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ASSESSMENT OF KNOWLEDGE REGARDING BASIC HOME CARE AMONG PARENTS OF NEONATES DISCHARGED FROM THE NEONATAL INTENSIVE CARE UNIT AT A TERTIARY CARE HOSPITAL IN PAKISTAN

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Abstract

Background:
Neonates discharged from the Neonatal Intensive Care Unit (NICU) remain at increased risk of preventable complications and hospital readmission, particularly in low- and middle-income countries. Adequate parental knowledge of basic neonatal home care is essential to ensure continuity of care and improve post-discharge outcomes.

Objective:
This study aimed to assess the level of knowledge regarding basic home care among parents of neonates discharged from the NICU at a tertiary care hospital in Abbottabad, Pakistan.

Methods:
A descriptive cross-sectional study was conducted among 70 parents of neonates at the time of NICU discharge. Participants were recruited using consecutive sampling. Data were collected using a structured, interviewer-administered questionnaire assessing parental knowledge of breastfeeding, immunization, umbilical cord care, thermoregulation, infection prevention, and recognition of neonatal danger signs. Ethical approval was obtained from the Institutional Review Board, and written informed consent was secured. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 23. Descriptive statistics were used to summarize demographic characteristics and knowledge levels.

Results:
The mean age of parents was 30.1 ± 7.0 years, and 84.3% had attained intermediate-level education or higher. Most neonates were full-term (64%) with a mean birth weight of 2.66 ± 0.53 kg. Overall, parents demonstrated a fair level of knowledge regarding basic neonatal home care. Knowledge was comparatively better in thermoregulation (41.4% good) and umbilical cord care (38.6% good). Fair knowledge levels were observed in immunization (62.9%), infection prevention (55.7%), and recognition of neonatal danger signs (40.0%). Only

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20.0% of parents demonstrated very good knowledge of breastfeeding. Notably, 68.6% of parents reported receiving no education on neonatal care during antenatal visits.

Conclusion:

Parents of neonates discharged from the NICU exhibited predominantly fair knowledge of essential home care practices, with significant gaps in breastfeeding and recognition of danger signs. Strengthening structured parental education during antenatal care and prior to NICU discharge is essential to enhance neonatal outcomes and reduce preventable readmissions.

INTRODUCTION

The neonatal period represents the most vulnerable stage of human life and contributes substantially to global under-five morbidity and mortality. Despite marked improvements in child survival over recent decades, neonatal deaths continue to account for nearly half of all deaths among children under five years of age, with the greatest burden observed in low- and middle-income countries (World Health Organization [WHO], 2016). Prematurity, low birth weight, birth asphyxia, and neonatal infections remain the leading causes of neonatal mortality, many of which are preventable through timely clinical interventions and appropriate postnatal care (Moxon et al., 2015).

Neonatal Intensive Care Units (NICUs) play a critical role in improving survival outcomes for high-risk neonates by providing specialized medical and nursing care. However, discharge from the NICU does not eliminate neonatal vulnerability. Following discharge, neonates remain at increased risk of complications such as infection, hypothermia, feeding difficulties, and delayed care-seeking, particularly when parents are inadequately prepared to assume full responsibility for care at home (Smith et al., 2009). The transition from hospital-based care to home care therefore represents a critical period requiring effective discharge preparation and parental education.

Parents, especially mothers, serve as the primary caregivers after NICU discharge and are responsible for providing essential neonatal care. Basic neonatal home care includes exclusive breastfeeding, appropriate immunization practices, proper umbilical cord care, maintenance of body temperature, infection prevention, and early recognition of neonatal danger signs (Enweronu-Laryea et al., 2015). Evidence indicates that insufficient parental knowledge in these domains contributes to preventable neonatal morbidity, delayed treatment-seeking, and increased hospital readmissions (Amolo et al., 2017; Jemberia et al., 2018).

Pakistan continues to experience a high neonatal mortality rate despite improvements in institutional deliveries and neonatal care infrastructure (WHO, 2016). Neonatal readmissions impose a significant burden on families and healthcare facilities, particularly tertiary hospitals operating within resource-constrained settings. Studies conducted in comparable contexts have demonstrated that parental education and discharge readiness are strongly associated with improved neonatal outcomes and caregiver confidence (Smith et al., 2009; Melnyk et al., 2001). However, empirical evidence assessing comprehensive parental knowledge of neonatal home care, specifically among parents of NICU-discharged neonates, remains limited in Pakistan.

NICU nurses play a pivotal role in facilitating parental preparedness through discharge education and family-centered care. Discharge readiness has been defined as the acquisition of technical skills, knowledge, emotional comfort, and confidence necessary for infant care at home (Smith et al., 2009). Evidence suggests that structured educational interventions initiated early during NICU admission and reinforced throughout hospitalization can reduce parental anxiety and improve caregiving competence after discharge (Melnyk et al., 2001; Lee, 2014).

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Given the critical role of parents in post-discharge neonatal care and the limited local evidence regarding parental knowledge in Pakistan, this study aimed to assess the level of knowledge regarding basic neonatal home care among parents of neonates discharged from the NICU at a tertiary care hospital in Abbottabad. Identifying knowledge gaps at the time of discharge may inform targeted educational strategies, strengthen discharge planning, and contribute to improved neonatal health outcomes.

Objectives and Research Questions

Study Objective

The primary objective of this study was to assess the level of knowledge regarding basic neonatal home care among parents of neonates discharged from the Neonatal Intensive Care Unit (NICU) at a tertiary care hospital in Abbottabad, Pakistan.

Specific Objectives

The specific objectives of the study were to:

1. Assess parental knowledge related to key components of basic neonatal home care, including breastfeeding, immunization, umbilical cord care, thermoregulation, infection prevention, and recognition of neonatal danger signs.
2. Describe the socio-demographic characteristics of parents and the clinical characteristics of neonates discharged from the NICU.
3. Identify gaps in parental knowledge that may increase the risk of preventable neonatal complications following discharge.

Research Question

What is the level of knowledge regarding basic neonatal home care among parents of neonates discharged from the NICU at Ayub Teaching Hospital, Abbottabad?

MATERIALS AND METHODS

Study Design

A descriptive cross-sectional study design was employed to assess parental knowledge regarding basic neonatal home care at the time of discharge from the Neonatal Intensive Care Unit (NICU). This design was appropriate for evaluating knowledge levels within a defined population at a single point in time.

Study Setting

The study was conducted in the Neonatal Intensive Care Unit of Ayub Teaching Hospital, Abbottabad, Pakistan. Ayub Teaching Hospital is a tertiary care public-sector hospital that provides advanced neonatal services and serves a large population from both urban and rural regions.

Study Population and Sampling

The study population consisted of parents of neonates admitted to and discharged from the NICU during the data collection period. Non-probability consecutive (convenience) sampling was used to recruit participants at the time of neonatal discharge.

A total of 70 parents were included in the study. Eligible participants were parents who were directly involved in providing care to the neonate for at least five hours per day. Parents who were healthcare professionals and those with language barriers (other than Urdu, Pashto, or English) were excluded to reduce professional bias and communication limitations.

Data Collection Instrument

Data were collected using a structured, interviewer-administered questionnaire developed through extensive literature review and guided by international neonatal care recommendations. The questionnaire consisted of three sections:

1. **Parental socio-demographic characteristics**, including age, education level, employment status, parity, family type, residence, prior NICU experience, and receipt of antenatal education on neonatal care.
2. **Neonatal characteristics**, including gestational age, birth weight, gender, diagnosis for NICU admission, and length of NICU stay.
3. **Knowledge of basic neonatal home care**, covering six domains: breastfeeding, immunization, umbilical cord care, thermoregulation, infection prevention, and recognition of neonatal danger signs.

Responses were recorded using a three-point scale ("yes," "no," and "not sure"), scored as 2, 1, and 0, respectively. Knowledge scores were categorized as

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poor (≤50%), good (51–75%), or very good (≥76%).

Data Collection Procedure

Data were collected through face-to-face interviews conducted in a designated area adjacent to the NICU. Written informed consent was obtained from all participants prior to data collection. Each interview lasted approximately 15–20 minutes. Data collection was carried out over a two-month period by the principal investigator.

Pilot Testing and Reliability

Pilot testing was conducted on 10% of the sample to assess clarity, feasibility, and cultural appropriateness of the questionnaire. Necessary modifications were made following expert review. The internal consistency of the instrument was assessed using Cronbach's alpha, which demonstrated acceptable reliability ($\alpha = 0.83$).

Data Analysis

Data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 23. Descriptive statistics were used to summarize variables. Frequencies and percentages were calculated for categorical variables, while means and standard deviations were used for continuous variables.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of Ayub Teaching Hospital, Abbottabad. Participation was voluntary, confidentiality was maintained through anonymized coding, and participants were informed of their right to withdraw at any stage without penalty.

Results

Socio-Demographic Characteristics of Parents

A total of 70 parents participated in the study. The mean age of parents was 30.1 ± 7.0 years. Most respondents were mothers (71.4%) and resided in urban areas (74.3%). The majority had attained intermediate-level education or higher (84.3%) and were not employed (77%). Most participants belonged to joint family systems (78.6%). A substantial proportion (68.6%) reported that they did not receive any education regarding neonatal care during antenatal visits.

Table 1

Socio-Demographic Characteristics of Parents (N = 70)

Variable	Category	n	%
Respondent	Mother	50	71.4
	Father	20	28.6
Residence	Urban	52	74.3
	Rural	18	25.7
Educational status	Uneducated	1	1.4
	Primary	2	2.9
	Matric	8	11.4
	Intermediate or higher	59	84.3
Employment status	Employed	16	23.0
	Unemployed	54	77.0
Family type	Joint	55	78.6
	Nuclear/Extended	15	21.4
Received antenatal education	Yes	22	31.4
	No	48	68.6
Previous NICU experience	Yes	12	17.1
	No	58	82.9

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Clinical Characteristics of Neonates

Among the neonates, 64% were born at term, while 37% were premature. Female neonates constituted 56% of the sample. The mean birth weight was 2.66 ± 0.53 kg. The mean length of stay in the NICU was 5.03 ± 6.27 days, ranging from 0 to 35 days. Prematurity was the most frequently reported indication for NICU admission.

Table 2

Clinical Characteristics of Neonates (N = 70)

Variable	Category	n	%
Gestational age	Full-term	45	64.3
	Preterm	25	35.7
Gender	Male	31	44.3
	Female	39	55.7
Birth weight (kg)	Mean ± SD	2.66 ± 0.53	,
Length of NICU stay (days)	Mean ± SD	5.03 ± 6.27	,
Reason for admission	Prematurity	17	24.3
	Other causes	53	75.7

Parental Knowledge of Basic Neonatal Home Care

Overall, parents demonstrated a **fair level of knowledge** regarding basic neonatal home care. Knowledge levels varied across domains. The lowest proportion of very good knowledge was observed in breastfeeding, while relatively better knowledge was noted in thermoregulation and cord care.

Table 3

Parental Knowledge Levels across Domains of Basic Neonatal Home Care

Knowledge Domain	Poor n (%)	Good n (%)	Very Good n (%)
Breastfeeding	32 (45.7)	24 (34.3)	14 (20.0)
Immunization	18 (25.7)	44 (62.9)	8 (11.4)
Umbilical cord care	20 (28.6)	27 (38.6)	23 (32.8)
Thermoregulation	17 (24.3)	29 (41.4)	24 (34.3)
Infection prevention	14 (20.0)	39 (55.7)	17 (24.3)
Recognition of danger signs	27 (38.6)	28 (40.0)	15 (21.4)

Summary of Key Findings

The findings indicate that while parents possessed fair overall knowledge of neonatal home care, substantial gaps existed, particularly in breastfeeding practices and recognition of neonatal danger signs. The lack of antenatal education reported by a majority of parents may have contributed to these deficiencies.

DISCUSSION

This study assessed parental knowledge regarding basic neonatal home care among parents of neonates discharged from the Neonatal Intensive Care Unit (NICU) at a tertiary care hospital in Pakistan. Overall, the findings indicate that parents demonstrated predominantly *fair* levels of knowledge across most domains of neonatal care, with notable deficiencies in breastfeeding practices and recognition of neonatal danger signs. These findings highlight important gaps in discharge preparedness and underscore the need for strengthened parental education prior to NICU discharge.

The predominance of fair knowledge suggests that while parents possess some awareness of neonatal care practices, their understanding may be

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insufficient to ensure optimal caregiving following discharge. This is particularly concerning given that more than two-thirds of parents reported receiving no neonatal care education during antenatal visits. Previous research has emphasized that inadequate antenatal and discharge education is associated with poor caregiver preparedness and increased risk of preventable neonatal complications (Amolo et al., 2017; Smith et al., 2009). The absence of structured educational interventions during pregnancy and hospitalization may therefore contribute to the observed knowledge gaps.

Breastfeeding emerged as the domain with the lowest proportion of very good knowledge. This finding is consistent with studies conducted in similar low- and middle-income settings, where misconceptions regarding exclusive breastfeeding, early initiation, and colostrum feeding remain common (Gul et al., 2014; Meseka et al., 2017). Given the well-established benefits of exclusive breastfeeding in reducing neonatal infections and improving growth and development, limited parental knowledge in this area represents a significant public health concern (World Health Organization [WHO], 2013). The NICU environment, which often disrupts early mother–infant contact, may further contribute to suboptimal breastfeeding knowledge and practices.

Knowledge related to neonatal immunization was largely categorized as fair. This finding aligns with previous evidence indicating partial awareness among parents regarding vaccines administered at birth, but limited understanding of immunization schedules and benefits (Owais et al., 2011). Inadequate parental knowledge of immunization has been associated with delayed or incomplete vaccination, increasing the risk of preventable infectious diseases. Structured education at the time of discharge may therefore play a critical role in improving timely vaccine uptake.

Relatively better knowledge was observed in the domains of thermoregulation and umbilical cord care. These findings may reflect routine nursing practices in the NICU, where parents frequently observe and receive guidance on maintaining neonatal warmth and basic hygiene. Similar trends have been reported in other studies, where parental exposure to bedside care improved understanding of selected neonatal care practices (Afolaranmi et al., 2018). However, despite comparatively better performance in these domains, a substantial proportion of parents still failed to demonstrate very good knowledge, indicating the need for reinforcement and standardized teaching.

Of particular concern was the limited knowledge regarding recognition of neonatal danger signs. Early identification of symptoms such as poor feeding, fever, hypothermia, respiratory distress, and lethargy is essential for timely care-seeking and prevention of severe neonatal outcomes. Consistent with findings from Ethiopia and Kenya, many parents in the present study demonstrated inadequate awareness of critical danger signs (Jemberia et al., 2018; Kibaru & Otara, 2016). Poor recognition of neonatal illness has been linked to delayed presentation to healthcare facilities and increased neonatal mortality, emphasizing the urgency of targeted education in this domain.

The findings of this study reinforce the pivotal role of NICU nurses in parental education and discharge preparation. Discharge readiness should be conceptualized as a continuous process initiated early during NICU admission and reinforced throughout hospitalization. Evidence suggests that structured, family-centered educational interventions can enhance parental confidence, reduce anxiety, and improve caregiving competence after discharge (Lee, 2014; Melnyk et al., 2001). Implementing standardized discharge education protocols may therefore improve neonatal outcomes and reduce preventable readmissions.

CONCLUSIONS

This study demonstrated that parents of neonates discharged from the Neonatal Intensive Care Unit exhibited predominantly fair levels of knowledge regarding basic neonatal home care. While some understanding was observed in areas such as thermoregulation and umbilical cord care, significant knowledge gaps were identified in breastfeeding practices and recognition of

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neonatal danger signs. These deficiencies suggest that many parents may be inadequately prepared to assume full caregiving responsibility following NICU discharge.

The findings highlight the critical importance of structured parental education as an integral component of neonatal care. Given that a substantial proportion of parents reported receiving no education on neonatal care during antenatal visits, opportunities for early preparation appear to be underutilized. Strengthening antenatal counseling and reinforcing education throughout NICU hospitalization may enhance parental knowledge, confidence, and readiness for discharge.

Overall, improving parental knowledge of essential neonatal home care practices has the potential to reduce preventable neonatal morbidity, minimize hospital readmissions, and contribute to improved neonatal health outcomes, particularly in resource-limited settings.

Implications for Practice and Policy

The findings of this study have important implications for neonatal nursing practice and health policy. Given the predominantly fair level of parental knowledge identified at the time of NICU discharge, there is a clear need to strengthen structured parental education as part of routine neonatal care. Nurses in the NICU are strategically positioned to provide consistent, evidence-based education to parents and should be supported through standardized discharge teaching protocols that address all essential components of neonatal home care.

From a clinical practice perspective, discharge education should be initiated early during NICU admission and reinforced throughout hospitalization rather than being limited to the time of discharge. Particular emphasis should be placed on breastfeeding support and the early recognition of neonatal danger signs, as these were identified as areas of significant knowledge deficit. Use of simple, culturally appropriate educational materials and interactive teaching methods may enhance parental understanding and retention of information.

At the policy level, integration of comprehensive neonatal home care education into routine antenatal and postnatal services should be prioritized. Development of institutional or national guidelines for parental education and discharge preparedness may promote consistency and quality of care across healthcare facilities. Policymakers should also consider incorporating family-centered care models into neonatal services to empower parents and improve continuity of care beyond the hospital setting.

Limitations

Several limitations should be considered when interpreting the findings of this study. First, the study was conducted at a single tertiary care hospital using non-probability consecutive sampling, which may limit the generalizability of the results to other healthcare settings or populations. Second, the assessment of parental knowledge was performed at the time of NICU discharge only; follow-up evaluations were not conducted to determine knowledge retention or actual caregiving practices at home.

Additionally, data were collected using self-reported responses, which may be subject to social desirability or recall bias. Finally, the cross-sectional study design limits the ability to establish causal relationships between parental knowledge and neonatal outcomes. Despite these limitations, the study provides valuable insight into parental knowledge gaps and highlights areas for targeted educational interventions.

Authors' Contributions

Maria Bushra (MB): Supervised the study, provided overall academic leadership, and guided the research design and methodology. MB critically reviewed the manuscript for intellectual content and approved the final version for submission.

Rabia Shareef (RS): Contributed to data collection, assisted in data organization, and participated in drafting the manuscript, particularly the introduction and results sections.

Nasreen Koukab (NK): Assisted with data collection and literature review. NK contributed

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to manuscript drafting and supported data interpretation under supervision.

Humera Shahdin (HS): Participated in data collection and questionnaire administration. HS assisted in manuscript preparation and revision for clarity and consistency.

Muhammad Akif Mehmood Asif (MA): Contributed to data collection and preliminary data analysis. MA supported the preparation of tables and results presentation.

All authors read and approved the final manuscript.

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