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Knowledge, Practices, and Attitudes of Jordanian Parents Regarding Neonatal Jaundice Associated with ABO Incompatibility: A Cross-sectional Study

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ABSTRACT

Background: Neonatal jaundice associated with ABO incompatibility can lead to serious complications if undiagnosed or not treated properly. Parental knowledge, practices, and attitudes play an essential role in early detection and safe treatment. ***Purpose*****:** This study aims to evaluate knowledge, practices, and attitudes of Jordanian parents concerning neonatal jaundice associated with ABO incompatibility. ***Methods*****:** This study was conducted with 536 participants using a reliable, valid online questionnaire. Knowledge, practices, and attitudes were calculated and analyzed using descriptive and inferential statistical tests. ***Results*****:** The findings reported that the participants had moderate levels of knowledge (15.8 ± 2.6) and practices (18.8 ± 2.3), but a high level of attitudes (22.9 ± 1.6) toward neonatal jaundice associated with ABO incompatibility. Knowledge scores were higher among participants who had previously heard about ABO incompatibility and those with higher education. Practice scores were higher among females, parents with previous neonatal jaundice experience, and those who had previously heard about ABO incompatibility, while older participants reported slightly lower practice scores. Attitude scores were higher among females, parents with prior neonatal jaundice experience, and those who had previously heard about ABO incompatibility, with slight decreases among older participants and those with more children. ***Conclusion*****:** Jordanian parents showed a gap in knowledge and harmful practices regarding neonatal jaundice associated with ABO incompatibility. We need educational programs integrated into pre-natal and post-natal care to address knowledge gaps, reduce harmful practices, and improve neonatal care. ***Implications for Nursing*****:** It is essential to add effective educational programs to routine pre-natal and post-natal care.

Keywords: ABO incompatibility, Attitudes, Knowledge, Neonatal jaundice, Practices, Jordanian parents.

What does this paper add?

This study is the first to evaluate the knowledge, practices, and attitudes of Jordanian parents regarding neonatal jaundice associated with ABO incompatibility. To date, no prior research has examined these aspects in this context. Addressing this research gap is essential, as limited knowledge, unsafe practices, and negative attitudes can affect neonatal health outcomes.

Introduction

Neonatal jaundice is common in the first days of life; also, it is considered one of the main reasons for hospital readmissions. One of the main causes of neonatal jaundice is hemolytic disease of the newborn (HDN).

HDN occurs when there is a mismatch in blood type or Rhesus factor between the mother and her baby. A mismatch in blood type is known as ABO incompatibility, which occurs if a mother has blood type O and her baby has blood type A, B, or AB. In this case, the mother's antibodies can cross the placenta, attack the baby's blood cells, break down the baby's blood cells, and raise bilirubin levels (Gomella et al., 2004).

ABO incompatibility occurs in about 12%-15% of pregnancies, but clinically significant hemolytic effects occur in less than 1% of cases (Gomella et al., 2004). In the United States, ABO incompatibility was in 1% of all cases of HDN during 15 years (Yu et al., 2023). In Jordan, by analyzing 10,000 births from 2007 to 2009, it was found that 44.7% of neonatal jaundice cases were associated with ABO incompatibility (Khassawneh et al., 2013).

Multiple clinical guidelines have been developed to enhance the early detection and follow-up of jaundice associated with ABO incompatibility. The American College of Obstetricians and Gynecologists recommends blood type testing for all pregnant mothers (Kemper et al., 2022). Similarly, the American Academy of Pediatrics (AAP) advises that if the mother has blood type O, additional cord blood samples should be taken after birth. These include the direct antiglobulin test (DAT) to identify maternal antibodies in the neonate's circulation, newborn blood typing, and cord blood bilirubin levels. The AAP considers both DAT results and cord bilirubin levels as critical indicators for early detection and timely follow-up. Cord blood testing is considered a simple, cost-effective, and non-invasive procedure that facilitates early detection (Kemper et al., 2022).

The AAP has created guidelines for the management of neonatal jaundice. These guidelines include the continuation of breastfeeding while discouraging oral glucose supplementation. In severe cases, phototherapy, intravenous immunoglobulin, or blood exchange might be needed to prevent neurological complications (Kemper et al., 2022). Despite these evidence-based recommendations, many harmful and ineffective practices continue to be used, including stopping breastfeeding, exposing newborns to sunlight or household neon lights, and relying on traditional remedies (Al-Hadeethi et al., 2025; Al-Sagarat & Al-Kharabsheh, 2017; Ghafel & Al-Jubouri, 2024; Horn et al., 2021; Manji & Mohammed, 2020).

Several international studies have examined parental knowledge and practices associated with Rhesus incompatibility or neonatal jaundice in general (Abimbola & Olasubomi, 2021; Alfaifi et al., 2023; Aljuhaysh et al., 2017; Al-Zamili & Saadoon, 2020; Geta et al., 2024). In contrast, no research addressed ABO incompatibility and its associated jaundice. This gap in research is significant, as insufficient knowledge, unsafe practices, and negative attitudes can delay the diagnosis, increase the risk of complications, and encourage harmful practices (Gomella et al., 2004). In Jordan, previous studies have indicated that many parents had inadequate knowledge and harmful practices in different areas of child health issues (Abu-Baker et al., 2024; Al Shikh et al., 2024; Bani-Ahmed et al., 2023). Therefore, it is important to examine parents' knowledge, practices and attitudes regarding neonatal jaundice associated with ABO incompatibility in the local community.

The objective of this study was to evaluate the knowledge, practices, and attitudes (KPA) of Jordanian parents concerning neonatal jaundice associated with ABO incompatibility. Its findings can guide the development of educational programs that may promote early detection, reduce complications, and improve newborn health outcomes.

Methodology

Study Design

This study utilized a cross-sectional design.

Sampling Technique

Convenience sampling was employed to recruit a representative sample of parents from diverse regions across Jordan.

The required sample size was determined by taking into account the primary planned statistical analyses. We assumed a medium effect size, a significance level of 0.05, and a statistical power of 0.80. Based on these parameters, the minimum sample size was 300 (Cohen, 1992).

Inclusion Criteria

Married men and women aged 18 years or older, who had at least one child, were included.

Data Collection Procedure

Data was collected through an electronic

questionnaire, distributed through widely used social online platforms, to promote broad participation across Jordan. Participation was voluntary, with informed consent obtained electronically. The questionnaire was designed to be completed in approximately 10-15 minutes. A pilot study was conducted to assess clarity, readability, and ease of completion of the questionnaire. The data collection phase was conducted over a four-month period, from June to September 2025.

Data Collection Tool

A structured questionnaire was developed specifically for this study due to the unavailability of a validated tool addressing parental KPA regarding neonatal jaundice associated with ABO incompatibility. The development of the questionnaire was guided by a comprehensive review of the literature (Alfaifi et al., 2023; Al-Zamili & Saadoon, 2020; Hanif et al., 2022; Salia et al., 2021).

The draft questionnaire was reviewed by two independent experts: one in obstetrics and gynecology and the other in pediatrics. Following this, the tool was translated into Arabic by a bilingual translator and subsequently evaluated by an additional research specialist to assess accuracy and cultural appropriateness.

A pilot study was conducted with 50 participants (approximately 10% of the estimated sample size). Based on its results, three items in the practice scale (P3, P4, and P5) were revised due to their low item-total correlation values of less than 0.30.

The final version of the questionnaire comprised four sections. The overall scale demonstrated acceptable internal consistency, with a Cronbach's alpha of 0.778. Construct validity was evaluated using exploratory factor analysis. The Kaiser-Meyer-Olkin value of 0.782 indicated sampling adequacy, and Bartlett's test of sphericity was significant ($x^2 = 2984.05$, df = 325, $p < 0.001$). Together, these results indicate that the questionnaire is a valid and reliable tool for assessing KPA regarding neonatal jaundice associated with ABO incompatibility.

1. Socio-demographic Data

It included participants' age, gender, educational level, region of residence, number of children, blood types (both participant and spouse), history of neonatal jaundice, and previous hearing about ABO incompatibility.

2. Knowledge Scale

It consisted of ten items designed to assess the understanding of pathophysiology, complications, diagnosis, management, and follow-up tests. Each item is scored as follows: correct answer = 2 points, incorrect answer = 1 point. Total scores range from 10 to 20 and are categorized as low (10-13), moderate (14-17), or high (18-20). The scale demonstrated on acceptable internal consistency, with a Cronbach's alpha of 0.764.

3. Practice Scale

It consisted of eight items evaluating both safe and potentially harmful practices. Each item is scored as follows: "I will do this" = 3 points, "I am unsure of its benefits or risks" = 2 points and "I will not do this" = 1 point. Items reflecting harmful practices were reverse coded, so that higher scores indicate better practices. Total scores range from 8 to 24, categorized as good (20-24), moderate (14-19), or harmful (8-13). The scale demonstrated a moderate internal consistency, with a Cronbach's alpha of 0.612.

4. Attitude Scale

It included eight items using a three-point Likert scale (agree = 3, neutral = 2, disagree = 1). Negatively worded items were reverse coded to maintain consistency. Total scores range from 8 to 24 and are classified as positive attitudes (20-24), moderate attitudes (14-19), or negative attitudes (8-13). The scale's internal consistency was acceptable, with a Cronbach's alpha of 0.701.

Ethical Considerations

Ethical approval from the Institutional Review Board was obtained from Jordan University hospital/teaching hospital (number 14388). An electronic consent form was obtained from the participants. Participants' confidentiality and anonymity were maintained, with all data securely stored and used only for research purposes.

Data Analysis

Data was analyzed using SPSS, version 24. The data was checked for completeness and consistency. Descriptive statistics and inferential statistics were used.

Results

A total of 709 individuals accessed the online

questionnaire; 536 completed the questionnaire. The attrition rate was 24.4%.

The normality of the sample was checked using skewness and kurtosis statistics. The average age of participants was 34.81 years (SD = 6.2 years), with a skewness of 0.55 and a kurtosis of 0.64. The average number of living children was 3.11 (SD = 1.5), with a skewness of 0.79 and a kurtosis of 0.65. According to previous research, a sample can be considered normally distributed if skewness and kurtosis values are non-zero, but less than 3.00 (Matore & Khairani, 2020).

Socio-demographic Characteristics

As presented in Table 1, most of the participants were female (64%), and the majority were aged between 28 years and 37 years (60.2%). Regarding education, 67.7% were university graduates. More than a half of the participants (64%) lived in the middle regions of Jordan.

In terms of parity, most participants had 2–5 living children (78.3%). Concerning neonatal history, 46% reported that their child had experienced jaundice without requiring phototherapy, and 20% reported jaundice that required phototherapy.

Only 37.7% of the participants had heard previously about jaundice associated with ABO incompatibility, whereas 62.3% had not heard of it. Most participants knew their blood type (96.3%), but fewer knew their spouse's blood type (67.5%).

Table 1. Socio-demographic characteristics

Variable	n	%
Gender		
Male	193	36%
Female	343	64%
Age (years)		
18-27	53	9.9%
28-37	323	60.2%
38-47	142	26.5%
48-57	17	3.2%
≥ 58	1	0.2%
Educational level		
School level	132	24.6%
Graduate	363	67.7%
Postgraduate	41	7.7%
Region of residency		
North of Jordan	122	22.8%
Middle of Jordan	343	64%
South of Jordan	71	13.2%
Number of living children		
1 child	76	14.2%
2-5 children	420	78.3%
6-9 children	40	7.5%
History of neonatal jaundice		
No history	182	34.0%
Jaundice (no phototherapy /admission)	247	46.0%
Jaundice (needed phototherapy / admission)	107	20.0%
Heard previously about jaundice associated with ABO incompatibility		
Yes	202	37.7%
No	334	62.3%
Know your own blood type		
Yes	516	96.3%
No	20	3.7%
Know your spouse's blood type		
Yes	362	67.5%
No	174	32.5%
n = frequency % = percentage		

Participants' KPA Scores

As shown in Table 2, the participants had a moderate level of knowledge (mean score 15.8 ± 2.6; range 10–20). The highest correct response was for identifying the role of laboratory tests in detecting jaundice (K9), followed by knowing that some cases need phototherapy (K6), the need to repeat bilirubin tests when levels are high (K10), that ABO incompatibility affects the baby more than the mother (K3), that jaundice may appear within the first 24 hours (K5), that the baby's blood can enter the mother's bloodstream (K1), the role of maternal antibodies in destroying baby blood cells (K4), the need for blood exchange in severe cases (K7), and the role of blood type mismatch that causes jaundice (K2).The lowest correct response was for (K8), concerning the role of testing placental blood.

Table 2. Distribution of responses to knowledge scale items (n= 536)

Item	Correct answer	Incorrect answer
	Yes	No
	n (%)	n (%)
K 1: Do you know that a small amount of the baby's blood can enter the mother's bloodstream during pregnancy or birth ?	276 (51.5%)	260 (48.5%)
K 2: Do you know that ABO incompatibility happens when the mother has blood type O and the baby has blood type A, B, or AB?	259 (48.3%)	277 (51.7%)
K 3: Do you know that ABO incompatibility affects the newborn more than it affects the mother?	343 (64.0%)	193 (36.0%)
K 4: Do you know that in ABO incompatibility, the mother's antibodies can break down the baby's red blood cells and can cause jaundice?	276 (51.5%)	260 (48.5%)
K 5: Do you know that jaundice caused by ABO incompatibility can appear within the first 24 hours after birth?	321 (59.9%)	215 (40.1%)
K 6: Do you know that some babies with jaundice caused by ABO incompatibility may need neonatal intensive care unit admission and phototherapy?	391 (72.9%)	145 (27.1%)
K 7: Do you know that severe jaundice caused by ABO incompatibility may require an exchange blood transfusion?	269 (50.2%)	267 (49.8%)
K 8: Do you know that a blood test taken from the placenta after delivery can help detect jaundice risk in mothers with blood type O?	200 (37.3%)	336 (62.7%)
K 9: Do you know that laboratory tests for the baby after birth, such as bilirubin level and blood type, help detect jaundice caused by ABO incompatibility?	398 (74.3%)	138 (25.7%)
K 10: Do you know that if the baby's jaundice level is high, the test will be repeated several times within 48 hours-72 hours after birth?	384 (71.6%)	152 (28.4%)
Note : K = knowledge item, n = frequency, % = percentage		

As shown in Table 3, the practice level was moderate (18.8 ± 2.3; range 11-24). Most participants reported safe practices, including following-up with the pediatrician to check for jaundice (P2), monitoring the baby's skin and eye color (P1), performing routine jaundice blood tests (P3), and continuing to breastfeed their baby (P5). However, some participants reported harmful practices, such as exposing the baby to sunlight to treat jaundice (P4), giving sugar water (P6), using traditional remedies, like garlic necklaces (P7), and relying on home lighting instead of hospital phototherapy (P8).

Table 3. Distribution of responses to practice scale items (n= 536)

Item	I will do it	I am unsure of its benefits or risks	I will not do it	Practice type
	n(%)	n(%)	n(%)	
P1:I monitor my baby's skin and eye color to check for jaundice.	512 (95.5%)	17 (3.2%)	7 (1.3%)	Good
P2: I follow-up with the pediatrician to check my baby for jaundice.	521 (97.2)	10 (1.9%)	5 (0.9%)	Good
P3:I take my baby for jaundice blood tests even if he/she does show symptoms.	469 (87.5%)	46 (8.6%)	21 (3.9 %)	Good
P4:I expose my baby to sunlight when he/she shows signs of jaundice.	436 (81.4%)	66 (12.3%)	34 (6.3%)	Harmful
P5:I continue breastfeeding my baby even if he/she has jaundice.	384 (71.6%)	115 (21.5%)	37 (6.9 %)	Good
P6:I give my baby sugar water to treat jaundice.	217 (40.5)	145 (27%)	174 (32.5%)	Harmful
P7:I use traditional remedies (such as garlic necklaces) to treat jaundice.	127 (23.7)	129 (24.1%)	280 (52.2)	Harmful
P8:I use home lighting instead of hospital phototherapy to treat jaundice.	211 (39.4%)	125 (23.3%)	200 (37.3%)	Harmful
Note: P = practice item, n = frequency, % = percentage				

As shown in Table 4, the attitude level was high (22.9 ± 1.6; rang 13-24), indicating that the participants generally held positive attitudes. In descending order, most participants agreed that blood type testing should be performed for all pregnant women (A1), that monitoring a baby's skin and eye color is important (A2), and that parents should receive education about ABO incompatibility (A7). They also supported performing blood tests as recommended by pediatricians (A6), recognized that early diagnosis improves health outcomes (A4), supported delayed discharge for monitoring (A5), and understood that untreated jaundice is a serious condition (A3). In contrast, most participants disagreed with the negatively worded item (A8), showing awareness of the risks of jaundice associated with ABO incompatibility.

Table 4. Distribution of responses to attitude scale items (n= 536)

Item	Agree	Neutral	Disagree	Attitude type
	n(%)	n(%)	n(%)	
A1: I believe that blood type tests should be part of routine care for all pregnant women.	524 (97.8%)	7 (1.3%)	5 (0.9%)	Positive
A2: I believe that monitoring the baby's skin and eye color is important in the first few days after birth.	518 (96.7%)	14 (2.6%)	4 (0.7%)	Positive
A3: I believe that jaundice resulting from blood type incompatibility is a serious condition if not treated.	452 (84.3%)	77 (14.4%)	7 (1.3%)	Positive
A4:I believe that early diagnosis improves health outcomes in jaundice caused by ABO incompatibility.	497 (92.7%)	29 (5.4%)	10 (1.9%)	Positive
A5:I believe that delaying discharge from the hospital and monitoring for jaundice are necessary for the baby's well-being.	473 (88.2%)	62 (11.6%)	1 (0.2%)	Positive
A6: I believe that it is important to perform the baby's blood tests at the time recommended by the pediatrician.	514 (95.9%)	18 (3.4%)	4 (0.7%)	Positive
A7:I believe that parents should be educated about ABO incompatibility and jaundice during prenatal or postnatal visits.	515 (96 %)	18 (3.4%)	3 (0.6%)	Positive
A8: I am not concerned about the health effects of jaundice on newborns.	109 (20.3%)	62 (11.6%)	365 (68.1%)	Negative
Note : A= attitude item, n = frequency, % = percentage				

Factors Affecting KPA Scores

As presented in Table 5, knowledge level was higher among those who had previously heard about ABO incompatibility and those with higher education levels. There were no significant differences in knowledge based on gender, previous history of neonatal jaundice, age, number of children, or region of residence.

Practice level was better among females, participants who had prior experience with neonatal jaundice, and those who had heard previously about ABO incompatibility. In contrast, older participants reported slightly lower practice levels. However, the number of children, participants' level of education, and region of residence did not have significant effects on practice level.

Attitude level was higher among females, participants with prior experience of neonatal jaundice, individuals with graduate-level education, and those who had previously heard about ABO incompatibility. In contrast, slightly lower attitude scores were observed among older participants and those with more children. However, the region of residence was not associated with attitude levels.

Table 5. Factors affecting KPA score (n= 536)

Variables	**Comparison Groups**	**Test**	**Knowledge**	**Practice**	**Attitude**
Gender	Male vs. Female	t-test	M ± SD 15.55 ± 3.01 vs 15.96 ± 2.50	M ± SD 18.34 ± 2.56 vs 19.09 ± 2.13	M ± SD 22.53 ± 2.00 vs 23.16 ± 1.36
			t(df), *p* *t* (534) = –1.68, *p* = .093	*t*(df), *p* *t* (534) = –3.64, *p*=.00**	*t*(df), *p* *t* (534) = –4.31, *p* = .00**
History of Jaundice	No vs. Yes	t-test	M ± SD 15.71 ± 2.74 vs 15.87 ± 2.68	M ± SD 18.38 ± 2.29 vs 19.05 ± 2.31	M ± SD 22.62 ± 2.03 vs 23.09 ± 1.39
			t(df), *p*; *t* (534) = –0.66, *p* = .513	*t*(df), *p* *t* (534) = –3.20, *p* = .001**	*t*(df) , *p* *t* (534) = –3.15, *p* = .002**
Heard about ABO incompatibility	No vs. Yes	t-test	M ± SD 14.90 ± 2.48 vs 17.33 ± 2.34	M ± SD 18.46 ± 2.16 vs 19.43 ± 2.46	M ± SD 22.80 ± 1.86 vs 23.15 ± 1.21
			t(df), *p* *t* (534) = –11.25, *p*= .000**	*t*(df), *p* *t* (534) = –4.77, *p*= .001**	*t*(df), *p* *t* (534) = –2.44, *p*= .015**
Age		Pearson	*r*=0.009 *p*=.843	*r*=-0.097 *p*=.025*	*r*=-0.154 *p*<.001
Number of living children		Pearson	*r*=-0.036 *p*=.407	*r*=-0.052 *p*=.231	*r*=-0.085 *p*=.049
Education level	School vs. Graduate vs Postgraduate	ANOVA	M ± SD 14.98 ± 2.59 vs 16.04 ± 2.68 vs 16.54 ± 2.66	M ± SD 18.49 ± 2.24 vs 18.69 ± 2.27 vs 18.66 ± 2.89	M ± SD 22.74 ± 1.89 vs 23.05 ± 1.42 vs 22.51 ± 2.48
			*F(*df), *p* *F* (2, 533) = 9.36, *p*= .000**	*F(*df), *p* *F* (2, 533) = 2.09, *p* = .124.	*F(*df), *p* *F* (2, 533) = 3.11, *p* = .046*
Region of residency	North vs. Middle vs South	ANOVA	M ± SD 16.14 ± 2.44 vs 15.83 ± 2.82 vs 15.18 ± 2.40	M ± SD 18.49 ±2.13 vs 18.88 ± 2.43 vs 19.11 ± 2.04	M ± SD 23.05±1.3 vs 22.86 ± 1.81vs 23.07±1.35
			*F(*df), *p* *F* (2, 533) = 2.86, *p* = .058	*F(*df), *p* *F* (2, 533) = 1.91, *p* = .150	*F(*df), *p* *F* (2, 533) = 0.88, *p* = .414

Note:
M = mean
SD = standard deviation
t = t-test value
F= ANOVA test value
df = degree of freedom
p = level of significance

*= significant at ≤0.05
**= significant at ≤0.01

Discussion

Participants' KPA Scores

This study is the first to assess KPA of parents regarding neonatal jaundice associated with ABO incompatibility. Comparisons were made with research on neonatal jaundice in general or KPA associated with Rhesus incompatibility due to a lack of studies focusing specifically on ABO incompatibility.

The participants in the current study demonstrated a moderate level of knowledge. This result is consistent with a Saudi cross-sectional study on 343 mothers, which similarly reported low to moderate knowledge levels regarding Rhesus incompatibility (Aljuhaysh et al., 2017). Likewise, the findings align with an Ethiopian cross-sectional study involving 414 mothers, which documented a knowledge gap regarding Rhesus incompatibility (Geta et al., 2024).

Similarly, the findings of the current study align with previous studies, which have reported limited levels of knowledge regarding neonatal jaundice. This finding was reported in two Saudi cross-sectional studies (Alfaifi et al., 2023; Hanif et al., 2022), as well as in an Iraqi cross-sectional study (Al-Zamili & Saadoon, 2020) and a Ghanaian cross-sectional study involving 202 parents (Salia et al., 2021).

Regarding practices, the current study reported several ineffective or potentially harmful practices. Some participants reported using home lighting or sunlight as an alternative for phototherapy, under the misconception that these methods provide therapeutic benefits for neonatal jaundice. These practices were documented in a previous Jordanian qualitative study (Al-Sagarat & Al-Kharabsheh, 2017) and an Iraqi study (Al-Zamili & Saadoon, 2020). It is important to emphasize that home lighting does not reduce bilirubin levels, and sunlight exposure may result in skin burns. In contrast, phototherapy devices deliver specific wavelengths with controlled irradiance to safely and effectively lower bilirubin levels (Horn et al., 2021).

Some participants also reported the use of traditional remedies, such as placing garlic necklaces around the necks of newborns, based on the belief that garlic can absorb bilirubin from the baby's body. This ineffective practice has been previously documented within the Jordanian community (Al-Sagarat & Al-Kharabsheh, 2017) and similarly observed among Iranians (Manji & Mohammed, 2020). Additionally, some parents reported administering sugar water as a treatment for jaundice, despite evidence demonstrating its ineffectiveness (Kemper et al., 2022). The continued use of sugar water has been noted in Jordan, as reported in a prior qualitative study (Al-Sagarat & Al-Kharabsheh, 2017), and has also been identified in two cross-sectional studies conducted in Iraq (Al-Hadeethi et al., 2025; Ghafel & Al-Jubouri, 2024).

Finally, stopping breastfeeding is another harmful practice; evidence indicates that frequent breastfeeding supports bilirubin excretion by increasing hydration and stimulating bowel movements (Gomella et al., 2004). Misconceptions that breast milk causes jaundice were reported in a current study and in Saudi community (Alfaifi et al., 2023).

The participants demonstrated a high level of positive attitudes, suggesting that parents are willing to engage in effective preventive measures despite existing gaps in knowledge and practices. Comparable results have been reported in two Arabic communities, including a Saudi study (Alfaifi et al., 2023) and an Iraqi study (Al-Zamili & Saadoon, 2020). In contrast, a study conducted in Ghana reported lower levels of parental attitudes toward neonatal jaundice care (Salia et al., 2021).

Factors Affecting KPA Scores

Regarding factors influencing knowledge levels, our findings are consistent with a Saudi study indicating that participants who had previously heard about ABO incompatibility demonstrated higher knowledge levels (Alfaifi et al., 2023). Similarly, the current results align with an Ethiopian study, which reported that higher educational level was associated with higher knowledge levels (Geta et al., 2024). However, our findings contrast with some studies suggesting that knowledge levels increase with the number of children (Geta et al., 2024) and with other studies reporting that females had higher knowledge levels than males (Alfaifi et al., 2023). Among all the socio-demographic factors studied, it is interesting that 66% of parents had previously experienced neonatal jaundice, but this did not improve their knowledge level. This surprising result suggests that even with prior experience, many parents may still have incorrect information, highlighting the need for educational intervention.

Regarding practices, the adoption of ineffective practices can be largely attributed to the strong influence of traditional and cultural norms within the Jordanian community, which may lead parents to adopt some practices despite clear evidence of their ineffectiveness (Al-Sagarat & Al-Kharabsheh, 2017). Our findings are in line with previous studies showing that unsafe practices remain common regardless of age, education, or number of children (Al-Hadeethi et al., 2025; Al-Sagarat & Al-Kharabsheh, 2017; Ghafel & Al-Jubouri, 2024; Horn et al., 2021; Manji & Mohammed, 2020). In contrast, one study reported that parents living in rural areas showed greater adherence to unsafe practices compared to those living in urban areas (Salia et al., 2021).

Regarding attitudes, our findings partially align with previous studies, which reported that older mothers, parents with more children, and individuals with higher education exhibited higher attitude levels toward jaundice (Al-Zamili & Saadoon, 2020; Salia et al., 2021).

Conclusion

The findings indicate that Jordanian parents reported moderate levels of knowledge and practices while maintaining highly positive attitudes regarding neonatal jaundice associated with ABO incompatibility. These results highlight the urgent need for educational programs designed to address knowledge gaps, reduce unsafe practices, and enhance the quality of neonatal care.

Implications for Nursing

For research: Repeating the study with a random sample. Future research should explore the effect of educational interventions on health outcomes. Additionally, quantitative and qualitative studies could examine barriers to implementing evidence-based practices in different communities.

For policymakers and practice: Policies could support adding effective parental education into routine pre-natal and post-natal care.

Strengths and Limitations

Strengths: This study is the first study to assess parents' KPA toward neonatal jaundice associated with ABO incompatibility.

Limitations: Using self-reported online questionnaires may lead to social bias or underrepresentation of parents with limited internet access.

Conflict of Interests

The authors declare no conflict of interests.

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Author Contributions

Study Design: **ST**. Data Collection: **ST**. Data Analysis: **ST**. Study Supervision: **AB, EB**. Manuscript Writing: **ST**. Critical Revision for Important Intellectual Content: **AB, EB**.

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