

Mothers' Knowledge, Attitudes, and Practices toward Neonatal Jaundice: A Cross-Sectional Study at a Public Sector Tertiary Care Hospital in Karachi, Pakistan

Ms. Anna Shaheen

GBSN Lecturer, Abdali Institute of Nursing & Health Sciences, Karachi.

Mr. Amjad Iqbal*

GBSN 8th Semester Student, Abdali Institute of Nursing & Health Sciences, Karachi.

Email: amjadiqbalh333@gmail.com

Mr. Asfandyar Adil

GBSN 8th Semester Student, Abdali Institute of Nursing & Health Sciences, Karachi,.

Mr. M. Hassan

GBSN 8th Semester Student, Abdali Institute of Nursing & Health Sciences, Karachi.

Mr. Abdul Quddus

GBSN 8th Semester Student, Abdali Institute of Nursing & Health Sciences, Karachi.

Author Details

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Corresponding E-mails & Authors*:

Mr. Amjad Iqbal*

amjadiqbalh333@gmail.com

Abstract

Background: Globally, neonatal jaundice is a common condition among newborns and can lead to chronic illness if absent from assessment and management. Being primary caregivers of newborns, mothers are frontline caregivers in the early detection and management of neonatal jaundice.

Objective: To determine mothers' knowledge, attitude and practices on neonatal jaundice at a public sector tertiary care institute in Karachi, Pakistan.

Methodology: A cross-sectional study was done on mothers of neonates who were admitted to the Neonatal Intensive Care Unit (NICU), and the pediatric and postnatal wards of the selected public sector hospitals in Karachi. A non-probability convenience sampling technique was employed, and 354 mothers participated in the study. Data were collected via a structured questionnaire. Data were analyzed via SPSS version 26. Utilizing the descriptive statistical

methods, data were summarized and a chi-square test was done to establish the associations between the demographic characteristics and KAP levels. The level of significance was set at $p < 0.05$.

Results: Of the surveyed mothers, 206 (58.2%) had poor knowledge of neonatal jaundice, and good knowledge was demonstrated by 148 (41.8%) mothers. Concerning attitude towards neonatal jaundice, 202 (57.1%) mothers had a good attitude, and a poor attitude was shown by 152 (42.9%) mothers. Regarding neonatal jaundice practice, 219 (61.9%) mothers had poor practice, while 135 (38.1%) mothers had good practice. There were statistically significant associations between the demographic characteristics and mothers' KAP ($p < 0.05$).

Conclusion: While attitudes toward neonatal jaundice were mostly positive among mothers, knowledge and practice gaps were noted. Improving maternal education, counseling, and awareness initiatives will strengthen early detection and improve health-seeking and preventative measures of complications that arise from neonatal jaundice.

Keywords: Neonatal jaundice, mothers' knowledge, attitude, practice, newborn, Karachi, Pakistan.

INTRODUCTION

Neonates suffer from many conditions owing to jaundice and therefore their major burden of disease can be attributed to jaundice (Mitra & Rennie, 2017). In Kahn's study, Salia (2015) stated that 60% of babies born at term and 80% of preterm babies suffering from jaundice were covered. The study published in The Lancet 2008 stated that neonatal jaundice is a common cause for the readmission of neonates to a hospital (Seneadza et al., 2022).

Hyperbilirubinemia describes the condition of increased bilirubin in the blood. Classic symptoms of this condition are jaundiced skin and the yellow appearance of the sclera. Jaundice may be a clinical finding in hyperbilirubinemia, which is said to be diagnosed with a total blood bilirubin level of 1.5 mg/dL or greater. Jaundice in a neonatal patient may be classified as either pathological or physiological. Out of the two classes of jaundice, physiological jaundice is the more common one, whereas pathological jaundice is far less common. The pathology of physiological jaundice in neonates is the breakdown of a greater amount of hemoglobin or immature hepatic clearance. It may also be caused by several other conditions such as Rh incompatibility, hypothyroidism, inherited enzyme deficiency, bile duct atresia, and drug toxicity (Tikmani et al., 2010).

Severe unconjugated hyperbilirubinemia can cause kernicterus or acute bilirubin encephalopathy, which can cause lifelong neurological disabilities, including cerebral palsy, and hearing loss, and can be fatal, although most neonates will be fine (Aggarwal et al., 2017). Therefore, initiated treatment and early detection are critical. As primary caregivers, mothers are important in the early detection of jaundice, monitoring its progress, and recognizing the early signs of acute bilirubin encephalopathy and kernicterus. They are integral to ensure the treatment of neonatal jaundice is successful (Wennberg et al., 2020).

The National Institute for Health and Care Excellence suggests that to manage neonatal jaundice, staff should ensure that parents and caregivers have knowledge of neonatal jaundice and understand how to undertake monitoring and the appropriate steps to take should it be apparent. Early detection, treatment, and management of neonatal jaundice are critical to minimizing adverse outcomes. Nurses and midwives are the primary caregivers who provide the necessary care to neonates in the hospital before discharge (Donkor et al., 2023).

Maternal knowledge, attitudes, and practices concerning neonatal jaundice show a wide range of statistics globally. 46.4% of mothers in Shenzhen, China, have knowledge concerning neonatal jaundice (Huang et al., 2022). In a different study conducted in Ghana, 45.5% of respondents had knowledge concerning neonatal jaundice; 47.5% had a positive attitude towards neonatal jaundice, and 58.9% showed good practice regarding neonatal jaundice (Salia et al., 2021). In Ethiopia, 39.2% of the mothers had knowledge concerning neonatal jaundice (Demis et al., 2021). In Iraq, 30% of the respondents had knowledge of neonatal jaundice and only 5.5% of the respondents had a positive attitude towards neonatal jaundice (Zainel et al., 2022). Lastly, in a study conducted in Ghana, 69.3%, 64.9%, and 62.9% of the respondents demonstrated good knowledge, attitudes, and practices concerning neonatal jaundice, respectively (Dzantor et al., 2023). Variations in these statistics indicate the need for situation-based studies, especially in developing countries, because neonatal morbidity is still high.

In Pakistan, not much research has been conducted to understand mothers' perceptions, attitudes, and practices towards neonatal jaundice. This study has been conducted to find knowledge gaps for mothers in order to avoid unnecessary morbidity among infants. Maternal attitudes regarding neonatal jaundice in a tertiary practice facility are the focus of this study.

Neonatal jaundice is a common condition among infants that is potentially fatal if not identified early. Mothers are the key caregivers of infants and identify the symptoms and decide to take the infant to seek medical attention. It is important to study perceptions, attitudes, and maternal practices related to neonatal jaundice in Karachi, Pakistan, as there are limited studies established in this area. This study will be a good start in identifying gaps in maternal education and enhancing health outcomes for infants. The findings of this study may be useful for future studies as baseline data.

METHODOLOGY

This study utilized a cross-sectional study design. The population of the study included mothers of all neonates who were patients of the Neonatal Intensive Care Unit (NICU), Pediatric Ward, and Postnatal Ward of a tertiary care hospital.

The sample size of the study was determined using Rao Software with 37.38% (Qumer et al., 2022), a 95% Confidence Interval, and a 5% margin of error. A sample

size of 354 participants was determined (Raosoft, 2011). A non-probability convenience sampling technique was used to recruit participants. The inclusion criteria were mothers who were able to speak, were willing to participate and provide informed consent, and whose neonates were admitted in NICU, Pediatric Ward, or Postnatal Ward. The mothers who were unwilling to participate, did not provide written informed consent, and were critically ill, or were unable to communicate, or were mentally ill or cognitively impaired, or otherwise affected to the extent to which they were unable to respond the questionnaire were excluded from the study. The data were collected after permission was obtained from both the concerned review board and hospital administration, and eligible mothers were identified based on the inclusion criteria. Participants were briefed about the purpose and scope of the study. The research team collected data through questionnaires. Written informed consent was obtained from all participants before data collection. To maintain participants' anonymity and confidentiality, the participants were given hypothetical identification numbers.

Data were collected using a structured questionnaire containing baseline characteristics, knowledge, attitudes, and practices concerning newborn jaundice. The total number of items in the questionnaire was 27. Knowledge was assessed through 16 items with categorical response options: 'true', 'false', and 'don't know'. Attitudes were assessed through 7 items using a 5-point Likert scale, and practices were assessed through 4 items using yes/no response options. In the questionnaire developed by Li et al. (2021), each of the 16 knowledge items scored 1 point if the response was correct and scored 0 points otherwise, and maximum knowledge score of 16 was considered. A score of less than 10 was interpreted as poor knowledge, while a score of more than 10 was good knowledge. Regarding the attitude score, a score of 28 or below was poor, and a score of 29-35 was good. Participants scored less than 4 in practice and were considered to have poor practice, while a score of 4 was considered good practice. Content validity for the questionnaire was achieved by expert review, and based on the scale level content validity index (S-CVI) of the questionnaire, a value of 0.958 was obtained which was also above the acceptable level of 0.80 (Shi et al., 2012). Evaluation of internal consistency of the questionnaire using Cronbach's alpha resulted in an overall value of 0.802, which was considered to indicate good consistency (Huang et al., 2022).

The Statistical Package for the Social Sciences (SPSS) version 26 was used to input and analyze the data. Descriptive statistics were employed to summarize the data. Frequencies and percentages were used to describe the demographic characteristics of the sample. The association between the demographic variables and the respective knowledge, attitude, and practice levels was assessed using the Chi-square test. The association was considered statistically significant if the p-value was less than 0.05. All ethical guidelines were followed in the study. Data were collected after the participants signed the informed consent forms to show that they were willing to participate. It was their choice to volunteer, as participation was not mandatory, and no penalties were issued for withdrawing from the study. The participants' confidentiality and anonymity were preserved, and their right to self-determination was protected throughout the procedure. Data collected were stored and secured; hard copies were kept in a cabinet that locks, while soft copies were digitally preserved in the researcher's laptop and protected with a password.

RESULTS

Levels of Knowledge, Attitude, and Practice Regarding Neonatal Jaundice

Table I shows the Knowledge, Attitude, and Practice (KAP) score of mothers on neonatal jaundice. Knowledge on neonatal jaundice was classified as poor among more than half of the mothers, 206 (58.2%). On the other hand, knowledge on neonatal jaundice was classified as good among 148 (41.8%) of the mothers. Regarding attitude, mothers had good attitude, 202 (57.1%), while poor attitude was shown by 152 (42.9%) of the mothers. As to practice, poor practice was reported by 219 (61.9%) of the mothers, while good practice was reported by 135 (38.1%) of the mothers. Although mothers' attitude on neonatal jaundice was more on the positive side, poor knowledge and practical management was shown by the mothers.

Table I: Levels of Knowledge, Attitude, and Practice Regarding Neonatal Jaundice

Level	Knowledge N (%)	Attitude N (%)	Practice N (%)
Poor	206 (58.2)	152 (42.9)	219 (61.9)
Good	148 (41.8)	202 (57.1)	135 (38.1)

Demographic Characteristics of Study Participants

Demographics of the study participants are in Table II. In terms of education, the majority of mothers were graduates (n = 160, 45.2%). This was followed by those with primary or secondary education (n = 122, 34.5%). Postgraduate mothers were the least, n = 72 (20.3%). In terms of employment, a similar number of mothers were self-employed (n = 135, 38.1%) and housewives (n = 135, 38.1%). Employed mothers were n = 84 (23.7%). In terms of monthly family income, the majority of participants (n = 156, 44.1%) earned 50,000 or less, followed by those with 50,001 – 100,000 (n = 128, 36.2%). Those with income more 100,000 were n = 70 (19.8%). In terms of parity, multiparous mothers were n = 216 (61.0%) and primiparous mothers were n = 138 (39.0%). The majority of mothers had a normal vaginal delivery (n = 179, 50.6%) and caesarean delivery (n = 175, 49.4 %), respectively. The majority of mothers had prior education on neonatal jaundice (n = 230, 65.0%) and (n = 124, 35.0%) did not. The majority of mothers had previous children with neonatal jaundice (n = 199, 56.2%) and (n = 155, 43.8%) did not.

Table II: Demographic Characteristics of Study Participants

Characteristics	Frequency N (354)	%
EDUCATION		
Primary/Secondary	122	34.5
Graduate	160	45.2
Postgraduate	72	20.3
OCCUPATION		
Employed	84	23.7
Self-employed	135	38.1
House wife	135	38.1
MONTHLY FAMILY INCOME		
≤50,000	156	44.1
50,001–100,000	128	36.2
>100,000	70	19.8
PARITY		
Primi-Para	138	39.0

Characteristics	Frequency N (354)	%
Multipara	216	61.0
MODE OF DELIVERY		
Normal vaginal	179	50.6
Caesarean section	175	49.4
PRIOR EDUCATION ON NEONATAL JAUNDICE		
No	124	35.0
Yes	230	65.0
PREVIOUS CHILD WITH NEONATAL JAUNDICE		
No	155	43.8
Yes	199	56.2

Maternal Knowledge Regarding Neonatal Jaundice

Table III shows mothers' knowledge of neonatal jaundice. More than two-thirds of mothers, 244 (68.9%) were correct in saying jaundice means newborns' skin turns yellow, with 110 (31.1%) providing incorrect answers. Of the participants, 190 (53.7%) said the face turns yellow first, and, 201 (56.8%) said bright natural light. In terms of the nature and severity of neonatal jaundice, 201 (56.8%) said neonatal jaundice can be physiological or pathological, and, 210 (59.3%) said yellow palms and soles denote severe jaundice. More than half of mothers said jaundice appearing within 24 hours is abnormal, 196 (55.4%), and 207 (58.5%) said it is abnormal if jaundice reappears after it has disappeared. Regarding the complications and causes, 206 (58.2%) mothers reported that severe jaundice can damage the brain, and 205 (57.9%) said blood group incompatibility is one of the causes. The rest, 206 (58.2%) said cranial hematoma, 203 (57.3%) said G6PD deficiency, and, 190 (53.7%) said neonatal jaundice can be due to intestinal obstruction. The majority of mothers 197 (55.6%) said that breastfeeding can cause jaundice and 205 (57.9%) said that breast milk jaundice is benign and self-limiting. The majority also recognized that the gold standard for jaundice diagnosis is a blood test 224 (63.3%) and that phototherapy is a safe and effective treatment (59.3%). The findings indicate that there is a moderate level of maternal knowledge of neonatal jaundice.

Table III: Maternal Knowledge about Neonatal Jaundice

Variables	Correct N (%)	Incorrect N (%)
Skin turns yellow during jaundice	244 (68.9)	110 (31.1)
Face becomes yellow first in neonatal jaundice	190 (53.7)	164 (46.3)
Jaundice should be checked in bright natural light	201 (56.8)	153 (43.2)
Neonatal jaundice is physiological or pathological	201 (56.8)	153 (43.2)
Yellow palms/soles indicate severe jaundice	210 (59.3)	144 (40.7)
Jaundice appearing within 24 hours is abnormal	196 (55.4)	158 (44.6)
Reappearance of jaundice after disappearance is abnormal	207 (58.5)	147 (41.5)
Severe jaundice can cause brain damage	206 (58.2)	148 (41.8)
Blood group incompatibility can cause jaundice	205 (57.9)	149 (42.1)
Cranial hematoma may cause jaundice	206 (58.2)	148 (41.8)
Intestinal obstruction may cause jaundice	190 (53.7)	164 (46.3)
G6PD deficiency may cause jaundice	203 (57.3)	151 (42.7)
Breastfeeding can cause jaundice	197 (55.6)	157 (44.4)
Breast milk jaundice is benign and self-limiting	205 (57.9)	149 (42.1)
Blood test is gold standard for diagnosing jaundice	224 (63.3)	130 (36.7)
Phototherapy is safe and effective treatment	210 (59.3)	144 (40.7)

Maternal Attitude Regarding Neonatal Jaundice

Table IV shows the responses of the mothers regarding their perception of neonatal jaundice. In response to the statement claiming neonatal jaundice is benign and is of no concern, 156 mothers (44.1%) stated that they strongly agreed, and 86 of them (24.3%) agreed. On the other hand, 34 of the mothers (9.6%) stated that they disagreed, and 46 of them (13.0%) stated that they strongly disagreed. In response to the claim that jaundice will clear on its own without any need for treatment, almost half that is 176 mothers (49.7%) agreed, and 89 mothers (25.1%) stated that they strongly agreed. On the other hand, 40 mothers, and 15 (4.2%) of them, stated that they disagreed and strongly disagreed, respectively. In response to the attitude towards monitoring neonatal jaundice, 121 mothers (34.2%) stated that they strongly agreed and 130 mothers (36.7%) agreed that monitoring jaundice after discharge was

necessary, and 141 mothers (39.8%) and 126 mothers (35.6%) stated that they strongly agreed and agreed, respectively, that postpartum visits to check jaundice were necessary. Almost half, 176 mothers (49.7%), stated that they strongly agreed that a baby with jaundice should be taken to a health facility without delay, and 121 mothers (34.2%) stated that they agreed. In response to the question regarding improving jaundice with adequate breastfeeding, 162 mothers (45.8%) and 117 mothers (33.1%) stated that they strongly agreed and agreed, respectively. Almost half that is 175 mothers (49.4%) stated that they strongly agreed and 98 mothers (27.7%) stated that they agreed, that there was a need to educate the public on neonatal jaundice. From the responses given, it can

Table IV: Maternal Attitude Regarding Neonatal Jaundice

Variables	Strongly Agree N (%)	Agree N (%)	Not Sure N (%)	Disagree N (%)	Strongly Disagree N (%)
Neonatal jaundice is harmless and needs no concern	156 (44.1)	86 (24.3)	32 (9.0)	34 (9.6)	46 (13.0)
Jaundice resolves without treatment	89 (25.1)	176 (49.7)	34 (9.6)	40 (11.3)	15 (4.2)
Observation of jaundice after discharge is important	121 (34.2)	130 (36.7)	83 (23.4)	14 (4.0)	6 (1.7)
Postpartum visits for jaundice assessment are necessary	141 (39.8)	126 (35.6)	68 (19.2)	12 (3.4)	7 (2.0)
Baby with jaundice should visit health facility timely	176 (49.7)	121 (34.2)	45 (12.7)	8 (2.3)	4 (1.1)
Adequate breastfeeding helps reduce jaundice	162 (45.8)	117 (33.1)	63 (17.8)	7 (2.0)	5 (1.4)
Learning about neonatal jaundice is necessary	175 (49.4)	98 (27.7)	71 (20.1)	4 (1.1)	6 (1.7)

Maternal Practice Regarding Neonatal Jaundice

Table V shows mothers' involvement with neonatal jaundice. Out of 354 mothers, most of them, 276 (78.0%), said they look for information on neonatal jaundice. 78

(22.0%) mothers said they do not look for information. About post-discharge care, 233 (65.8%) mothers said they check their baby for jaundice post-discharge. 121 (34.2%) mothers said they do not check. 301 (85.0%) participants said they follow the doctor for the advice for bilirubin, and 53 (15.0%) said they don't. 239 (67.5%) mothers said they breastfeed and 115 (32.5%) mothers said they do not breastfeed. The majority of mothers said they are active for the management and care of neonatal jaundice.

Table V: Maternal Practice Regarding Neonatal Jaundice

Variables	Yes N (354)	No N (354)
I actively seek information about neonatal jaundice	276 (78.0)	78 (22.0)
I check my baby for jaundice after discharge	233 (65.8)	121 (34.2)
I follow doctor's advice for bilirubin testing	301 (85.0)	53 (15.0)
I practice adequate breastfeeding	239 (67.5)	115 (32.5)

Association of Demographic Variables with Mothers' Knowledge Regarding Neonatal Jaundice

The association between some demographic variables and nursing mothers' knowledge of neonatal jaundice was examined using the chi-square distribution test (Table VI). The findings indicated that mothers' age ($\chi^2 = 14.796, p = 0.001$) and monthly family income ($\chi^2 = 16.324, p = 0.001$), the number of previous births ($\chi^2 = 4.588, p = 0.032$), the gender of the child ($\chi^2 = 14.660, p = 0.001$), the methods of feeding the child ($\chi^2 = 13.847, p = 0.001$), and whether the mother previously received training on neonatal jaundice ($\chi^2 = 24.339, p = 0.001$) were all statistically significant at ($p < 0.05$). On the contrary, mothers' education, employment, the mode of delivery, and whether the mother had a child with neonatal jaundice in the past were of no statistically significant value in relation to knowledge of the mother ($p > 0.05$).

Table VI: Association of Demographic Variables with Mothers' Knowledge Regarding Neonatal Jaundice

Variables	χ^2	p-value
Mother's age (years)	14.796	0.001*
Education level	0.103	0.950
Occupation	1.347	0.510

Variables	χ^2	p-value
Monthly family income	16.324	0.001*
Parity	4.588	0.032*
Mode of delivery	2.852	0.091
Baby's gender	14.660	0.001*
Feeding method	13.847	0.001*
Prior education on neonatal jaundice	24.339	0.001*
Previous child with neonatal jaundice	1.088	0.297

$\chi^2 = Chi-square$; * $p < 0.05$ (statistically significant)

Association of Demographic Variables with Mothers' Attitude Regarding Neonatal Jaundice

A chi-square test was utilized in examining the links between demographic characteristics, mothers' attitude, and neonatal jaundice (Table VII). The results showed that mother's age ($\chi^2 = 14.250$, $p = 0.001$) and monthly family income ($\chi^2 = 12.250$, $p = 0.002$) had a statistically significant association with mothers' attitude ($p < 0.05$). However, the mother's education, work, number of children, delivery type, child's gender, feeding method, and prior knowledge of neonatal jaundice as well as the mother's prior experience of neonatal jaundice in her child showed no statistically significant association with mothers' attitude ($p > 0.05$).

Table VII: Association of Demographic Variables with Mothers' Attitude Regarding Neonatal Jaundice

Variables	χ^2	p-value
Mother's age (years)	14.250	0.001*
Education level	5.331	0.070
Occupation	0.977	0.613
Monthly family income	12.250	0.002*
Parity	0.076	0.782
Mode of delivery	2.849	0.091
Baby's gender	0.798	0.372
Feeding method	4.783	0.091
Prior education on neonatal jaundice	0.255	0.614
Previous child with neonatal jaundice	3.342	0.068

$\chi^2 = Chi-square$; * $p < 0.05$ (statistically significant)

Association of Demographic Variables with Mothers' Practice Regarding Neonatal Jaundice

The association between demographic variables and mothers' practices regarding NGJ in Bangladesh, using a chi-square test, is presented in Table VIII. It was evident from the outcome of the test that mothers' practices were significantly associated with these variables: monthly family income ($\chi^2 = 8.604$, $p = 0.014$), parity ($\chi^2 = 6.805$, $p = 0.009$), baby's gender ($\chi^2 = 7.336$, $p = 0.007$), feeding method ($\chi^2 = 9.520$, $p = 0.009$), and knowledge on neonatal jaundice ($\chi^2 = 28.533$, $p = 0.001$). The remaining demographic variables, namely, mother's age, education, occupation, and mode of delivery, did not show any significant association with mothers' practices ($p > 0.05$).

Table VIII: Association of Demographic Variables with Mothers' Practice Regarding Neonatal Jaundice

Variables	χ^2	p-value
Mother's age (years)	8.655	0.013
Education level	3.006	0.222
Occupation	0.125	0.940
Monthly family income	8.604	0.014*
Parity	6.805	0.009*
Mode of delivery	3.270	0.071
Baby's gender	7.336	0.007*
Feeding method	9.520	0.009*
Prior education on neonatal jaundice	28.533	0.001*
Previous child with neonatal jaundice	2.309	0.129

$\chi^2 = Chi-square$; * $p < 0.05$ (statistically significant)

DISCUSSION

The objective of this study was to determine the knowledge, attitude, and practice of mothers on neonatal jaundice in mothers having neonates admitted to tertiary care hospitals in Karachi, Pakistan. Neonatal jaundice is one of the most common conditions among neonates and can result in serious complications if identified and treated promptly. As mothers are the primary caregivers of the newborn, the knowledge, attitude, and practices of the mothers are of paramount importance for the early detection and management of neonatal jaundice.

The results demonstrated that the majority of mothers, 206 (58.2%), had insufficient knowledge on neonatal jaundice, while 148 (41.8%) had sufficient knowledge. These results indicate that the mothers had little knowledge of the causes, signs, complications, and interventions related to neonatal jaundice. These results were similar to studies in Ethiopia where only 39.2% of mothers had adequate knowledge (Demis et al., 2021) and China where 46.4% of mothers had good knowledge (Huang et al., 2022). Likewise, a study in Iraq showed that 30% of mothers had adequate knowledge and poor maternal knowledge was reported (Zainel et al., 2022). Meanwhile, results in Ghana showed that 69.3% of mothers had good knowledge (Dzantor et al., 2023). These discrepancies in results can be attributed to differences in the caregivers educational level, maternal healthcare, the existence of awareness constellations, and socioeconomic status and maternal beliefs.

The current study shows 57.1% (n=202) of mothers had a good attitude, whereas, 42.9% (n=152) had a poor attitude regarding neonatal jaundice. Overall, mothers had a positive attitude towards seeking healthcare, attending postpartum visits, breastfeeding, and understanding neonatal jaundice. In relation to maternal attitude, these results are similar to a study in Ghana where 64.9% of mothers had a positive attitude (Salia et al., 2021). On the contrary, 5.5% of mothers in another study in Iraq had a positive attitude (Zainel et al., 2022). The positive attitude in this study could be attributed to increased maternal knowledge and healthcare consultation during the antenatal and postnatal visits.

As for maternal practice, 61.9% (n=219) of mothers in this study demonstrated poor practice, while 38.1% (n=135) demonstrated good practice regarding neonatal jaundice. Even though a positive attitude was reported by many mothers on seeking information, monitoring jaundice after discharge, and adhering to treatment and

breastfeeding, the overall practice was rated poor. This is contrary to findings in Ghana where good practice was reported by 58.9% and 62.9% of mothers (Salia et al., 2021; Dzantor et al., 2023). The poor practice in this study may be attributed to lack of clinical knowledge and misconceptions, poor counseling, and poor healthcare education.

The current research evaluated the link between demographic characteristics and mothers' understanding of neonatal jaundice. The results demonstrated significant statistical relationships between mothers' ages, monthly family income, number of children, child's gender, feeding method, and whether or not they received education about neonatal jaundice and maternal knowledge ($p < 0.05$). This shows that maternal experience, social class, and prior exposure to health knowledge may positively impact knowledge. Lack of education, job, delivery method, and prior child with neonatal jaundice also showed no statistically significant relation ($p > 0.05$).

As for maternal attitude, significant statistical relationships were found between mothers' ages and monthly family income ($p < 0.05$). No significant relationships were found between other demographic variables and maternal attitude ($p > 0.05$). This implies that maternal attitude and perception of neonatal jaundice management may be dependent on social class. On the other hand, maternal practice also showed that monthly family income, number of children, child's gender, feeding method, and education about neonatal jaundice are significant ($p < 0.05$). Maternal practice also showed no significant relationship with mothers' ages, education, job, delivery method, and prior child with neonatal jaundice ($p > 0.05$) (Qumer et al., 2022; Huang et al., 2022; Ashebir et al., 2022).

The current study shows how mothers, even with a positive attitude towards neonatal jaundice, lack adequate knowledge and skill for dealing with the problem. With this information, education and counseling of mothers, along with other healthcare providers, on neonatal jaundice should improve the health of the neonates. With an increased awareness and skill to deal with the problem, the positive outcomes can be realized from such programs.

CONCLUSION

The study assessed the level of knowledge, attitude, and practice of mothers regarding jaundice in neonates admitted in a public sector hospital in Karachi, Pakistan. The results show that the majority of mothers had poor knowledge and poor

practice of neonatal jaundice. More than 50% of the mothers, however, had a positive attitude regarding neonatal jaundice. Although the mothers' positive attitude towards neonatal jaundice was encouraging, there was still a gap in maternal knowledge and practical management of neonatal jaundice. With the help of this study, the knowledge, attitude, and practice of mothers regarding neonatal jaundice, and some of the demographic factors, have been assessed. The knowledge and attitude towards neonatal jaundice were significantly determined by the age of the mother and family monthly income. The mother's practice was significantly determined by family monthly income, neonatal and maternal parity, the gender of the neonatal child, the feeding method, and maternal educational status in the neonatal field. Of the factors studied, maternal education was the most important variable in determining both knowledge and practice. The findings from this study show that there is a need to enhance maternal education regarding neonatal jaundice to improve early identification, care-seeking, and to reduce the likelihood of adverse events to the newborn.

RECOMMENDATIONS

- Health education on the problem of neonatal jaundice should be provided to mothers both in the antenatal and postnatal periods, as well as during their hospital discharge.
- Nurses and midwives are recommended to train mothers on identifying early symptoms of neonatal jaundice and timely interventions for the complications.
- Maternal knowledge and practices can be reinforced using brochures, pamphlets, and awareness sessions.
- It is essential for hospitals to create educational programs on neonatal jaundice to enhance maternal knowledge and improve neonatal outcomes.
- It is critical to focus on mothers who have a particularly low level of awareness and education concerning neonatal jaundice.
- Assessing populations in other regions is recommended to achieve study diversification.

LIMITATIONS OF THE STUDY

- Due to the cross-sectional design of the study, a cause-effect relationship was not applicable.

- Since the study was only carried out in a few selected tertiary care hospitals in Karachi, the findings may not be applicable outside of these.
- A non-probability convenience sampling method may have introduced bias.
- The study was based on the respondents' self-reported responses, which may have resulted in bias in the form of recall or social acceptability.

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