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Determinants of Initiation of Breastfeeding: A Cross-Sectional Study

Research Article

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Abstract

Background: Breastfeeding is essential for the well-being of infants as well as mothers, providing numerous health benefits and promoting bonding. [1] However, improper breastfeeding practices contribute to neonatal mortality, accounting for significant proportion of child deaths under five. This study aims to investigate factors associated with initiation of breastfeeding.

Methods: This hospital-based cross-sectional study was conducted over a period of one year, involving 500 mothers-neonate dyads, admitted in the postnatal ward. Socioeconomic and maternal factors, including maternal stress, were assessed using the Perceived Stress Scale (PSS) and the Edinburgh Postnatal Depression Scale (EPDS) [2]. Early initiation of breastfeeding was defined as breastfeeding starting within one hour of birth.

Results: Majority of mothers (71.8%) were aged 18-25 years and resided in urban areas (66.6%). Most mothers (88.2%) were housewives. Maternal stress assessment revealed that 73% had low stress, and 82.6% did not report any depression. Maternal age, parity, delivery mode, pregnancy complications, and pain interfering with breastfeeding were associated with delayed initiation of breastfeeding. On multivariate analysis, cesarean section (LSCS) and pain (various reasons) were the two main factors which contributed to delayed initiation of breastfeeding.

Conclusion: Understanding these factors can aid in promoting early breastfeeding initiation and addressing challenges faced by mothers. Improving breastfeeding practices is crucial to reduce neonatal and child mortality, enhance maternal and infant health, and strengthen the mother-infant bond. Health interventions and support programs should target the identified factors to foster optimal breastfeeding practices and improve maternal and neonatal outcomes.

Keywords: Breastfeeding; Cross-Sectional Study; Neonatal Mortality; Maternal Stress; Pain

Introduction

Breastfeeding is crucial, offering numerous benefits to both mothers and infants. It enhances bonding and provides essential growth factors, immune factors, hormones, and bioactive components. Mothers benefit from reduced risks of breast cancer, ovarian cancer, and type 2 diabetes [3]. For infants, breastfeeding lowers the chances of pneumonia, diarrhea, childhood obesity, atopic diseases, juvenile diabetes, and sudden infant death syndrome, while promoting neurodevelopmental growth [4].

Improper breastfeeding practices and pre-lacteal feed contribute to neonatal mortality, responsible for around 40% of deaths among children under five [5]. Understanding factors related to early breastfeeding initiation is vital for promoting optimal breastfeeding.

Several factors influence early breastfeeding, including socioeconomic factors (area of residence, region, paternal education, and income) and maternal factors (age at marriage, antenatal care, birth preferences, physical abuse risk, multiparity, breast issues, medication, attachment, positioning, and stress) [6].

Early initiation, starting breastfeeding within one hour after birth, is a critical intervention to prevent neonatal and child deaths, endorsed by the American Association of Pediatrics (AAP) [7].

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Benefits of early initiation are manifold. It increases colostrum intake, providing infection-fighting antibodies and nutrients. Skin-to-skin contact regulates neonates' temperature and triggers oxytocin release, reducing postpartum complications for mothers. It strengthens the mother-newborn bond, facilitating successful exclusive breastfeeding for six months. Moreover, it enhances maternal immunity, delays subsequent pregnancies, and lowers insulin needs for diabetic mothers [1-6].

This study aims to analyze various neonatal and maternal factors that affect breastfeeding initiation. Specifically, maternal stress, recognized as a significant factor impacting initiation and continuation of breastfeeding, is objectively assessed using two scales: the Edinburgh Postnatal Depression Scale and the Perceived Stress Scale. By investigating these factors, we seek to gain insights into promoting optimal breastfeeding practices and addressing the challenges faced by mothers in initiating breastfeeding early.

Materials and methods

Study Design

Hospital-based cross-sectional study

Study Period

One year

Sample Size

The total sample size was calculated using the formula = $4pq/d^2$, assuming a prevalence of initiation of breastfeeding to be 50%, a confidence interval of 95%, and an error of 5%. The calculated sample size was N=500.

Consent

Written and informed consent were obtained from mothers admitted to the postnatal ward. Information was provided in a language that the mothers could understand, as the consent form and patient information sheet were bilingual.

Inclusion Criteria

All mothers-infant dyad admitted to the postnatal ward with their babies

Exclusion Criteria

a) Mothers admitted to the obstetric ICU

b) Mothers whose babies were referred to neonatal intensive care.

Study tool

Pretested semi-structured proforma.

Methodology

Permission to conduct the study was obtained by institutional ethical

committee. Data collection was done using semi-structured proforma. All interviews were conducted by face-to-face by the investigator who collected data on maternal and neonatal demographic variables and clinical findings of the study participants. It also included information on maternal stress using Perceived stress scale (PSS) and Edinburgh postnatal depression scale.

Stress scales

1) Perceived Stress Scale

The perceived stress scale is most widely used psychological instrument for measuring the perception of stress. It is a self-reported questionnaire that was designed to measure "the degree to which individuals appraise situations in their lives as stressful" 10-item scale (PSS-10) , with 4 positive items and 6 negative items rated on a 5-point Likert scale. Scoring – PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items. Stress level are classified as to the points on likert scale as- Low stress (0-13), Moderate stress (14-26) and High perceived stress (27-40)

2) Edinburgh Postnatal Depression Scale

The Edinburgh Postnatal Depression Scale (EPDS) is one of the most widely used screening instruments for assessing symptoms of perinatal depression and anxiety. This is a 10-item scale with each item scored from 0 to 3. Maximum score: 30 Possible Depression: 10 or greater Always look at item 10 (suicidal thoughts). The mother was screened for possible PPD using the 10-item well-validated Edinburgh PPD Scale (EPDS) in hindi language

(2) with responses varying from 0 to 3 for each item. The cutoff point to screen the PPD is decided as score more than 10.5 based on a study done by **Desai *et al.*** to validate the EPDS in Gujarat language with a specificity of 98% and sensitivity 100% It assesses emotional experiences over the past seven days using ten Likert-scale items. Scoring is as: Depression not likely (<8), Depression possible (9-11), Fairly high possibility of depression (12-13) and Probable depression (14 and higher)

Ethical Clearance

The study was initiated after obtaining permission from the institutional ethical committee (letter number: 478/MC/IEC/2020).

Statistical analysis

The collected data were transformed into variables, coded and entered in Microsoft Excel. Data were analyzed and statistically evaluated using SPSS-PC-25 version. Quantitative data was expressed in mean ± standard deviation and depends on normality distribution difference between two comparable groups were tested by student's t-test (unpaired) or Mann Whitney 'U' test. Qualitative data were expressed in percentage and statistical differences between the proportions were tested by chi square test or Fisher's exact test. All the factors which were found to be significant in univariate analysis were included in the multiple logistic regression model and adjusted odds ratio along with 95% CI was calculated for delayed initiation of breastfeeding.

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Results

Maternal and neonatal parameters

Table 1 represents sociodemographic profile of mothers of neonates admitted in postnatal ward. Out of 500 mothers, 71.8% mothers belonged to age range of 18 to 25 years. In the study, maximum mothers were resident of urban area (66.6%) and majority of them (40.4%) were educated up to high school. In our study 88.2% of mothers were housewives and 11.8% females were working mothers. Obstetric profile of mothers has been displayed in Figure 1. Majority of mothers were primigravida (46.2%). Mode of delivery was vaginal and LSCS in 56.8% and 43.2% cases respectively. The study revealed 68.6% of mothers had pregnancy complications.

Neonatal demographic parameters have been displayed in table 2.59% of neonates aged between less than 24-72 hours. Male predominance was observed which accounted to 56% and majority of neonates were full term i.e 432 (86.4%) Birthweight of 77.4% of neonates was more than 2.5 kg whereas 21.4% neonates had birth weight ranged between 1.8 to 2.49 kgs.

73% of mothers had low self-perceived stress. When considering EPDS score, out of 500 mothers 82.6% did not report any depression while 12% mothers had possible depression. Early initiation of breastfeeding was observed in 45.6% of mothers.

Table 1: Socio-demographic parameters of mother

Variables	Category	Frequency (n=500)	Percentage (%)
Age (years)	Upto 18 years	1	0.2
	18-25 years	359	71.8
	26-30 years	98	19.6
	31-35 years	26	5.2
	>35 years	16	3.2
Mean maternal age	24.2		
Residence	Rural	167	33.4
	Urban	333	66.6
Education	Illiterate	138	27.6
	Primary	117	23.4
	High school	202	40.4
	Higher secondary	12	2.4
	Graduate and above	31	6.2
Occupation	Non-working	441	88.20%
	Working	59	11.80%

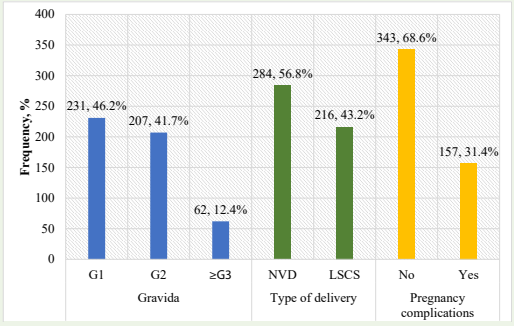

Figure 1: Distribution according to Obstetric profile of mothers (n=500)

Table 2: Neonatal demographic parameters

Variables	Category	Frequency (n=500)	Percentage (%)
Age (days)	1-3 days	295	59
	4-7 days	194	38.8
	>7 days	11	2.2
Gender	Male	280	56
	Female	220	44
Gestational age	<37 weeks	64	12.8
	37-42 weeks	432	86.4
	>42 weeks	4	0.8
Birth weight	<1.8 kgs	6	1.2
	1.8-2.49 kgs	107	21.4
	≥2.5 kgs	387	77.4

Table 3: Distribution of other maternal factors

Variables	Category	Frequency (n=500)	Percentage (%)
Type of feeding	Direct	339	67.8
	Expressed	107	21.4
	Top milk	54	10.8
Perceived Self Stress Category	Low self-perceived stress	365	73
	Moderate stress	135	27
EDPS category	Depression not likely (<8)	413	82.6
	Depression possible	60	12
	Fairly high possibility of depression	16	3.2
	Probable depression	11	2.2
Time of initiation of Breastfeeding	Upto 1 hrs	228	45.6
	After >1 hrs	272	54.4

Univariate analysis

Table 4 presents the relationship between various parameters and the initiation of breastfeeding. In terms of neonatal parameters, 46.1% of male neonates and 45% of female neonates had early initiation of breastfeeding. Additionally, 44.2% of low birth weight (LBW) neonates and 44.9% of preterm neonates had early initiation of breastfeeding. However, difference in none of these neonatal parameters showed a statistically significant association with the initiation of breastfeeding.

Regarding maternal factors, 39.5% of mothers residing in rural areas-initiated breastfeeding within one hour, while 48.6% of mothers living in urban areas did the same. This difference was also not found to be statistically significant ($p>0.05$). Among literate mothers, 50.7% initiated breastfeeding within one hour, whereas 43.6% of illiterate mothers did the same, and this difference was not statistically significant ($p>0.05$). Furthermore, 46.7% of non-working mothers had early initiation of breastfeeding, whereas only 36.7% of working mothers-initiated breastfeeding within one hour. Again, this difference was not statistically significant.

The mean maternal age for early initiation of breastfeeding was 23.48±4.11, while for delayed initiation, it was 24.80±4.80. This difference of maternal age and initiation time was found to be statistically significant ($p<0.01$).

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Table 4: Association tables (Univariate analysis)

Variable	Category	Group, n(%)		P value	Odds ratio (95% CI)
		Early initiation	Late initiation		
Neonatal demography					
Gender	Male	129 (46.1)	151 (53.9)	0.81	0.95 (0.67-1.36)
	Female	99 (45.0)	121 (55.0)		-
Birth weight (Kgs)	<2.5	57 (44.2)	56 (55.8)	0.24	0.77 (0.51-1.18)
	≥2.5	171 (50.4)	216 (49.6)		
Mean birth weight		2.70±0.45	2.80±0.43	0.07	
Gestational age (weeks)	<37	31 (44.9)	33 (55.1)	0.43	3.19 (0.31-32.35)
	37-42	194 (48.4)	238 (51.6)		3.68 (0.37-35.66)
	>42	3 (75.0)	1 (25.0)		-
Median gestational age (IQR)		38 (37-40)	38.2 (37.4-40.0)	0.27	
Maternal demography					
Residence	Rural	66 (39.5)	101 (60.5%)	0.05	1.44 (0.99-2.11)
	Urban	162 (48.6)	171 (51.4%)		
Maternal educational	Literate	70 (50.7)	68 (49.3%)	0.15	0.75 (0.50-1.11)
	Illiterate	158 (43.6)	204 (56.4%)		
Mother's occupation	Non working	206 (46.7)	235 (53.3%)	0.14	0.66 (0.37-1.15)
	Working	22 (36.7)	38 (63.3%)		
Mean maternal age		23.48±4.11	24.80±4.80	<0.01	
Maternal factors					
Gravida	1	109 (44.9)	122 (55.1)	0.23	-
	2	97 (48.4)	110 (51.6)		1.01 (0.69-1.47)
	≥3	22 (75.0)	40 (25.0)		1.62 (0.90-2.90)
Pregnancy compli- cations	No	168 (49.0)	175 (51.0)	0.02	-
	Yes	60 (38.2)	97 (61.8)		1.55 (1.05-2.28)
Pain interfering with BF	No	190 (47.9)	207 (52.1)	0.04	-
	Yes	38 (36.9)	65 (63.1)		1.57 (1.01-2.45)
Type of delivery	NVD	208 (73.2)	76 (26.8)	<0.001	0.03 (0.02-0.06)
	LSCS	20 (9.3)	196 (90.7)		-
Maternal stress associated with initiation of breastfeeding					
PSS score	0-13	168 (46.0)	197 (54.0)	0.75	-
	14-26	60 (44.4)	75 (55.6)		1.06 (0.71-1.58)
EDPS score	≤8	186 (45.0)	227 (55.0)	0.9	-
	9-11	30 (50.0)	30 (50.0)		0.81 (0.48-1.40)
	12-13	7 (43.8)	9 (56.2)		1.05 (0.38-2.88)
	≥14	5 (45.5)	6 (54.5)		0.98 (0.29-3.27)

The preceding data examines maternal factors linked to the initiation of breastfeeding. Among primiparous women, delayed initiation was observed in 55.1%, while among multiparous women, the rate was 25% (p>0.05). In women with pregnancy complications, 63.1% experienced delayed initiation, whereas in women without pregnancy complications, the rate was 52.1%. This association was found to be statistically significant with a p-value of 0.02, suggesting that pregnancy complications may impact breastfeeding initiation.

Furthermore, for women experiencing pain, initiation was delayed in 63.1% of neonates. This association was also found to be statistically significant, with a p-value of 0.04, suggesting that pain during breastfeeding influences the timing of initiation. Moreover, among women with vaginal delivery, 26.8% experienced delayed initiation, while a significantly higher proportion of 90.7% of women who underwent LSCS experienced delayed initiation. This difference was found to be statistically significant (p<0.001).

In regard with association of maternal stress. Among mothers with low perceived stress, delayed initiation was observed in 54% of cases, while among mothers with moderate stress, the rate was 55.6% (p>0.05). Additionally, mothers without depression had a delayed initiation rate of 54%, whereas mothers with probable depression had a slightly higher rate of 54.5%.

Multivariate logistic regression analysis

Table 5 presents Multivariate logistic regression analysis of independent factors for delayed initiation of breastfeeding. All the factors which were found to be significant in univariate analysis were included in the multiple logistic regression model. After adjusting for other factors, the independent predictors for delayed initiation of breastfeeding were LSCS delivery [AOR = 29.65 (95% CI: 16.82, 52.26)], and pain interfering with breastfeeding [AOR = 1.66 (95% CI: 1.06, 3.19)].

Discussion

Breastfeeding after one hour of birth increases the risk of

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Table 5: Multivariate logistic regression analysis of independent factors for delayed initiation of breastfeeding

Factors/ Characteristics		Ref	Exp(β)/ Odds ratio (95% CI)	P value
Type of delivery	NVD	Ref	29.65 (16.82-52.26)	<0.001
	LSCS			
Residence	Urban	Ref	1.03 (0.63-1.71)	0.88
	Rural			
Pregnancy complications	No	Ref	1.13 (0.66-1.91)	0.64
	Yes			
Pain interfering with breastfeeding	No	Ref	1.66 (1.06-3.19)	0.02
	Yes			
Maternal age			1.02 (0.94-1.11)	0.91

infant mortality, according to a systematic review[8]. Many factors, including mode of delivery, mother's parity, maternal stress, insufficient milk supply, and maternal illness, are negatively associated with successful breastfeeding, resulting in delays in early breastfeeding initiation (within the first hour of birth) and reduced duration of exclusive breastfeeding for infants. Breastfeeding should be started as soon as possible, preferably within one hour, according to WHO recommendations.[9]

Analysis of a large cohort of almost 100,000 newborns from three large trials conducted in India, Ghana and Tanzania had shown that in comparison to infants who started breastfeeding during the first hour of life, the risk of neonatal death was 41 percent and 79 percent greater in infants who started breastfeeding between 2-23 hours and 24-96 hours after delivery, respectively. [8].

In our study the early initiation of breastfeeding was practiced in 45.6% of newborns. Gupta et al.and Sharma et al [10,11] reported breast feeding within one hour in 40%, and 38.6% of newborns respectively. This rate is less than 50% and it clearly indicates that majority of newborns are not fed timely even after the institutional deliveries in India are almost 95% [5]

Neonatal factors affecting initiation of breastfeeding

In present study the. mean gestational age of neonates was (38.2 +1.780) weeks. 44.9% of preterm infants were breastfed within one hour of birth, whereas breastfeeding was started early in 48.4% and 75% of full-term and post-term newborns, respectively. The findings were contrary with observations of Ayton et al and Meckonen et al who concluded that late preterm and term neonates had lower rates of early initiation of breastfeeding [12,13]. In our study, 46.1% of mothers with male newborns-initiated breast feeding within one hour, which was comparable to other studies [14]. Though the differences in initiation of breast feeding as per gestational age and gender are not statistically significant.

In our study, 44.2% of low-birth-weight neonates were breastfed early. These findings were similar to other studies where no association between birthweight and initiation of breastfeeding was established.

Maternal factors affecting initiation of breastfeeding

The study showed 50.7% of literate mothers and 43.6% of illiterate mothers started breastfeeding within an hour. The association between maternal literacy and breastfeeding initiation was not statistically significant. This observation is significant as rural women are usually illiterate but they can be motivated to breast feed early by observing peers in institutional deliveries, thus this could be one more benefit of institutional deliveries.39.5% of mothers residing in rural areas whereas 48.6% of those from urban areas-initiated breastfeeding within one hour. This observation is similar with the study conducted by Khanal et al. and may reflect better exposure to appropriate breastfeeding practices among urban mothers [15].

In current study, mothers with complications during pregnancy had a lower rate of early breastfeeding initiation (38.4%). Antepartum hemorrhage, postpartum hemorrhage, and eclampsia were among the illnesses that required intensive care treatment, leading to delayed initiation of breastfeeding. Complications during pregnancy were significantly associated with late initiation of breastfeeding. Working mothers (36.7%) in our study had a slightly lower rate of early breastfeeding initiation compared to non-working women (46.7%), as observed in other studies as well [16,17]. In our study mothers who experienced pain interfering with breastfeeding (36.9%) also had delayed initiation, with mastitis, breast engorgement, and pain due to LSCS being the main contributing factors. This vicious cycle of pain leading to delayed initiation was found to be significant. As per our findings, delivery by cesarean section (LSCS) was associated with delayed initiation of breastfeeding. Various meta-analysis has also concluded that LSCS deliveries are linked to lower odds of timely breastfeeding initiation compared to vaginal birth [18,19,20].

Breastfeeding provides potential protection against postpartum depression. However, early cessation of breastfeeding and severe breastfeeding discomfort or pain are associated with postpartum depression. Breastfeeding may have an antidepressant effect and contribute to a better regulation of diurnal basal cortisol secretion [21]. In our study, maternal stress was measured using the Perceived Stress Scale, with 73% of mothers experiencing low stress and 27% experiencing moderate stress. While all mothers experienced some level of stress during delivery, the relationship between maternal stress and initiation of breastfeeding was not found to be statistically significant. The initiation of breastfeeding showed no relation with depression as only 2.2% of mothers were probably depressed as per scoring in the study. This result was consistent with the study of Amipara et al and other similar studies [22,23]. The relation between stress and delayed initiation of breastfeeding is not well established though early initiation of breast feeding can decrease stress in lactating mothers at the same time the constant worry that baby is not getting enough milk can be a reason of stress [24].

Conclusion

Our study revealed significant association between the mode of delivery and pain experienced during delivery with delayed initiation of breastfeeding. However, maternal stress was not significantly associated with delayed initiation of breastfeeding. Based on these results, we strongly recommend that all mothers are counselled about the importance of early breastfeeding initiation during their antenatal car visits. Additionally, it is crucial to identify women who may be at a higher risk of not starting breastfeeding on time and provide them with additional lactation support.

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To promote early breastfeeding initiation, a best practice is to have all newborns placed on their mother's breast shortly after delivery in the labor room, (skin to skin contact) with assistance from healthcare professionals. This approach will help initiate breastfeeding as promptly as possible, enhancing the likelihood of successful breastfeeding and its associated health benefits for both mother and baby.

The conclusions drawn from this study are subject to certain limitations that need to be considered. Firstly, the findings may not be applicable to the general population as the study was conducted in a hospital setting, which may not fully represent the broader demographic diversity. Secondly, since this study was designed as a one-time observational study, we did not assess the impact of early initiation on total duration of breastfeeding.

Ethical clearance

The approval was obtained from the Institutional Ethical Committee of the Gandhi Medical College, Bhopal (letter number: 478/MC/IEC/2020).

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