

Knowledge and Attitude of Mothers Toward Neonatal Jaundice and Associated Risk Factors in Al Hilla City

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Abstract

Background: Neonatal jaundice is one of the commonest diseases in newborns. Due to its' dangerous effects on the brain, it is important to be diagnosed as early as possible and so treated properly. Therefore, by increasing their knowledge, mothers will be better able to identify jaundice early and take appropriate action. **Objectives:** The aim of this study is to assess the knowledge and attitude of mothers toward neonatal jaundice and its associated risk factors in Al Hilla City. **Materials and Methods:** This is a descriptive cross-sectional study which carried out on a convenient sample of 138 mothers of neonates with neonatal jaundice aged 0–28 days and admitted to neonatal care units in the three main hospitals in Al Hilla City, including Imam Al-Sadiq General Teaching Hospital, Babylon Maternity and Pediatric Teaching Hospital, and Al Noor Pediatric Hospital. It was conducted over a period of two months beginning from February 15 to April 15, 2023. **Result:** This study involved 138 mothers of newborns with jaundice. The majority of mothers was between 20 and 30 years old and was housewives. More than half of the mothers were from urban areas. Nearly half of the mothers had attended primary school. The majority of the births were delivered by cesarean section. Out of the 138 mothers, 33 had a positive medical history during pregnancy. Most neonates aged between 1 and 10 days, with male newborns accounting for 62.3% of the total. The majority of newborns were delivered at 37 or more gestational weeks. **Conclusion:** This study shows a moderate knowledge among Babylonian mothers about neonatal jaundice and a moderate attitude toward it. There was a strong association between mothers' education, residence, and their attitude toward jaundice.

Keywords: Attitude, jaundice, knowledge, neonatal jaundice

INTRODUCTION

Neonatal jaundice (NNJ) is a relatively common and curable condition that affects neonates and is strongly associated with morbidity and mortality in poor countries. NNJ is a condition that causes a newborn's skin and sclera to turn yellow as a result of increased bilirubin levels in the blood.^[1] It is thought to affect 80% of preterm infants and 60% of full-term infants.^[2] The primary cause of jaundice, which raises bilirubin levels, is an imbalance between bilirubin conjugation and production. The immature liver and the quick destruction of red blood cells, which may be caused by a number of circumstances, are the main causes of this imbalance.^[3] Based on the amounts of elevated plasma bilirubin, two forms of hyperbilirubinemia are described: Physiologic and pathologic.^[4] Jaundice usually appears in newborn babies within the first week of their life. By

day third or fourth, the blood bilirubin level in term newborns reaches a level that can be clinically detected. Over the following few days, this steadily decreases until it reaches the typical level of serum bilirubin for neonates by the completion of the second week of their lives. Physiological jaundice is the term used to describe this condition.^[5]

On the first day of life, jaundice is always pathogenic, and its underlying cause requires immediate care.^[3] If jaundice is promptly identified, monitored, and treated to stop it from progressing to extreme hyperbilirubinemia,

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it may not be harmful. It can, however, be neurotoxic and result in kernicterus, generalized brain damage, or even death in neonates.^[6] The increased incidence of unhealthy behaviors, such as childbirth without skilled birth attendants, childbirth outside of medical facilities, childbirth with early hospital discharge after delivery, and inadequate post-delivery follow-up, emphasizes the importance of mothers and other caregivers having a basic understanding of the causes, symptoms, treatments, and complications associated with neonatal jaundice.^[7] Instructions and precautionary measures for parents during physiological jaundice are important.^[8] Lack of information or incorrect information and beliefs that mothers have been taught through the years may be the cause of delaying seeking prompt medical help.^[9]

Objectives: Assessment of knowledge and attitude of mothers toward neonatal jaundice and associated risk factors in Al Hilla city.

MATERIALS AND METHODS

This cross-sectional study was conducted at Babylon Maternity and Pediatric Hospital, Al-Sadiq Hospital and Al Noor Pediatric Hospital over a period of 2 months. This study included a convenient sample of 138 mothers of neonates with neonatal jaundice who were admitted to neonatal care units for phototherapy or exchange transfusions in the Al Hilla hospitals mentioned above and who agreed to participate in this study. Male, female, term, and preterm neonates were included in the study. Any mother who refused to be included was ruled out from the study. A pilot study was carried out before starting the collection of data for a period of two weeks.

After obtaining verbal permission, data was collected by interviewing mothers whose neonates were admitted to the neonatal care units in the hospitals. The questionnaire's content validity was assessed by professionals.^[10] The questionnaire included three parts: The first one was sociodemographic and disease characteristics. The second part includes 15 questions about mothers' knowledge (the total score was 15). Each correct answer scored 1 and incorrect answer scored 0. The total score of the correct answers is used to categorize mothers as: Poor knowledge (0–5), moderate knowledge (6–10), and good knowledge (11–15).^[10]

The third part was the attitude of mothers toward NNJ which consisted of seven questions on a five-point Likert scale (agree strongly/agree/do not have an idea/disagree/disagree strongly). Each “agree strongly” answer to a positive question scored 5 points and the “disagree strongly” answer to the same question scored 1. In a negative question, each “disagree strongly” answer scored 5 points, and the “agree strongly” answer to the same question scored 1 point. The total attitude scores are

sorted into poor attitude (0–12), moderate attitude (13–24), and good attitude (25–35).^[10]

Data analysis

SPSS version 27 was used for statistical analysis. Numbers and percentages were used to represent categorical variables. Mean standard deviation was used to represent continuous variables.

Ethical and administrative arrangements

The study protocol was reviewed and granted permission by the ethical committee of Babylon University, College of Medicine. Verbal consent was obtained from the mothers prior to interviewing. After explaining the purposes of this study to them, an official agreement was obtained from the Babylon Health Directorate to carry out the study.

RESULTS

The following result involves the data of 138 hospitalized neonates and their mothers. Table 1 shows 64.5% of mothers age within the 20–30-year range, 79.7% are housewives, 64.5% from urban areas, 48.6% attended primary school, and 58.7% have negative consanguinity with their husbands. 28.3% of the mothers are primigravida while the rest are multigravida. 55.1% of mothers gave birth via cesarean section.

Table 2 shows that 78.3% of neonates are between 1 and 10 days old; male neonates constitute 62.3%; 84.8% were delivered at 37 or more gestational weeks; and 58.7% had birth weights between 2500 and 3500 g. 60.1% of neonates did not have a sibling with neonatal jaundice. About 41.3% of neonates are being breast-fed. The mean duration of NNJ was 2.84 ± 1.76 days with the lowest duration being 0.25 days and the highest duration being 8 days. The distribution of NNJ causes is depicted in Figure 1. The majority of the causes (46.4%) are unidentified.

The mean duration of phototherapy treatment was 28.5 h. 94.9% received intravenous fluids. 136 patients received phototherapy and 2 received exchange transfusions with no complications. The mean knowledge score was 9.05, SD ± 2.21 , the lowest score was 5, and the highest score was 13. Figure 2 shows the distribution of NNJ knowledge. 26.1% had good knowledge, 68.8% had moderate knowledge, and 5% of the mothers had poor knowledge.

The mean attitude score was 24.7, SD ± 4.69 ; the lowest score was 15, and the highest score was 34. Figure 3 shows that 52.9% of mothers had a moderate attitude and 47.1% had a good attitude. Table 3 displays no significant association between the sociodemographic characteristics of mothers and their knowledge about NNJ (P value ≥ 0.05).

Table 4 demonstrates the association between the sociodemographic characteristics of neonates and the

Table 1: The distribution of the mothers according to their sociodemographic characteristics

Maternal age (in years)	Number	Percent (%)
10–20 year	14	10.1%
20–30 year	89	64.5%
30–40 year	34	24.6%
40 years and more	1	0.7%
Total	138	100%
Employment status		
Employee	18	13%
Housewife	110	79.70%
Student	10	7.20%
Total	138	100%
Residence		
Urban	89	64.50%
Rural	49	35.50%
Total	138	100%
Level of education		
Illiterate	8	5.80%
Primary school	67	48.60%
Secondary school	33	23.90%
College or higher	30	21.70%
Total	138	100%
Consanguinity		
Positive	57	41.30%
Negative	81	58.70%
Total	138	100%
Parity		
Para 1	39	28.30%
Para 2	37	26.80%
Para 3	31	22.50%
Para 4	23	16.70%
5th and more	8	5.80%
Total	138	100%
Mode of delivery		
Normal vaginal delivery	62	44.90%
Cesarean section delivery	76	55.10%
Total	138	100%
Maternal medical disease during pregnancy		
Positive	33	23.90%
Negative	105	76.10%
Total	138	100%
Maternal history during pregnancy		
DM	8	5.80%
Hypertension	14	10.10%
DM and hypertension	3	2.20%
Heart failure	0	0%
Torch infection (fever during pregnancy)	2	1.40%
Others	6	4.30%
Total	33	100%

mothers’ knowledge of NNJ. No considerable relations were found (P value ≥ 0.05).

In Table 5, there was a considerable association between residence, education level, and mothers’ attitude (P values

Table 2: The distribution of the hospitalized neonates with jaundice according to their sociodemographic characteristics

Age of neonates (in days)	Number	Percent (%)
1–10 days	108	78.3%
10–20 days	25	18.1%
20 days and more	5	3.6%
Total	138	100%
Gestational age (in weeks)		
Less than 37 weeks	21	15.20%
37 weeks and more	117	84.80%
Total	138	100%
Gender of neonates		
Male	86	62.30%
Female	52	37.70%
Total	138	100%
Birth weight		
<1500 g	1	0.70%
1500–2500 g	31	22.50%
2500–3500	81	58.70%
≥ 3500	25	18.10%
Total	138	100%
Had siblings with neonatal jaundice		
Yes	55	39.90%
No	83	60.10%
Total	138	100%
Feeding		
Breastfeeding	57	41.30%
Bottle feeding	43	31.20%
Mixed feeding	38	27.50%
Total	138	100%
Birth trauma with bruising and/or fractures		
Yes	1	0.70%
No	137	99.30%
Total	138	100%

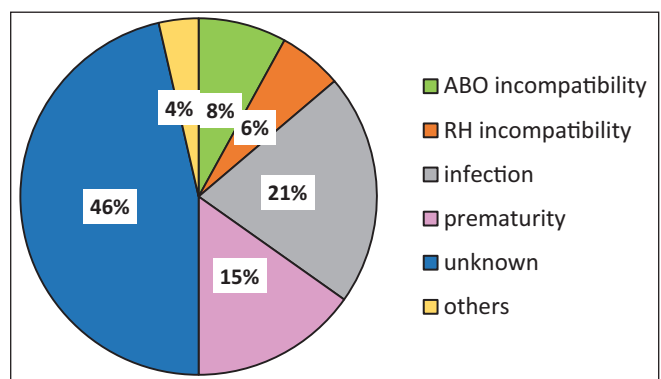


Figure 1: The distribution of NNJ causes among patients

= 0.001 and 0.004, respectively). The presence of positive consanguinity and maternal disease during pregnancy has an important association with their attitude (P values = 0.043 and 0.010, respectively). Table 6 revealed no significant association between attitude and the sociodemographic characteristics of neonates (P value ≥ 0.05).

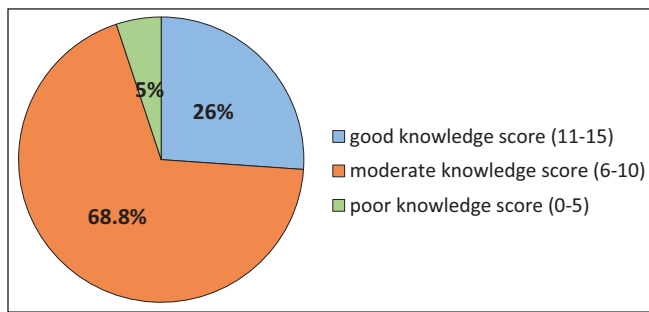


Figure 2: The distribution of the mothers according to their knowledge about NNJ

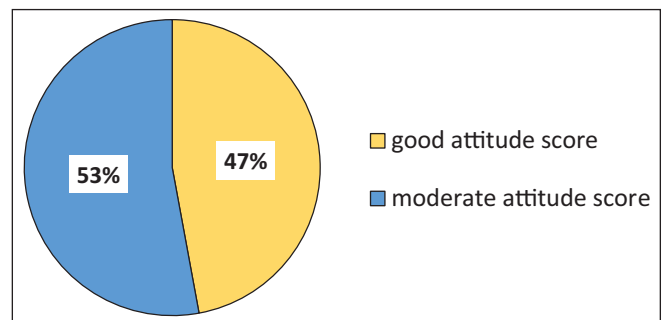


Figure 3: The distribution of the mothers according to their attitude about NNJ

Table 3: The association between study variables and mothers' knowledge about NNJ

Sociodemographic characteristics of the mothers		Knowledge			Chi-square test	P value
		Good knowledge	Moderate knowledge	Poor knowledge		
Maternal age	10–20 year	6 (16.7%)	7 (5.1%)	1 (14.3%)	0.293	
	20–30 year	22 (61.1%)	62 (44.9%)	5 (71.4%)		
	30–40 year	7 (19.4%)	26 (18.8%)	1 (14.3%)		
	40 years and more	1 (2.8%)	0 (0%)	0 (0%)		
	Total	36 (100%)	95 (100%)	7 (100%)		
Employment	Employee	2 (5.6%)	15 (15.8%)	1 (14.3%)	0.546	
	Housewife	31 (86.1%)	73 (76.8%)	6 (85.7%)		
	Student	3 (8.3%)	7 (7.4%)	0 (0%)		
	Total	36 (100%)	95 (100%)	7 (100%)		
Residence	Urban	25 (69.4%)	62 (65.3%)	2 (28.6%)	0.096	
	Rural	11 (30.6%)	33 (34.7%)	5 (71.4%)		
	Total	36 (100%)	95 (100%)	7 (100%)		
Education	Illiterate	2 (5.6%)	6 (6.3%)	0	0.211	
	Primary school	21 (58.3%)	42 (44.2%)	4 (57.1%)		
	Secondary school	7 (19.4%)	24 (25.3%)	2 (28.6%)		
	College and higher	6 (16.7%)	23 (24.2%)	1 (14.3%)		
	total	36 (100%)	95 (100%)	7 (100%)		
Consanguinity	positive	21 (33.3%)	41 (43.2%)	4 (57.1%)	0.417	
	negative	24 (66.7%)	54 (56.8%)	3 (42.9%)		
	total	36 (100%)	95 (100%)	7 (100%)		
Parity	Para 1	10 (27.8%)	29 (30.5%)	0	0.362	
	Para 2	8 (22.2%)	24 (25.3%)	5 (71.4%)		
	Para 3	10 (27.8%)	19 (20%)	2 (28.6%)		
	Para 4	6 (16.7%)	17 (17.9%)	0		
	Para 5 and more	2 (5.6%)	6 (6.3%)	0		
	total	36 (100%)	95 (100%)	7 (100%)		
Mode of delivery	NVD	16 (44.4%)	42 (44.2%)	4 (57.1%)	0.867	
	C/S	20 (55.6%)	53 (55.8%)	3 (42.9%)		
	total	36 (100%)	95 (100%)	7 (100%)		
Maternal disease during pregnancy	Positive	9 (25%)	24 (25.3%)	0	2.139*	
	Negative	27 (75%)	71 (74.7%)	7 (100%)		
	total	36 (100%)	95 (100%)	7 (100%)		

*All variables used the Fisher's exact test except maternal disease during pregnancy using the Chi-square test.

DISCUSSION

In our study that involved 138 mothers, more than 64% of them were within 20–30 years old; this was slightly higher than the result of a similar study in Baghdad.^[11] Nearly 79%

of mothers were housewives, which was nearly comparable to the study of Zainel *et al.*^[12] It was found that 64.5% of them were from urban area. A comparable study conducted in Baghdad found that 79% of the mothers came from urban

Table 4: The association between study variables related to neonates and mothers' knowledge toward NNJ

Sociodemographic characteristics of neonates		Knowledge			Chi-square test	P value
		Good knowledge	Moderate knowledge	Poor knowledge		
Gender of neonates	Male	23 (63.9%)	58 (61.1%)	5 (71.4%)	0.864	
	Female	13 (36.1%)	37 (38.9%)	2 (28.6%)		
	Total	36 (100%)	95 (100%)	7 (100%)		
Age of neonates	1–10 days	28 (77.8%)	75 (78.9%)	5 (71.4%)	0.872	
	10–20 days	7 (19.4%)	17 (16.8%)	2 (28.6%)		
	20 days and more	1 (1.3%)	4 (4.2%)	0		
	Total	36 (100%)	95 (100%)	7 (100%)		
Weight of neonates	<1500 g	0	1 (1.1%)	0	0.413	
	1500–2500 g	7 (19.4%)	20 (21.1%)	4 (57.1%)		
	2500–3500 g	23 (63.9%)	55 (57.9%)	3 (42.9%)		
	≥3500 g	6 (16.7%)	19 (20%)	0		
	Total	36 (100%)	95 (100%)	7 (100%)		
Gestational age	<37 weeks	5 (13.9%)	13 (13.7%)	3 (42.9%)	4.367*	
	37 weeks and more	31 (86.1%)	82 (86.3%)	4 (57.1%)		
	Total	36 (100%)	95 (100%)	7 (100%)		
Had Sibling with NNJ	Yes	14 (38.9%)	39 (41.1%)	2 (28.3%)	0.825	
	No	22 (61.1%)	56 (58.9%)	5 (71.4%)		
	Total	36 (100%)	95 (100%)	7 (100%)		
Type of feeding	Breastfeeding	16 (44.4%)	37 (38.9%)	4 (57.1%)	0.460	
	Bottle feeding	10 (27.8%)	33 (34.7%)	0		
	Mixed feeding	10 (27.8%)	25 (26.3%)	3 (42.9%)		
	Total	36 (100%)	95 (100%)	7 (100%)		

*all variables used Fisher exact test except gestational age used Chi Square test

areas.^[13] This might be attributed to the urban location of the main hospitals in which our study was done.

About 48.6% of mothers joined primary school, which was similar to the result of a study conducted in Karbala^[14] but different from a study performed in Saudi Arabia.^[15] A negative consanguinity was making 58.7%, and this differs from the result of a study done in Karbala.^[14] 28.3% of mothers are primigravida, and this was lower than the result of Demis *et al.*^[16] 55.1% of mothers were delivered by cesarean section, which differs from a study done in Shenzhen, China, that revealed 75.7% of mothers were delivered by normal vaginal delivery (NVD).^[17] This result may be due to an increased number of unindicated cesarean sections in Iraq.

About 75% of the mothers recoded a negative medical history during their pregnancy, in comparison with 41.8% of mothers in the study of Kaur *et al.*, which was conducted in India. About 10.1% of the mothers were diagnosed with hypertension, 5.8% with diabetes mellitus, and 2.2% with both diabetes mellitus (DM) and hypertension. In the same comparable study, the highest percentage of the mothers were diagnosed with DM.^[18]

About 78.3% of neonates were born within 1–10 days, while in a study done in northern Ethiopia, it ranged from 1 to 5 days.^[16] 84.8% of neonates were born at 37 completed weeks, and 15.2% were born before 37 weeks. This shows a mismatch in a study in northern Ethiopia.^[16] 62.3% of neonates were male and 37.7% were female. This differs from a study by

Sadeq *et al.*^[19] Only 39.9% of the neonates had a sibling with a history of NNJ, and 60.1% did not. This matches a study result in Baghdad.^[19] 58.7% of neonates had birth weights between 2500 and 3500 g, 22.5% between 1500 and 2500 g and 18.1% and 0.7% of them had weights ≥3500 and ≤1500 g, respectively. This outcome matches the results of other studies.^[19] 41.3% of neonates were exclusively breast-fed, 31.2% were fed by bottle, and 27.5% were mixed feeding. This disagreed with a study conducted in China by Huang *et al.*, which reported that 48.6% were breast-fed, 48.9% were mixed-fed, and 2.5% were bottle fed. This discrepancy may be due to the encouragement of breastfeeding rather than bottle feeding alone in China and due to increased use of formula feeding in Iraq in comparison to the other countries.^[17] Regarding the causes of NNJ, nearly half of the causes are unknown. This may be the result of inadequate medical documentation and a lack of essential investigations in hospitals. Prematurity accounted for 15.2%, infection made up 21%, and ABO and Rh incompatibility accounted for 8% and 5.8%, respectively. The study by Israel-Aina *et al.* in Nigeria showed the most frequent cause of NNJ was sepsis (49%) followed by prematurity, asphyxia, and ABO incompatibility.^[20]

About 26.1% of mothers had good knowledge, 68.8% had moderate knowledge, and 5% had a poor score. This result was significantly higher than in comparable studies.^[10,12] In another comparable study done in Nigeria and Egypt, most mothers had a poor knowledge score.^[6,21] It is believed

Table 5: The association between study variables and mothers' attitude toward NNJ

Sociodemographic characteristics of the mothers		Attitude		Chi-square test	P value
		Good attitude	Moderate attitude		
Maternal age	10–20 years	7 (10.8%)	7 (9.6%)	3.326	0.204
	20–30 years	37 (56.9%)	52 (71.2%)		
	30–40 years	20 (30.8%)	14 (19.2%)		
	40 years and more	1 (1.5%)	1 (1.5%)		
	Total	65 (100%)	73 (100%)		
Employment	Employee	12 (18.5%)	6 (8.2%)	10.470	0.189
	Housewife	48 (73.8%)	62 (84.9%)		
	Student	5 (7.7%)	5 (6.8%)		
	Total	65 (100%)	73 (100%)		
Residence	Urban	51 (78.5%)	38 (52.1%)	4.102	0.001
	Rural	14 (21.5%)	35 (47.9%)		
	Total	65 (100%)	73 (100%)		
Education level	Illiterate	4 (6.2%)	4 (5.5%)	4.102	0.004
	Primary school	23 (35.4%)	44 (60.3%)		
	Secondary school	16 (24.6%)	17 (23.3%)		
	College and higher	22 (33.8%)	8 (11%)		
	Total	65 (100%)	73 (100%)		
Consanguinity	Positive	21 (32.3%)	36 (49.3%)	0.796	0.043
	Negative	44 (67.7%)	37 (50.7%)		
	Total	65 (100%)	73 (100%)		
Parity	Para 1	20 (30.8%)	19 (26%)	0.380	0.538
	Para 2	18 (27.7%)	19 (26%)		
	Para 3	12 (18.5%)	19 (26%)		
	Para 4	12 (18.5%)	11 (15.1%)		
	Para 5 and more	3 (4.6%)	5 (6.8%)		
	Total	65 (100%)	73 (100%)		
Mode of delivery	NVD	31 (47.7%)	31 (42.5%)	6.663	0.010
	C/S	34 (52.3%)	42 (57.5%)		
	Total	65 (100%)	73 (100%)		
Maternal disease during pregnancy	Positive	22 (33.8%)	11 (15.1%)		
	Negative	43 (66.2%)	62 (84.9%)		
	Total	65 (100%)	73 (100%)		

All variables used the Chi-square test except maternal age, education level, and parity, which used the Fisher's exact test

in our study, this large percentage of mothers who had a moderate to good knowledge score was as a result of the information provided to them by medical personnel and doctors during hospitalization.

The attitude score range was 14–35, while the mean was 24.72 ± 4.69 . Of all respondents, no one had a poor attitude, with the scores for moderate and good attitudes being 52.9% and 47.1%, respectively. This result was nearly similar to the result of Rabiyeepoor *et al.* in Iran.^[10] This result greatly differed from the study of Zainel *et al.* in Mousel.^[12] So the attitude of the mothers toward NNJ in Al Hilla City was much better than the attitude of the mothers in Telafer Mousel. Another comparable study in Nigeria and Egypt showed that almost all participant mothers had a poor knowledge towards NNJ.^[6,21] Our study displayed no significant association between the sociodemographic characteristics of mothers and their knowledge about NNJ (P value ≥ 0.05). Also there was

no association between variables related to neonates and mothers' knowledge about jaundice (P value ≥ 0.05). This result matched that of another study in Iraq.^[12] There was a powerful association between the residence of mothers, their education level, and their attitude toward NNJ (P values = 0.001 and 0.004, respectively). This result was supported by the same association found in a study by Moawad *et al.* in Egypt, with a P value of <0.001 ^[6]. This can be explained by using traditional methods in the treatment of jaundice in rural areas more than in urban areas, leading to delays in visiting physicians and treatment. Furthermore, the high-educated mother had a better attitude than the low-educated one. Regarding other variables, both positive consanguinity between parents and the presence of maternal medical disease during pregnancy had strong associations (P value = 0.043 and P value = 0.01, respectively). The remaining variables showed no association.

Table 6: The association between study variables related to neonates and mothers' attitude toward NNJ

Sociodemographic characteristics of neonates		Attitude		Chi-square test	P value
		Good attitude	Moderate attitude		
Gender of neonates	Male	43 (66.2%)	43 (58.9%)	0.770	0.380
	Female	22 (33.8%)	30 (41.1%)		
	Total	65 (100%)	73 (100%)		
Age of neonates	1–10 days	55 (84.6%)	53 (72.6%)	0.191	
	10–20 days	9 (13.8%)	16 (21.9%)		
	20 days and more	1 (1.5%)	4 (5.5%)		
	Total	65 (100%)	73 (100%)		
Weight of neonates	<1500 g	0	1 (1.4%)	0.663	
	1500–2500 g	14 (21.5%)	17 (23.3%)		
	2500–3500 g	41 (63.1%)	40 (54.8%)		
	≥ 3500 g	10 (15.4%)	15 (20.5%)		
	Total	65 (100%)	73 (100%)		
Gestational age	Less than 37 weeks	10 (15.4%)	11 (15.1%)	0.003	0.959
	37 weeks and more	55 (84.6%)	62 (84.9%)		
	Total	65 (100%)	73 (100%)		
Had Sibling with NNJ	Yes	30 (46.2%)	25 (34.2%)	2.034	0.154
	No	35 (53.8%)	48 (65.8%)		
	Total	65 (100%)	73 (100%)		
Type of feeding	Breastfeeding	22 (33.8%)	35 (47.9%)	3.759*	0.153
	Bottle feeding	25 (38.5%)	18 (24.7%)		
	Mixed feeding	18 (27.7%)	20 (27.4%)		
	Total	65 (100%)	73 (100%)		

*All variables used the Chi-square test except age of neonate and weight of neonate, which used the Fisher's exact test

CONCLUSION

NNJ is a common pediatric disease worldwide. This study shows moderate knowledge among mothers about NNJ and a moderate attitude toward jaundice. There was a strong association between mothers' education, residence, consanguinity, and the presence of maternal medical disease during pregnancy and their attitude toward NNJ in Al Hilla City.

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Conflicts of interest

There are no conflicts of interest.

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