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Implementation of Essential Newborn Care and Factors Associated with Knowledge and Practices among Postnatal Mothers in the Slum Area of Karachi, Pakistan

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ABSTRACT

OBJECTIVE: To determine the implementation of essential newborn care (ENC) and factors associated with knowledge and practices among postnatal mothers in the Slum Area of Karachi, Pakistan.
METHODOLOGY: This cross-sectional study was conducted in the outpatient and inpatient departments, postnatal ward/well baby clinic/immunization clinic, Jinnah Medical College Hospital (JMCH), Karachi, Pakistan, from January - June 2024. A total of 233 postnatal mothers aged between 18-35 years, within 2 months after delivery, and without complications who delivered babies (gestational age 38-42 weeks) without any congenital anomalies or disability were analyzed. A non-probability consecutive sampling technique was adopted. Data about ENC was collected on a structured and comprehensively validated questionnaire. Data was analyzed using IBM-SPSS Statistics, version 26.0.
RESULTS: In a total of 233 participants, the mean age was 26.27±4.69 years. 54 (23.2%) received health education on ENC during pregnancy, and 167(71.7%) after delivery. Fifty (21.5%) mothers practiced skin-to-skin contact, and 161(69.1%) delayed the first bath for more than 24 hours. The time of initiation of breastfeeding was within one hour, found in 70(30.0%) participants. Washing hands before and after 54(23.2%) mothers reported diaper changes. 108 (46.4%) mothers reported recognition of all danger signs.
CONCLUSION: The study concludes that implementing ENC among postnatal mothers in the slum area of Karachi is sub-optimal, with significant gaps in knowledge and practices. Key areas needing improvement include antenatal care attendance, hygiene practices, and late breastfeeding initiation.

KEYWORDS: Birth weight, breastfeeding, essential newborn care, postnatal, skin-to-skin contact.

INTRODUCTION

The future of any nation is seen through its children. Giving them the proper treatment throughout the perinatal period is essential to ensure their wellness and, by extension, the country's well-being. A total of 5.0 million children under the age of five died in 2021; of these, sub-Saharan Africa accounted for 58% and South Asia for 26% of all under-five deaths worldwide[1]. The first month of life is the most hazardous for children, with an average of 18 deaths worldwide for every 1,000 live births. The first month of life claimed the lives of 2.3 million children worldwide in 2021; almost 6,400 newborns perish every day, which nearly accounts for 47% of mortality under five[2,3].

African and South Asian regions account for over 80% of 5 million deaths below 5 years of age. Five nations, including Nigeria, India, Pakistan, Congo, and Ethiopia, contribute nearly half of all mortality below 5 years of age[4]. Pakistan is in 3rd place with the highest newborn mortality rates. Annually, the country is thought to have 300,000 newborn deaths[5,6]. The most recent data available indicates that the neonatal mortality rate in Pakistan is 39 per 1000 live births; 1 in 14 are not expected to survive before their first birthday, and 1 in 11 pass away before they turn five[7].

As per the third objective target (No. 3.2) of the 17 "Sustainable Development Goals (SDGs)" that were established by the United Nations in 2015, every nation must strive to eliminate millions of preventable deaths of newborns and children under five by 2030, with goals between 12-25 deaths per 1000 live-birthsx[8]. The World Health Organization (WHO) has declared that "a customary practice that reduces newborn morbidity and mortality has been identified as indispensable, and these include essential newborn care (ENC)." Knowing that Pakistan is among the countries with higher rates of newborn fatalities and considering the World Bank data about neighboring countries India and Afghanistan to have lower neonatal mortality rates, 19 per 1000 live births and 34 per 1000 live births, respectively[9], we planned this study to determine the implementation of ENC and factors associated with knowledge and practices among postnatal mothers in the slum area of Karachi, Sindh. Policymakers and health planners may find this helpful study in developing measures to maintain and enhance the decline in newborn mortality.

METHODOLOGY

This descriptive, cross-sectional study was conducted in the outpatient and inpatient departments, postnatal ward/well baby clinic/immunization clinic, Jinnah Medical College Hospital (JMCH), Karachi, Pakistan, from January - June 2024. The JMCH is located in Korangi, Karachi, which is known to be a slum area in the city. Approval from the Institutional Ethical Review Committee Letter No. 000316/23 was obtained before the study commencement. A sample size of 233 was calculated, taking the anticipated proportion of respondents as 32% who bathed their newborns within 6 hours following birth,[10] with a 6% margin of error and 95% confidence level. A non-probability consecutive sampling technique was adopted for sample selection.

The inclusion criteria were postnatal mothers within 2 months after delivery without complications and who delivered babies (gestational age 38-42 weeks) without any congenital anomalies or disability. The exclusion criteria were mothers who were seriously ill or unable to communicate with the interviewer. According to the WHO, postnatal is the first six weeks following birth. This is a demanding time when both mother and infant need various care[4]. The study's purpose, procedure, and benefits were explained to the mothers. After assuring them of the secrecy of their provided data, they were asked for informed and written consent. A primary researcher/postgraduate trainee collected data. The quantitative data collection was done using a pre-tested, structured interview questionnaire.[11,12] The questionnaire consisted of three parts; the first part carried the personal data of mothers (such as age, education, residence occupation, family type, etc.) and neonatal assessments (such as age, gender, birth weight, etc.). In contrast, the rest of the two sections were meant to assess the level of knowledge and practices regarding ENC on thermoregulation, breastfeeding, eye care, cord care, immunization, newborn hygiene, and neonatal danger signs. The WHO has defined ENC as critical care for all babies in the first days after birth, which is needed both in the health facility and at home.[11] The collected data were recorded on a pre-designed proforma.

Statistical analysis was carried out using IBM-SPSS Statistics version 26.0. The quantitative variables like the mother's age, family income, distance from home to a nearby health facility, parity, number of antenatal visits, and hospital stay were analyzed by calculating the mean and standard deviation (SD). The representation of the qualitative variables (mother's age group, educational level, occupation, family income, and residential status, etc) was made through frequency and percentage. Frequency analysis, cross-tabulation, and manual review were conducted to identify data entry errors.

RESULTS

In 233 study participants, the mean age was 26.27±4.69 years, ranging from 18 to 35 years. Most mothers, 152(65.2%) were aged 20-30. There were 94(40.3%) mothers who did not have any formal education, whereas 95.3% were housewives. The monthly income of fathers was above PKR 20,000 in 187(80.3%). 177(76%) families lived within 30 minutes of a healthcare facility. **Table I** shows the socio-demographic characteristics of study participants.

Table I: Socio-demographic Characteristics

Socio-demographics		Number (%)
Mother's age (years)	18-19	22 (9.4%)
	20-30	152 (65.2%)
	31-35	59 (25.3%)
Mother's education	No education	94 (40.3%)
	Primary	82 (35.2%)
	Above primary	57 (24.5%)
Mother's occupation	Housewife	222 (95.3%)
	Working	11 (4.7%)
Mother's monthly income (PKR)	None	222 (95.3%)
	<10,000	11 (4.7%)
Father's monthly income (PKR)	<10,1000	4 (1.7%)
	10,000 to 20,000	42 (18.0%)
	>20,000	187 (80.3%)
Ethnicity	Bangali	22 (9.4%)
	Muhajir	41 (17.6%)
	Punjabi	29 (12.4%)
	Saraiki	6 (2.6%)
	Sindhi	55 (23.6%)
	Pathan	51 (21.9%)
	Others	29 (12.4%)
Distance from home to a nearby healthcare facility (minutes)	<30	177 (76.0%)
	≥30	56 (24.0%)
Mode of transportation to a healthcare facility	By walk	36 (15.5%)
	Private	82 (35.2%)
	Public	115 (49.4%)

Hypertension was reported to be the most common chronic disease, noted in 22 (9.4%) mothers. There were 100 (42.9%) mothers who did not attend antenatal visits. The Mode of delivery was cesarean sections, noted in 108 (46.4%) women. There were 175 (75.1%) mothers who were delivered in hospitals. 54 (23.2%) received health education on ENC during pregnancy, and 167 (71.7%) after delivery. Among neonates, 135 (57.9%) were boys, and 83 (35.6%) had birth-weight below 2500 grams. **Table II** details the medical, obstetrical and neonatal characteristics of study participants.

Table II: Medical, Obstetrical, and Neonatal Characteristics

Characteristics			Number (%)
Medical	Chronic diseases	Hypertension	22 (9.4%)
		Diabetes mellitus	5 (2.1%)
		Others	4 (1.7%)
		None	202 (86.7%)
	Parity	Primiparous	115 (49.4%)
		Multiparous	118 (50.6%)
Obstetrical	Time of first antenatal visit	1st trimester	49 (21.0%)
		2nd trimester	40 (17.2%)
		3rd trimester	44 (18.9%)
		None	100 (42.9%)
	Health education received on ENC during pregnancy		54 (23.2%)
	Mode of delivery	Cesarean section	108 (46.4%)
		Vaginal delivery	125 (53.6%)
	Place of delivery	Home	37 (15.9%)
		Clinic	21 (9.0%)
		Hospital	175 (75.1%)
	Health education received on ENC after delivery		167 (71.7%)
	Discharge after delivery (hours)	<6	4 (1.7%)
		6-12	27 (11.6%)
		>12	165 (70.8%)
		None (delivered at home)	37 (15.9%)
Neonatal	Gender	Boy	135 (57.9%)
		Girl	98 (42.1%)
	Birth weight (grams)	<2500	83 (35.6%)
		≥2500	150 (64.4%)
	Birth order	1-3	166 (71.2%)
		>3	67 (28.8%)

ENC: Essential newborn care

Regarding knowledge and practices of ENC, 50(21.5%) practiced skin-to-skin contact, and 161(69.1%) delayed the first bath for more than 24 hours. For cord care, 139(59.7%) used scissors, and 135(57.9%) applied oil. Pre-lacteal feeding was reported in 110(47.2%), whereas honey/sugar water was the most frequently noted in 81(34.8%). 205(88.0%) mothers reported colostrum feeding. There were 228(97.9%) mothers who practiced breastfeeding on demand. 139 (60.0%) mothers reported exclusive breastfeeding for a period of above 6 months. The time of breastfeeding initiation was within one hour, and it was found in 70(30.0%) participants. Washing hands before and after 54(23.2%) mothers reported diaper changes. 108(46.4%) mothers reported recognition of all danger signs. **Table III** describes the knowledge and practice of the studied mothers regarding ENC.

Table III: knowledge and practices of the studied mothers regarding Essential Newborn Care

Knowledge and practice of ENC		Number (%)
Skin-to-skin contact		50 (21.5%)
Time of 1st bathing (hours)	<6	26 (11.2%)
	6-24	46 (19.7%)
	>24	161 (69.1%)
Cord Care	Used blade	30 (12.9%)
	New blade	64 (27.5%)
	Scissor	139 (59.7%)
Material application to cord	Oil	135 (57.9%)
	Powder	11 (4.7%)
	Salt	4 (1.7%)
	Chlorhexidine	10 (4.3%)
	Others	6 (2.6%)
	Nothing	61 (26.2%)
Pre-lacteal feeding		110 (47.2%)
Type of pre-lacteal feed	Butter/Ghee	8 (3.4%)
	Honey/sugar water	81 (34.8%)
	Milk other than breastfeeding	6 (2.6%)
	Qehwa	15 (6.4%)
	None	123 (52.8%)
Colostrum feeding		205 (88.0%)
Time of initiation of breastfeeding	Within one hour	70 (30.0%)
	After one hour	163 (70.0%)
Breastfeeding on demand		228 (97.9%)
Burping after feeding		222 (95.3%)
Hand washing after and before diaper change		54 (23.2%)
Hand washing after and before breastfeeding		5 (2.1%)
Wipe baby's face, neck and underarms with a clean damp cloth daily		186 (79.8%)
Wash buttocks when soiled, dry thoroughly		182 (78.1%)
Know about exclusive breastfeeding		173 (74.2%)
Duration of exclusive breastfeeding (months)	<6	34 (14.6%)
	≥6	139 (60.0%)
	None	60 (25.8%)
Eye care	Antimony	109 (46.8%)
	Eye ointment	10 (4.3%)
	Nothing	114 (48.9%)
Recognition of danger sign	All	108 (46.4%)
	Fast breathing / no movement/fever/jaundice	6 (2.6%)
	Fever	6 (2.6%)
	Inability to feed well / convulsion / fast breathing / chest in-drawing / no movement / fever / others	73 (31.3%)
	Others	6 (2.6%)
	None	34 (14.6%)

DISCUSSION

The definition of ENC is a planned, proactive strategy aimed at improving the health of newborns through interventions before, during, and following pregnancy, as well as in the early postpartum period[13]. The components of ENC are thermoregulation, clean delivery, cord care, breastfeeding, immunization, eye care, newborn hygiene, recognition of danger signs, care of preterm/low birth weight infants and management of neonatal illnesses[14-16]. There is mounting evidence that implementing ENC practices can lessen the burden of infant mortality and morbidity[17,18].

In his study, 42.9% of mothers did not attend antenatal visits, underscoring a significant gap in prenatal care. The lack of antenatal visits is concerning as it suggests missed early health education and intervention opportunities. **Berhea et al.,** [18] reported that antenatal care and counseling during delivery were strongly associated with good ENC practices. Our study showed that 75.1% of births occurred in hospitals. Our study's high rate of hospital deliveries is a positive indicator of access to healthcare facilities, yet the low rate of antenatal visits suggests barriers to continuous care.

Regarding neonatal characteristics, 35.6% had a birth weight below 2500 grams, indicating a significant proportion of low birth weight infants. This statistic is critical as low birth weight is associated with higher neonatal morbidity and mortality[19]. **Majumder et al.** [20] reported that knowledge about the importance of early breastfeeding and colostrum was good. Yet, there were gaps in other areas of newborn care, such as cord care and hygiene practices. This comparison suggests that while some aspects of ENC are well-understood, others remain inadequately addressed.

This study revealed several significant findings regarding the knowledge and practices of ENC. Only 21.5% of mothers practiced skin-to-skin contact. The low rates of skin-to-skin contact and delayed first bath practices indicated areas needing improvement in this study. It has been established that skin-to-skin contact promotes bonding and thermoregulation in newborns,[21] while delaying the first bath helps maintain the infant's body temperature and protect the skin barrier[22]. **Al-Nafeesah et al.**[23] reported higher rates of skin-to-skin contact (88.3%) and first-hour breastfeeding (89.6%), highlighting the effectiveness of health education in improving ENC practices. Pre-lacteal feeding was common (47.2%), with honey/sugar water being the most frequent (34.8%) among study participants. The high prevalence of pre-lacteal feeding, particularly with honey/sugar water, reflects cultural practices that need addressing through education.

In the present research, hand-washing practices were notably poor, with only 23.2% washing their hands before and after diaper changes and a mere 2.1% doing so before and after breastfeeding. This finding is particularly concerning given the importance of hygiene in preventing neonatal infections[24]. **Majumder et al.** [20] identified knowledge gaps in cord care, eye care, first bathing, and hygiene practices, similar to our findings. **Al-Nafeesah et al.** [23] reported higher rates of good ENC practices, such as skin-to-skin contact, proper cord care, and delayed bathing. These practices have been associated with better maternal education and access to healthcare, highlighting the importance of these factors in promoting good ENC practices[22]. **Leta M**[25] reported high rates of early breastfeeding initiation and exclusive breastfeeding for six months, which contrasts with our finding that only 30.0% initiated breastfeeding within the 1st hour. This discrepancy underscores the need for targeted interventions to promote early breastfeeding practices in our community.

In this study, the recognition of all danger signs was reported by 46.4% of mothers, indicating a moderate level of awareness that needs enhancement through continued education and support. **Berhea et al**. [18] found that mothers with good knowledge of ENC and newborn danger signs had significantly better ENC practices. This correlation suggests that enhancing maternal expertise through education and counseling can lead to improved practices, which is supported by our finding that postnatal health education significantly increased ENC practices. When comparing our findings with the literature[16,25], it is evident that our population had relatively lower rates of ENC knowledge and practices. **Ayele et al.** also reported a national pooled prevalence of ENC knowledge and practice among women at 55.05% and 41.49%, respectively. Factors such as secondary education, multiparity, and antenatal care were significantly associated with better knowledge and practices[26]. In contrast, our study population had lower education levels and fewer antenatal visits, which likely contributed to the relatively lower ENC practice rates observed.

This study reveals critical gaps in the implementation of ENC among postnatal mothers in the slums of Karachi. The low rates of antenatal visits, poor hygiene practices, and prevalence of pre-lacteal feeding indicate significant areas for improvement. The comparison with other studies underscores the importance of maternal education, antenatal care, and postnatal follow-up in enhancing ENC knowledge and practices. The high rates of hospital deliveries and postnatal health education are positive indicators that can be leveraged to improve ENC practices. Interventions should promote antenatal care, educate mothers on the importance of hygiene, breastfeeding, and proper newborn care practices, and address cultural practices that may hinder optimal ENC. As the women are delivered at home by traditional birth attendants (TBA) and cannot receive the main component of ENC, that is, delivery at the maternal abdomen, they may not receive skin-to-skin contact, and the element of thermoregulation cannot be achieved. However, we included those cases as excluding those mothers from this study would limit our understanding of ENC challenges in non-institutional settings. Including them helps identify gaps in care, assess available resources, and inform strategies to improve ENC, particularly through TBA training. This approach ensures a more comprehensive understanding of newborn care practices across different delivery settings, contributing to inclusive and effective health interventions. We appreciate your consideration of this perspective. The findings suggest that targeted educational interventions and improved access to continuous maternal and child healthcare are essential for enhancing ENC practices in this community. By addressing these gaps, we can improve neonatal health outcomes and reduce the risk of morbidity and mortality among newborns in the slum areas of Karachi.

The present study had some limitations. The cross-sectional design prevents establishing causal relationships between knowledge, practices, and ENC implementation. Self-reported data might have introduced social desirability bias, potentially leading to overestimating positive practices. Mothers were asked about postnatal practices up to two months after delivery, which could introduce recall bias. You can mention this in the limitations. The single-centre setting may limit the generalizability to other areas with different healthcare access and cultural influences.

CONCLUSION

The study concludes that the implementation of ENC among postnatal mothers in the slum area of Karachi is sub-optimal, with significant gaps in knowledge and practices. Key areas needing improvement include antenatal care attendance, hygiene practices, and late breastfeeding initiation. Targeted educational interventions and increased access to continuous maternal and child healthcare are crucial to enhancing ENC practices. Addressing these deficiencies can improve neonatal health outcomes and reduce the risk of morbidity and mortality among newborns in this underprivileged community.

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AUTHOR CONTRIBUTION

Nuzhat M: Data collection and drafting; responsible for data integrity and final approval.
Noreen A: Data collection and drafting; responsible for data integrity and final approval.
Hussain M: Conception, data analysis, critical revisions, final approval.
Ata I: Conception, data analysis, critical revisions, final approval.
Noor N: Data collection and drafting; responsible for data integrity and final approval.
Abro F: Conception, data analysis, proofreading, critical revisions, final approval.
Rafique B: Conception, design, proofreading, critical revisions, final approval.

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