeeding practices among institutionally delivered newborns, prevalent in our health care facility with special emphasis on EIBF and EBF, and determine the factors affecting it.

2. Materials and Methods

The present study was a hospital based analytical cross-sectional study conducted in the postnatal ward of a tertiary care teaching hospital of western Uttar Pradesh. The study commenced after obtaining approval from the Institutional Ethics Committee and conducted over the span of two months from November to December 2023. Written informed consent was obtained from all the participants.

2.1 Study population:

All postnatal mothers of healthy newborns who delivered at our hospital during November to December 2023

2.2 Sample size calculation: :

Considering the prevalence of EIBF to be 42% (NFHS, 2021) with 5% permissible error, the sample size was calculated using the formula:

$$\text{Formula for sample size} = \frac{Z^2 \cdot P(1-P)}{E^2}$$

Where:

- Z at 95% confidence level is 1.96.
- P (estimated prevalence) is 42% or 0.42.
- E (margin of error) is 5% or 0.05.

The calculated sample size is:

$$374.32 \approx 375$$

Consecutive sampling was used to include study participants until the desired sample size was obtained.

2.2.1 Inclusion criteria:

Mothers of all healthy newborns delivered at our hospital during November to December 2023 and not requiring Neonatal Intensive Care Unit (NICU) admission at the time of birth.

2.2.2 Exclusion criteria:

Mothers of neonates with congenital malformations.

2.3 Data collection procedure:

The study participants were the postnatal mothers, who were provided with the information sheet. They were recruited after explaining the study in the language which they easily understand and taking their written informed consent. All postnatal mothers fulfilling the inclusion criteria were interviewed within 24 hours postpartum using a pre-validated and standard questionnaire. The questionnaire included details pertaining to antenatal, delivery and maternity period. It is a part of self-appraisal tool devised by Baby-friendly Hospital Initiative (BFHI) to be used by hospitals, maternity facilities for evaluating their current practices aimed at protecting, promoting and supporting breastfeeding (WHO, 2009) . The demographic details of participating mothers, obstetric history, newborn details, breastfeeding history, breastfeeding practices were recorded into a case proforma. The principal investigator conducted a face to face interview with study participants and the responses were filled into the questionnaire by him. We maintained the privacy and anonymity of the study participants and confidentiality of their information shared with us throughout the study.

2.4 Data analysis:

The data obtained was entered into Microsoft Excel and statistically analyzed using IBM-SPSS Version 28.0 Descriptive statistics was performed for the categorical variables and expressed as frequency and percentages. Chi-square test was applied to find out the statistical association of various socio-demographic factors with breastfeeding practices like EIBF and EBF. Logistic regression analyses were done to find out the determinants associated with EIBF and EBF and Adjusted Odds Ratio (AOR) with 95% confidence intervals were calculated. P-value less than 0.05 was considered to be statistically significant while interpreting the results.

3. Results and Discussion

A total of 375 mothers were recruited for the study. The mean maternal age was 24.5 ± 4.05 years and majority of the mothers, 290 (77%) belong to 21-30 years age group. 238 mothers (63%) received primary education while 40 mothers (11%) were illiterate. Majority of the mothers, 320 (85%) were Hindu by religion, 199 (53%) resided in rural areas, 191 mothers (51%) belong to lower socio-economic status and 167 mothers (45%) were from middle socio-economic background. Among 375 postnatal mothers, 205 (55%) delivered via caesarean section and 170 (45%) had normal vaginal delivery. Of the 375 newborns, majority 352 (94%) were at term gestation and 273 (73%) had normal birth weight.

3.1 Breastfeeding practices:

Out of 375 respondents, only 143 mothers (39.2%) initiated breastfeeding within one hour of the delivery. Pre-lacteal feed was given by 112 mothers (30.7%), while exclusive breastfeeding was practiced by 197 mothers (54%) (Table 1).

Table 1. Breastfeeding practices among the study participants

Characteristics	No.(%)
	n = 375
Early Initiation of breastfeeding	143 (39.2)
Delayed Initiation of breastfeeding	232 (63.6)
Pre-lacteal feed given	112 (30.7)
Exclusive breastfeeding	197 (54)

3.2 Factors associated with early initiation of breastfeeding :

In our study, the educational status of mother was found to be significantly associated with practice of early initiation of breastfeeding as seen in 133 mothers with primary education and above (p-value 0.012). Socio-economic status of mother significantly influenced (p-value < 0.001) their practice of EIBF as majority of mothers belonging to upper strata, 14 (82.3%) initiated breastfeeding early while mothers belonging to lower and middle socio-economic status had timely initiation of breastfeeding in only 69 (36.1%) and 60 (35.9%) cases. Mode of delivery was found to have statistically significant impact (p-value < 0.001) on EIBF rates as evident in 110 newborns (64.7%) born vaginally while among 205 newborns born via caesarean section, only 33 (16%) were breastfed within one hour of birth (Table 2). On bivariate logistic regression analysis (Table 3), various predictors determining EIBF were analysed using adjusted odd ratios (AOR) with 95% confidence interval (CI). Factors which are found to be statistically significant with $p < 0.05$ are described further.

In our study, likelihood of practicing EIBF were 13 times more among mothers belonging to upper socio-economic status (p=0.001,95%CI 2.8-62.5). Babies born via caesarean section were less likely to receive breastfeeding within one hour of birth as compared to newborns who were delivered vaginally (p <0.001, 95% CI 0.1-0.2). Newborn's gestational age (GA) also determines the readiness with which the breastfeeding can be initiated. EIBF was achieved in 139 term newborns (39.5%) with GA equal or more than 37 weeks while amongst preterm babies with GA less than 37 weeks, only four newborns (17.3%) were breastfed within one hour of birth (p= 0.035). Parity of mother is found to be significantly linked with practices influencing breastfeeding initiation as evident through this study. As compared to primipara mothers, early initiation of breastfeeding was seen to be 2.5 times more common among multipara mothers (p= 0.006, 95% CI 1.3-4.7).

Table 2. Factors associated with Early Initiation Of Breast Feeding(EIBF) among study participants

Variables		EIBF		Total	P Value
		YES	NO		
		143	232	375	
Education	No education	10	30	40	0.012
	Primary	104	134	238	
	High school and above	29	68	97	
Occupation	Housewife	111	186	297	0.555
	Working	32	46	78	
Place Of Residence	Rural	71	128	199	0.298
	Urban	72	104	176	
Number of Antenatal visits	No	12	22	34	0.677
	One	21	28	49	
	Two	34	48	82	
	Three	43	66	109	
	Four	33	68	101	
Socioeconomic status	Lower	69	122	191	< 0.001
	Middle	60	107	167	
	Upper	14	3	17	
Age of the mother (years)	$\leq$ 20	23	37	60	0.979
	21 - 30	110	180	290	
	$\geq$ 31	10	15	25	
Religion	Hindu	123	197	320	0.77
	Others	20	35	55	
Mode of delivery	Normal	110	60	170	<.001
	Caesarean section	33	172	205	
Gestational age of baby (in weeks)	< 37	4	19	23	0.035
	$\geq$ 37	139	213	352	
Parity of mother	0 parity	46	94	140	0.188
	1 parity	58	75	133	
	$\geq$ 2 parity	39	63	102	
Birth weight of baby (in kilogram)	< 2.5 Kg	40	62	102	0.79
	$\geq$ 2.5 Kg	103	170	273	

Table 3. Results of the Bivariate Logistic Regression Analysis of the determinants of EIBF

Independent variables	Category	P value	AOR	95% CI
Education	No education (Reference)		1	
	Primary	0.127	2.046	0.8-5.1
	High school and above	0.692	0.802	0.3-2.4
Occupation	Housewife (Reference)		1	
	Working	0.95	1.021	0.5-1.9
Place Of Residence	Rural (Reference)		1	
	Urban	0.157	1.509	0.8-2.7
Number of Antenatal visits	Zero (Reference)		1	
	One	0.991	0.993	0.3-3.1
	Two	0.958	1.028	0.4-2.9
	Three	0.816	1.124	0.4-3.0
	Four	0.503	0.708	0.3-1.9
Socioeconomic status	Lower (Reference)		1	
	Middle	0.693	1.114	0.6-1.9
	Upper	0.001	13.31	2.8-62.5
Age of the mother (years)	$\leq$ 20 (Reference)		1	
	21 - 30	0.689	0.862	0.4-1.8
	$\geq$ 31	0.971	1.025	0.3-3.8
Religion	Hindu (Reference)		1	
	Others	0.436	0.744	0.4-1.6
Mode of delivery	Normal (Reference)		1	
	Caesarean section	<.001	0.089	0.1-0.2
Gestational age of baby (in weeks)	< 37(Reference)		1	
	$\geq$ 37	0.105	2.965	0.8-11.0
Parity of mother	0 parity (Reference)		1	
	1 parity	0.006	2.494	1.3-4.7
	$\geq$ 2 parity	0.133	1.746	0.8-3.6
Birth weight of baby (in kilogram)	< 2.5 Kg (Reference)		1	
	$\geq$ 2.5 Kg	0.284	0.725	0.4-1.3

3.3 Factors associated with Exclusive breastfeeding :

Through this study we found that health care delivery factors like antenatal visits played an important role in promoting exclusive breastfeeding amongst the postnatal mothers. Of the total 375 mothers, 34 mothers had never attended antenatal clinic with EB seen in only nine (26.5%) mothers as compared to high EB rates (63.5%) amongst those who had frequent antenatal checkups (p=0.012). Maternal age at the time of delivery significantly affects the practice of exclusive breastfeeding as seen in this study. EB was seen in 40 (66.6%) mothers aged 20 years or less, while it varies from 40% -50.6% amongst mothers aged more than 20 years (p=0.034). In addition to EIBF rates, mode of delivery has significantly influenced the practice of exclusive breastfeeding among 375 postnatal mothers. Majority of the mothers who delivered vaginally 100 (58.8%) were able to exclusively breastfeed their babies while among 205 mothers who underwent caesarean section only 78 (38%) were able to do exclusive breastfeeding (Table 4). Through results of bivariate logistic regression analysis (Table 5), it was found that mothers receiving antenatal visits were five times more likely to follow exclusive breastfeeding in their babies as compared to the mothers who had never received antenatal care (p= 0.001, 95% CI 1.9-14.5). Young mothers aged 20 years or less were observed to follow EBF more as compared to mothers aged 21-30 years (p=0.056, 95% CI 0.3-1.0). Mode of delivery proved to be a significant predictor in promoting exclusive breastfeeding. EB was seen more amongst the newborns delivered normally as compared to caesarean deliveries (p<0.001, 95% CI 0.3-0.7)

Table 4. Factors associated with Exclusive breastfeeding among study participants

Variable	Exclusive Breastfeeding				
		No	Yes	Total	P Value
	Total	178	197	375	
Education	No education	20	20	40	0.864
	Primary	114	124	238	
	High school and above	44	53	97	
Occupation	Housewife	148	149	297	0.074
	Working	30	48	78	
Place Of Residence	Rural	100	99	199	0.251
	Urban	78	98	176	
Number of Antenatal visits	Zero	25	9	34	0.012
	One	18	31	49	
	Two	34	48	82	
	Three	54	55	109	
	Four	47	54	101	
Socioeconomic status	Lower	92	99	191	0.588
	Middle	80	87	167	
	Upper	6	11	17	
Age of the mother (years)	≤ 20	20	40	60	0.034
	21 - 30	143	147	290	
	≥ 31	15	10	25	
Religion	Hindu	151	169	320	0.794
	Others	27	28	55	
Mode of delivery	Normal	100	70	170	<.001
	Caesarean section	158	46	205	
Gestational age of baby (in weeks)	< 37	7	16	23	0.091
	≥ 37	171	181	352	
Parity of mother	0 parity	66	74	140	0.931
	1 parity	62	71	133	
	≥ 2 parity	50	52	102	
Birth weight of baby (in kilogram)	< 2.5 Kg	44	58	102	0.305
	≥ 2.5 Kg	134	139	273	

Table 5. Results of the bivariate Logistic Regression Analysis of the determinants of Exclusive Breastfeeding

Independent variables	Category	P value	AOR	95% CI
Education	No education (Reference)		1	
	Primary	0.99	0.995	0.5-2.1
	High school and above	0.899	0.944	0.4-2.3
Occupation	Housewife(Reference)		1	
	Working	0.081	1.636	0.9-2.8
Place Of Residence	Rural (Reference)		1	
	Urban	0.352	1.263	0.8-2.1
Number of Antenatal visits	Zero (Reference)		1	
	One	0.001	5.298	1.9-14.7
	Two	0.006	3.714	1.5-9.4
	Three	0.027	2.728	1.1-6.6
	Four Visit	0.017	3.024	1.2-7.5
Socioeconomic status	Lower (Reference)		1	
	Middle	0.74	1.08	0.7-1.7
	Upper	0.233	1.971	0.6-6.0
Age of the mother (years)	$\leq$ 20 (Reference)		1	
	21 - 30	0.056	0.534	0.3-1.0
	$\geq$ 31	0.098	0.392	0.1-1.2
Religion	Hindu (Reference)		1	
	Others	0.851	0.942	0.5-1.8
Mode of delivery	Normal (Reference)		1	
	Caesarean section	<.001	0.41	0.3-0.7
Gestational age of baby (in weeks)	< 37(Reference)		1	
	$\geq$ 37	0.171	0.514	0.2-1.3
Parity of mother	0 parity (Reference)		1	
	1 parity	0.494	1.206	0.7-2.1
	$\geq$ 2 parity	0.619	1.166	0.6-2.1
Birth weight of baby (in kilogram)	< 2.5 Kg (Reference)		1	
	$\geq$ 2.5 Kg	0.326	0.777	0.5-1.3

3.4 Discussion:

The present cross-sectional analytical study assessed the breastfeeding practices among institutionally delivered newborns at a tertiary care teaching hospital of western Uttar Pradesh. Of 375 postnatal mothers recruited into the study, majority of them 290 (77%) were aged 21-30 years. Through this study we found that 143 (39.2%) mothers initiated breastfeeding within 1 hour after delivery and approximately 197 (54%) mothers followed exclusive breastfeeding in their babies. A cross-sectional hospital based survey of 1000 women revealed that only 45% mothers initiated breastfeeding within one hour of delivery (Sultania *et al.,* 2019) The national and the state EIBF and EBF rates are 41.8%, 23.9% and 63.7%, 59.7% respectively (NFHS, 2021; NFHSUP, 2021). Factors determining the breastfeeding practices among the study participants are further explored. Maternal education, socio-economic status, mode of delivery and parity of mother were found to be strong predictors for EIBF in our study. The practice of EBF was significantly linked with the maternal age, antenatal visits and mode of delivery as observed through this study.

We observed EIBF among 143 (39.2%) postnatal mothers in our study. Studies from various states across the nation reported varying EIBF rate ranging from 18.6% to 82.6% (Sharma *et al.,* 2020; Soren *et al.,* 2021; Mary *et al.,* 2022; Sharma *et al.,* 2023; Rasaily *et al.,* 2024; Senanayake *et al.,* 2019; Afrin *et al.,* 2021). The disparity observed among EIBF rate is attributed to variations in study design, socio-cultural practices, ethnic factors prevalent in these regions.

The present study showed that mothers belonging to upper socio-economic status had 13.31 times higher odds to initiate breastfeeding within 1 hour after birth than mothers with lower and middle socio-economic profile. This was in accordance with the findings reported by other studies (Sharma *et al.,* 2020; Mary *et al.,* 2022; Sharma *et al.,* 2023). The possible explanation might be that economically deprived mothers are usually less educated, have limited access to health care services and thus less likely to receive counseling pertaining to breastfeeding, and lesser awareness about the significance of early initiation of breastfeeding. Thus interventions aimed at raising the awareness of EIBF should specifically address the economically weaker sections of the society. Importance of formal education in mothers results in better breastfeeding knowledge and practices as highlighted by a similar study from a tertiary care hospital (Kumar *et al.,* 2021).

Mothers who had cesarean delivery were associated with less likelihood of early initiation of breastfeeding as well as exclusive breastfeeding compared to those with vaginal delivery. This observation is congruous with the other studies reported from India and worldwide (Sharma *et al.,* 2020; Soren *et al.,* 2021; Mary *et al.,* 2022; Sharma *et al.,* 2023; Senanayake *et al.,* 2019; Ahinkorah *et al.,* 2022; Alissa & Alshareef, 2024). The underlying reasons are manifold, which include maternal lassitude, post-operative pain, lack of early skin-to-skin contact because of involvement of nursing staff in assisting the mother's post-operative recovery. This can be mitigated by scaling up of the physical and emotional support to these mothers and providing a supportive environment to them by their family members. Besides this, the nursing staff and healthcare workers need to be apprised about the impediments in initiating early breastfeeding among mothers with cesarean section, and training on how to practice skin-to-skin contact and breast crawl in such mothers.

Parity of mother has shown to have significant influence on early initiation of breastfeeding in our study. Mothers with birth order two or more were more likely to practice EIBF as compared to mothers with birth order one. Similar results were reported by Ahinkorah et al through an international study on maternal and child factors associated with EIBF in Chad (Ahinkorah *et al.,* 2022). Maternal inexperience in context to breastfeeding, lack of confidence, anxiety and poor health seeking behavior by first time mothers are the contributory factors resulting in delayed initiation of breastfeeding amongst them. Therefore focused counseling of primiparous women both antenatally and during postnatal period is imperative to bridge this gap in breastfeeding practices. Mother's residential status had no impact on the breastfeeding practices as observed in this study. This could be because of equity in distribution of healthcare interventions for both rural and urban

population residing near to this tertiary healthcare facility, leading to similar breastfeeding practices. Contrary to it, Soren et al reported that mothers in rural areas are more inclined to timely initiate breastfeeding this is mainly due to government-funded rural specific maternal and child health (MCH) interventions which aimed to address the health needs of under-served rural areas (Soren *et al.,* 2021).

Mary et al observed that baby's birth weight of less than 2,500 g was a significant factor for delayed breastfeeding initiation. The possible explanation of the delay in EIBF could be due to poor suckling capacity, swallowing difficulty and poor co-ordination of a premature baby and requirement of admission in a NICU due to medical conditions like respiratory distress, jaundice, meconium aspirations (Mary *et al.,* 2022).In contrast to it, we did not find any significant association between baby's birth weight and timely initiation of breastfeeding. It is mainly due to the study's inclusion criteria where mothers who delivered healthy newborns not requiring NICU admissions were recruited. Antenatal counselling on breastfeeding and breast examination during ANC visits at healthcare centres plays a pivotal role in facilitating timely initiation of breastfeeding and sustaining exclusive breastfeeding thereafter (Majra & Silan, 2016).Such visits act as bridgehead of the mothers to have contact with the healthcare professionals (Mary *et al.,* 2022).We also had similar observations through this study, as mothers who attended ANC clinics were more likely to follow exclusive breastfeeding in their babies as compared to the mothers who had no contact with healthcare professionals during the entire antenatal period. This was consistently reported by various authors (Soren *et al.,* 2021; Mary *et al.,* 2022; Sharma *et al.,* 2023; Srivastava & Awasthi, 2014).Breast conditions like inverted/retracted nipple if addressed well before the baby's birth, help these mothers to be more receptive and prepare them for early initiation of breastfeeding and exclusive breastfeeding till the recommended age group. On contrary to other studies, we did not observe any significant association of ANC visits in promoting EIBF. The possible reasons were lack of awareness and counselling on EIBF by healthcare workers when expectant mothers seek antenatal care.

The use of pretested, validated and structured questionnaire devised by BFHI, which is also used as self-appraisal tool by the hospitals for assessing the breastfeeding practices at an institutional level added more objectivity to the study. To minimize recall bias, mothers were interviewed within 24 hours of delivery and collection of the data by a single investigator strengthened the study further. Being a hospital based cross-sectional study, causality of the various factors identified could not be ascertained nor the findings obtained from the study can be generalised at a community level.

Realising the huge gap between what is recommended and what actually gets implemented, there is an intriguing need for the future research to understand the perspectives of healthcare systems and the dynamics involved in effective implementation of policies at the grass root level.

4. Conclusions

The present study concluded that the breastfeeding practices like timely initiation of breastfeeding and exclusive breastfeeding among the institutionally delivered newborns are comparatively low as opposed to the nation's average value. Educational status, socio-economic profile, mode of delivery, parity, and health seeking behaviour of mothers proved to be the significant factors determining breastfeeding practices at an institutional level. This implies further scaling up of the intervention strategies tailored as per the risk factors identified in a given set of population. Antenatal counselling needs to be strengthened especially with identified bottlenecks like primiparous women, economically underprivileged, and uneducated mothers. Breastfeeding counselling and adequate lactation support is imperative during the postnatal phase also, mainly for the first time mothers, caesarean deliveries, and mothers with poor healthcare seeking attitude. Periodic audits on breastfeeding practices and healthcare delivery factors by the quality team / healthcare professionals will play an instrumental role in improvising and reinforcing good clinical practices at an institutional level. The observations of our study shall be useful in planning Quality Improvement

(QI) initiatives in a healthcare setting and will bring us more close towards the attainment of Sustainable Development Goal of ensuring everyone's health and wellbeing.

Acknowledgments

Our sincere thanks and gratitude to all the nursing staff, doctors, and medical interns, of the Department of Paediatrics and Obstetrics for their relentless support and co-operation while conducting the study. We are also thankful to all the postnatal mothers who participated in this study. This study being a part of ICMR-STS 2023 project, deeply acknowledge the guidance provided by ICMR-STS Program.

Conflicts of Interest

No potential conflict of interest was reported by the authors.

Author Contributions

Conceptualization: BHATNAGAR, R.; GUPTA,P.; **Data curation:** BHATNAGAR,R.; GUPTA,P.; BHARTI,A. **Formal analysis:** GUPTA,P.; BHARTI,A. **Funding acquisition:** - **Investigation:** BHATNAGAR, R.;GUPTA,P.;BHARTI,A. **Methodology:** BHATNAGAR, R.; GUPTA,P. **Project administration:** BHATNAGAR, R.; GUPTA,R.; **Software:** - **Resources:** BHATNAGAR, R.; GUPTA,R. **Supervision:** BHATNAGAR, R.; GUPTA,R. **Validation:** BHARTI,A. **Visualization:** - **Writing - original draft:** BHATNAGAR, R.; GUPTA,P.; GUPTA,R. **Writing - review and editing:** BHATNAGAR, R.; GUPTA,R.

References

1. Afrin, I., Khan, A. A. & Imtiaz, D. A cross sectional study on breastfeeding practices among mothers of rural population in Bareilly district. *International Journal of Health and Clinical Research* **4,** 160–163. ISSN: 2590-3241. https://ijhcr.com/index.php/ijhcr/article/view/2626 (16 Sept. 2021).
2. Ahinkorah, B. O., Seidu, A. A., Budu, E., Mohammed, A., Adu, C., Ameyaw, E. K., Kissah-Korsah, K., Adoboi, F. & Yaya, S. Maternal and child factors associated with early initiation of breastfeeding in Chad: evidence from nationally representative cross-sectional data. *International Health* **14,** 510–518. ISSN: 18763405. https://dx.doi.org/10.1093/inthealth/ihab060 (5 Sept. 2022).
3. Alissa, N. & Alshareef, M. Factors Influencing Exclusive Breastfeeding in Saudi Arabia. *Healthcare 2024, Vol. 12, Page 639* **12,** 639. ISSN: 2227-9032. https://www.mdpi.com/2227-9032/12/6/639/htmhttps://www.mdpi.com/2227-9032/12/6/639 (6 Mar. 2024).
4. Kumar, B., Bose, T., Das, S., Gupta, A. K., Kumar, A. & Bhandari, A. An assessment of knowledge and practices of breastfeeding among mothers having child less than 2 years of age in a city of central Uttar Pradesh, India. *International Journal of Contemporary Pediatrics* **8,** 48–54. ISSN: 2349-3291. https://www.ijpediatrics.com/index.php/ijcp/article/view/3976 (1 Dec. 2021).
5. Majra, J. P. & Silan, V. K. Barriers to early initiation and continuation of breastfeeding in a tertiary care institute of haryana: A qualitative study in nursing care providers. *Journal of Clinical and Diagnostic Research* **10,** LC16–LC20. ISSN: 0973709X (9 Sept. 2016).

6. Mary, J. J. F., Sindhuri, R., Kumaran, A. A. & Dongre, A. R. Early initiation of breastfeeding and factors associated with its delay among mothers at discharge from a single hospital. *Clinical and Experimental Pediatrics* **65,** 201. ISSN: 27134148. /pmc/articles/PMC8990951//pmc/articles/PMC8990951/?report=abstracthttps://www.ncbi.nlm.nih.gov/pmc/articles/PMC8990951/ (4 Apr. 2022).
7. NFHS. *National Family Health Survey (NFHS-5), 2019-21: India: Volume II.Mumbai,International Institute for Population Sciences (IIPS)* 2021.
8. NFHSUP. *National Family Health Survey (NFHS-5), India, 2019-21: Uttar Pradesh.* 2021.
9. Rasaily, R., Pathak, J., Borah, K., Chetry, P., Borah, N., Dutta, M., Borah, P. K. & Borah, K. Correlates of Breastfeeding in Villages and Tea-Gardens in Assam, India. *INDIAN PEDIATRICS* **210,** 2022 (2024).
10. Senanayake, P., O'Connor, E. & Ogbo, F. A. National and rural-urban prevalence and determinants of early initiation of breastfeeding in India. *BMC Public Health* **19,** 1–13. ISSN: 14712458. https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-7246-7 (1 July 2019).
11. Sharma, J., Pandey, S. & Negandhi, P. Determinants of suboptimal breastfeeding in Haryana - An analysis of national family health survey-4 data. *Indian journal of public health* **64,** 285–294. ISSN: 0019-557X. https://pubmed.ncbi.nlm.nih.gov/32985431/ (3 July 2020).
12. Sharma, M., Anand, A., Goswami, I. & Pradhan, M. R. Factors associated with delayed initiation and non-exclusive breastfeeding among children in India: evidence from national family health survey 2019-21. *International Breastfeeding Journal* **18,** 1–13. ISSN: 17464358. https://internationalbreastfeedingjournal.biomedcentral.com/articles/10.1186/s13006-023-00566-0http://creativecommons.org/publicdomain/zero/1.0/ (1 Dec. 2023).
13. Soren, S. K., Sahu, S., Kujur, A., Dandpat, A., Kashyap, V., Kumari, P., Ragini, K. J., Kumari, A. & Kumar, D. Predictors of Breastfeeding Initiation Among Postnatal Mothers at Tertiary Care Center of a Tribal Dominant State in India: A Regression Analysis. *Cureus* **13.** ISSN: 2168-8184. https://pubmed.ncbi.nlm.nih.gov/34513506/ (8 Aug. 2021).
14. Srivastava, N. M. & Awasthi, S. Breastfeeding practices for newborns among urban poor in Lucknow, northern India: A prospective follow-up study. *Clinical Epidemiology and Global Health* **2,** 66–74. ISSN: 2213-3984 (2 Aug. 2014).
15. Sultania, P., Agrawal, N. R., Rani, A., Dharel, D., Charles, R. & Dudani, R. Breastfeeding knowledge and behavior among women visiting a tertiary care center in India: A cross-sectional survey. *Annals of Global Health* **85.** ISSN: 22149996 (1 2019).
16. UNICEF. *United Nations Children's Fund, Division of Data, Analysis, Planning and Monitoring,UNICEF Global Databases: Infant and Young Child Feeding: Ever breastfed, Early initiation of breastfeeding, Exclusively breastfed for the first two days after birth* 2023.
17. WHO. *BABY-FRIENDLY HOSPITAL INITIATIVE:Revised Updated and Expanded for Integrated Care SECTION 4 HOSPITAL SELF-APPRAISAL AND MONITORING* 2009.
18. WHO. *Breastfeeding-early initiation,World Health Organization* 2021.