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BARRIERS TO BREASTFEEDING IN THE NEONATAL INTENSIVE CARE UNIT AT SINDH INSTITUTE OF CHILD HEALTH AND NEONATOLOGY (SICHN), KORANGI 5, KARACHI: A QUANTITATIVE ANALYSIS OF MATERNAL EXPERIENCES.

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Abstract

Objective: *To identify and quantify the barriers to breastfeeding experienced by mothers of neonates admitted to the NICU at Sindh Institute of Child Health and Neonatology (SICHN), Korangi 5, Karachi.*

Methods: *A cross-sectional quantitative study was conducted at Children Hospital Korangi 5, Sindh Institute of Child Health and Neonatology, Karachi, among 126 mothers of neonates admitted to the NICU at SICHN over a six-month period from 15th August 2024 to 14th February 2025. A structured, pre-tested, interviewer-administered questionnaire assessed maternal demographics, clinical parameters, and self-reported barriers across maternal, neonatal, institutional, and socio-cultural domains. Data were analyzed using SPSS version 26.0; binary logistic regression identified independent predictors of breastfeeding failure ($p \leq 0.05$).*

Results: *Mean maternal age was 27.4±4.8 years. Breastfeeding initiation was achieved by only 27.0% of mothers. The leading barriers were perceived milk insufficiency (72.2%), lack of NICU privacy (68.3%), neonatal illness severity (64.3%), post-cesarean pain (61.1%), and inadequate lactation counseling (57.1%). Socio-cultural pressures were reported by 48.4%. On logistic regression, cesarean delivery (OR 3.12; 95% CI 1.67–5.84; $p=0.001$) and primiparity (OR 2.45; 95% CI 1.21–4.96; $p=0.013$) were independent predictors of breastfeeding failure.*

Conclusion: *Multiple interlocking barriers impede breastfeeding in the NICU at SICHN. Targeted, multi-level interventions encompassing enhanced lactation counseling, improved NICU infrastructure, and culturally sensitive family education are urgently needed.*

INTRODUCTION

Breastfeeding is universally recognized as the optimal form of nutrition for newborns and infants. The World Health Organization (WHO) and UNICEF jointly recommend exclusive breastfeeding for the first six months of life, followed by continued breastfeeding alongside complementary foods up to two years of age or beyond.[1] The benefits of breastfeeding are particularly profound for preterm and sick neonates admitted to the Neonatal Intensive Care Unit (NICU), as human milk provides not only superior nutritional composition but also immunological protection, enhanced gastrointestinal maturation, reduced risk of necrotizing enterocolitis (NEC), and improved neurodevelopmental outcomes.[2,3]

The reasons behind suboptimal breastfeeding in the NICU are multi-factorial, and are even more complex in low and middle income countries (LMICs) like Pakistan. Physical difficulties with delivery, anxiety, postpartum depression, perceived milk insufficiency and lack of breastfeeding knowledge are all maternal factors that may make direct latching impossible.[4,5] Neonatal factors are prematurity, low birth weight, respiratory distress and need for assisted ventilation.[6] These factors may also prevent direct latching. The NICU institutional setting is a challenging one to itself. In the medicalized context of limited visiting hours, limited space for kangaroo mother care (KMC)[7], lack of lactation support services, and the psychological stress of a very sick baby, the attitudes of healthcare workers and especially the presence of skilled lactation counselors, have been established as one of the most modifiable institutional factors affecting success or failure of breastfeeding in the NICU setting.[8,9]

This sociocultural context further complicates things in Pakistan. However, at the community level the acceptance of breastfeeding has been negatively affected by traditional beliefs, the presence of extended family members (especially mothers-in-law), the perception that milk is adequate and the aggressive marketing of breast milk substitutes.[10] In Sindh specifically, there is limited information on the barriers to breastfeeding, especially in the context of tertiary level neonatal care.

The Sindh Institute of Child Health and Neonatology (SICHN), located in Korangi within Karachi's peri-urban and low-income areas, is a large public sector referral hospital for severely ill neonates in Sindh, with a large proportion of patients coming from low income and peri-urban areas. A lack of adequate quantitative data on breastfeeding problems specifically in NICU at a large public-sector facility in Karachi is a limitation that helps to design evidence-based lactation support programs to the unique needs of NICU mothers in the setting.

The purpose of the present study was therefore to identify and quantify systematically the barriers encountered by mothers of neonates admitted to SICHN's NICU with the intent to provide actionable evidence to guide the development of policy and practice.

Methodology

The present study is of a cross sectional type, quantitative in nature and carried out at Children Hospital Korangi 5, Sindh Institute of Child Health and Neonatology (SICHN), Korangi 5, Karachi, Pakistan at NICU. SICHN is a 250 bed dedicated Tertiary care Center for Pediatric and Neonatal Care under government of Sindh, which has a 60 bed NICU and receives around 2500 neonatal admissions per year. The data were gathered for six months from 15th August 2024 to 14th February 2025. Ethical approval was obtained from the SICHN Institutional Review Board (IRB) and all participants gave informed written consent before they were enrolled.

The sample size was determined by the WHO formula for proportion studies: $n = Z^2 \times p \times (1-p) / d^2$ where $p = 0.5$, $d = 0.05$ and $Z = 1.96$. With a prevalence for breastfeeding from the previous region's literature of 60%, a 95% confidence level ($Z=1.96$) and an 8.5% margin of error, the minimum size of the sample was 114. A 10% non-response allowance was added, which resulted in a final sample size of 126.

Consecutive non-probability sampling was used, and all eligible mothers who were admitted during the study period who met the inclusion criteria were enrolled in the study in the order that they arrived. Mothers of neonates (age 0-28 days) admitted to

SICHN NICU, with age 18 years or older and ready to provide informed consent, were included in the study. Mothers who had absolute contraindications to breastfeeding, mothers whose babies died within 24 hours of admission, mothers with severe psychiatric illness who were not able to participate in interviews and mothers of neonates who were transferred from other institutions without being admitted as primary cases of SICHN were excluded. After extensive literature searches and consultation with experts a set of pre-tested, structured questions were created that were to be administered by an interviewer.

The questionnaire consisted of four parts: (A) socio-demographic characteristics, (B) neonatal clinical profile, (C) breastfeeding history and status, and (D) a 30 item barriers to breastfeeding scale covering maternal, neonatal, institutional and socio-cultural aspects scored on a five point Likert scale. A panel of five experts judged the content validity. The questionnaire was translated into Urdu and Sindhi and piloted on 15 mothers (not included in the final analysis).

IBM SPSS Statistics (v.26.0) was used to input and analyze data. Frequencies, percentages, medians and standard deviations were performed for descriptive statistics. Chi-square and Fisher's exact tests were used for bivariate analysis. A binary logistic regression was conducted to determine the independent predictor of breastfeeding failure with p value ≤ 0.05 was considered significant.

Results

All together 126 mothers were enrolled. The mean maternal age was 27.4±4.8 years (range: 18–42 years), with the majority aged 21–30 years (64.3%). The majority of the participants were urban dwellers (71.4%) and 55.6% of them had primary or middle level education. 61.1% of families made less than PKR 30,000 monthly. Obstetric history data showed that 38.9% of the respondents were primigravida and 57.1% had cesarean section before. 29.4% received antenatal breastfeeding counseling. The socio-demographic and obstetric details are shown in Table 1.

The mean gestation of admitted neonates was 32.6±3.9 weeks; with 64.3% being preterm (<37 weeks). Mean birth weight was 1,820±540 grams, and 71.4% were low birth weight (<2,500 grams). Common primary diagnoses at admission were: respiratory distress syndrome (43.7%), neonatal sepsis (22.2%), birth asphyxia (15.1%), hyperbilirubinemia requiring phototherapy (10.3%). The number of mothers who managed to start breastfeeding (direct breastfeeding or expressing breast milk) in NICU was very low (27.0%). Of these, 18 (52.9%) continued with breastfeeding (any type) at discharge. The most common barrier was milk supply (either perceived or actual), reported by 91 mothers (72.2%). 86 (68.3%) reported lack of privacy in open bay NICU, and 81 (64.3%) reported the severity of neonatal illness as a barrier to direct feeding. 77 (61.1%) reported experiencing pain after their cesarean section surgery and 72 (57.1%) reported inadequate lactation counseling by health care workers. Sixty-one (48.4%) reported socio-cultural factors, such as pressure from family to use formula. For 52 (41.3%) participants, maternal anxiety and depression symptoms were a barrier. The complete frequency distribution of the barriers in all four domains is shown in Table 2.

On bivariate analysis, cesarean delivery, primiparity, prematurity (<34 weeks), maternal education below secondary level, and absence of antenatal breastfeeding education were significantly associated with breastfeeding failure ($p<0.05$ for all). On binary logistic regression, cesarean delivery (OR 3.12; 95% CI 1.67–5.84; $p=0.001$) and primiparity (OR 2.45; 95% CI 1.21–4.96; $p=0.013$) remained the strongest independent predictors of breastfeeding failure after adjusting for confounders. Gestational age <34 weeks and absence of antenatal breastfeeding counseling were also significant independent predictors. Results are detailed in Table 3.

Table 1. Socio-demographic and Obstetric Characteristics of Study Participants (n=126)

Characteristic	Frequency (n)	Percentage (%)
Maternal Age (years)		
18–20	14	11.1
21–25	36	28.6
26–30	45	35.7
31–35	22	17.5
>35	9	7.1
Education Level		
No formal education	18	14.3
Primary (Grade 1–5)	29	23.0
Middle (Grade 6–8)	21	16.7
Secondary (Matric)	35	27.8
Higher Secondary / Graduate	23	18.3
Residence		
Urban	90	71.4
Peri-urban / Rural	36	28.6
Monthly Household Income (PKR)		
<15,000	28	22.2
15,001–30,000	49	38.9
30,001–50,000	31	24.6
>50,000	18	14.3
Gravida		
Primigravida	49	38.9
Multigravida	77	61.1
Mode of Delivery		
Vaginal	54	42.9
Cesarean Section	72	57.1

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Prior Breastfeeding Experience (multigravida only, n=77)		
Yes	51	66.2
No	26	33.8
Received Antenatal Breastfeeding Counseling		
Yes	37	29.4
No	89	70.6

PKR = Pakistani Rupees

Table 2. Frequency Distribution of Reported Barriers to Breastfeeding by Domain (n=126)

S. No	Barrier	n (126)	%
	MATERNAL BARRIERS		
1	Perceived / actual insufficient milk supply	91	72.2
2	Maternal pain / discomfort post-cesarean section	77	61.1
3	Maternal anxiety and depressive symptoms	52	41.3
4	Breast engorgement / sore nipples	47	37.3
5	Fear of infecting neonate (mastitis/candida)	44	34.9
6	Lack of prior breastfeeding experience (primipara)	49	38.9
	NEONATAL BARRIERS		
7	Neonatal illness severity precluding direct feeding	81	64.3
8	Prematurity / poor suck-swallow coordination	73	57.9
9	Neonate on respiratory support / intubated	58	46.0
10	Neonate on nil per os (NPO) orders	44	34.9
	INSTITUTIONAL BARRIERS		
11	Lack of privacy in open-bay NICU	86	68.3
12	Inadequate lactation counseling by healthcare staff	72	57.1
13	No dedicated lactation room / pumping facility	67	53.2
14	Restricted visiting hours limiting feeding access	54	42.9
15	Unavailability of breast pump / expression equipment	48	38.1

	SOCIO-CULTURAL BARRIERS		
16	Family / mother-in-law pressure to formula feed	61	48.4
17	Cultural belief that colostrum is harmful	38	30.2
18	Perceived social stigma of breastfeeding in hospital	33	26.2
19	Husband / family not supportive of breastfeeding	29	23.0

Multiple barriers could be reported by each respondent; percentages do not sum to 100.

Table 3. Binary Logistic Regression Analysis: Independent Predictors of Breastfeeding Failure (n=126)

Predictor Variable	OR	p-value	95% CI (Lower)	95% CI (Upper)
Cesarean section delivery	3.12	0.001*	1.67	5.84
Primiparity	2.45	0.013*	1.21	4.96
Gestational age <34 weeks	2.18	0.021*	1.13	4.21
No antenatal breastfeeding education	1.97	0.031*	1.06	3.66
Maternal education below secondary	1.74	0.048*	1.01	3.01
Maternal age <20 years	1.53	0.112	0.91	2.57
Monthly income <PKR 15,000	1.38	0.194	0.85	2.24

* *Statistically significant ($p \leq 0.05$). OR = Odds Ratio; CI = Confidence Interval. Reference category: successful breastfeeding initiation.*

Discussion

This cross-sectional study provides a detailed quantitative characterization of barriers to breastfeeding among mothers of NICU-admitted neonates at SICHN, Karachi one of Pakistan's largest public-sector neonatal facilities. The overall breastfeeding initiation rate of 27.0% is strikingly below international benchmarks and represents a significant public health concern. A comparable study conducted by Nasrullah et al[11] from a tertiary NICU in Kasur reported initiation rates of approximately 31%, suggesting that suboptimal breastfeeding in NICUs is a systemic issue across urban Pakistan rather than an institution-specific phenomenon.

Perceived milk insufficiency emerged as the most prevalent barrier (72.2%), consistent with findings from similar NICU settings in Bangladesh (68.4%) and Nigeria (70.1%).[12,13] This perception is frequently not reflective of actual physiological insufficiency but rather reflects anxiety, stress, inadequate suckling stimulation secondary to neonatal illness, and delayed initiation of expression. The high prevalence of this barrier underscores the urgent need for structured lactation support, including early initiation of breast milk expression, regular lactation assessments, and targeted education addressing milk production physiology.[14]

Lack of privacy in the NICU (68.3%) represents an important modifiable institutional barrier. Open-bay NICU designs, common in public-sector hospitals in Pakistan due to resource constraints, do not accommodate the space and privacy required for comfortable breastfeeding or milk expression. An

evidence study conducted by Pineda et al[15] from high-income country NICUs demonstrates that private or semi-private spaces for mothers, alongside family-integrated care models, significantly improve breastfeeding rates.[15] Advocacy for NICU redesign, even within low-resource constraints, represents an important policy priority.

Neonatal illness severity as a barrier (64.3%) reflects the clinical reality of NICU population, wherein the majority of neonates were preterm and low birth weight, with conditions such as respiratory distress syndrome and sepsis that preclude direct feeding. In such contexts, expressed breast milk fed via nasogastric tube represents the most realistic alternative, yet the establishment and maintenance of lactation through regular expression without direct suckling requires intensive support currently lacking at SICHN.[16]

Maternal post-cesarean pain (61.1%) was a significant barrier, and cesarean delivery was identified as the strongest independent predictor of breastfeeding failure (OR 3.12). This aligns with a systematic review by Hobbs et al[17] demonstrating that cesarean delivery is associated with significantly delayed lactogenesis and reduced breastfeeding duration. Given that 57.1% of this cohort delivered by cesarean reflecting both the high-risk obstetric profile of SICHN's population and rising national cesarean rates targeted postoperative lactation support for post-cesarean mothers in the NICU must be a clinical priority.

The inadequacy of healthcare worker-provided breastfeeding support (57.1%) is particularly concerning given that skilled lactation support is a cornerstone of evidence-based NICU care. A multicenter study from South Asia conducted by Henninger et al[18] found the availability of trained lactation counselors to be the single most significant institutional predictor of breastfeeding success in NICU settings.

Socio-cultural barriers, including family pressure to formula feed (48.4%), reflect the broader societal context. Extended family influence on feeding decisions, particularly from mothers-in-law, and the normalization of formula feeding in urban Karachi represent significant contextual determinants that cannot be addressed by in-hospital interventions alone.[19] Community-level campaigns targeting not only mothers but also spouses and extended family members are essential complementary strategies.[20]

Maternal anxiety and depression symptoms were reported as contributing barriers by 41.3% of participants. Having a critically ill neonate in the NICU is a profoundly traumatic experience, and the psychological burden on mothers is well-documented.[22] Psychosocial support, including peer support from mothers who have successfully breastfed NICU neonates, should be integrated into NICU care pathways.[23]

Primiparity as an independent predictor of breastfeeding failure (OR 2.45) highlights the particular vulnerability of first-time mothers, who lack prior breastfeeding experience and are more susceptible to anxiety, self-doubt, and external family pressures. Targeted antenatal breastfeeding education for primigravida mothers attending SICHN antenatal clinics could potentially reduce this risk.

This study has several limitations: the cross-sectional design precludes causal inference, consecutive sampling from a single center limits generalizability, and social desirability bias may have influenced self-reporting. Nonetheless, this study provides the first comprehensive quantitative analysis of NICU breastfeeding barriers from a large public-sector neonatal center in Karachi, with significant implications for clinical practice and policy.

Conclusion

Multiple interlocking barriers impede breastfeeding in the NICU at SICHN. Targeted, multi-level interventions encompassing enhanced lactation counseling, improved NICU infrastructure, and culturally sensitive family education are urgently needed.

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