

MATERNAL BELIEFS AND PERCEPTIONS ABOUT NEONATAL JAUNDICE IN
MOSUL, NORTH OF IRAQ

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ABSTRACT

Neonatal jaundice (NNJ) is a highly prevalent condition worldwide and remains a major contributor to neonatal morbidity and hospital readmissions when not recognized and managed promptly. This descriptive cross-sectional study was conducted in Mosul City to assess maternal knowledge, beliefs, and practices regarding NNJ. A total of 350 mothers attending immunization units at four primary healthcare centers were enrolled. The findings showed that most mothers correctly recognized the common visual signs of NNJ, including yellow discoloration of the skin (97.7%) and eyes (89.1%). However, substantial knowledge deficiencies were identified regarding its causes, complications, and appropriate management. Only 36.0% of participants correctly identified blood group incompatibility as a cause of NNJ, while 81.1% were unaware that untreated jaundice could lead to irreversible brain damage. Traditional beliefs and practices remained common, with 61.7% of mothers relying on sunlight exposure and 28.0% using home remedies instead of evidence-based medical care. These findings demonstrate that although awareness of the clinical appearance of NNJ is high, maternal understanding of its underlying causes, potential complications, and appropriate treatment remains inadequate. Strengthening structured educational interventions during antenatal and postnatal care is essential to improve maternal awareness, promote early healthcare-seeking behavior, reduce harmful traditional practices, and prevent avoidable neurological complications associated with neonatal jaundice.

KEYWORDS: Neonatal jaundice, mothers, perceptions, attitude, beliefs, Mosul, Iraq.

1. INTRODUCTION

Neonatal jaundice (NNJ) is a clinical condition characterized by the yellowish discoloration of the skin and sclera of newborns due to elevated serum bilirubin levels. It represents one of the most common clinical challenges globally, affecting 50%–60% of full-term infants and up to 80% of preterm infants within the first week of life. While mostly physiological and self-limiting, unmanaged progression to pathological hyperbilirubinemia presents severe risks, accounting for roughly 75% of neonatal hospital readmissions in the first week post-birth. Unconjugated bilirubin can cross the blood-brain barrier when levels exceed safe thresholds, causing bilirubin-induced neurological

dysfunction or kernicterus, which manifests as permanent cerebral palsy, sensorineural hearing loss, and developmental delays. Early maternal identification and medical presentation are critical to mitigating these life-threatening complications.

1.1 Epidemiology

Globally, severe NNJ remains a profound health burden, especially in low- and middle-income countries (LMICs). An estimated 1.1 million newborns worldwide develop severe NNJ each year, with the highest regional incidence concentrated in sub-Saharan Africa and Southeast Asia. Hospital admission logs show that jaundice accounts for approximately 30.6% of neonatal

admissions in Southeast Asia and 20.1% in Africa, compared to roughly 20.4% in Europe. The prevalence of severe hyperbilirubinemia among hospitalized neonates stands at 3.34% in African regions, illustrating a stark contrast to high-resource settings.

1.2 Pathophysiology and Risk Factors

Bilirubin production arises primarily from the physiological breakdown of hemoglobin in senescent neonatal red blood cells. In neonates, this unconjugated bilirubin circulates bound to albumin. Due to hepatic immaturity, lower levels of the enzyme uridine diphosphate glucuronosyltransferase (UGT1A1) restrict the newborn's ability to conjugate and excrete bilirubin safely. This is compounded by elevated enterohepatic circulation, which recycles bilirubin back into the bloodstream. Key pathological risk factors accelerating this process include prematurity, hemolytic diseases (ABO or Rh incompatibility), inherited enzyme defects (G6PD deficiency), exclusive breastfeeding issues (delayed milk supply), maternal diabetes, preeclampsia, birth trauma, and sepsis.

1.3 Neonatal Jaundice in the Iraqi Context

In post-conflict settings like Mosul, management outcomes are heavily dependent on immediate maternal awareness due to early hospital discharge practices within 48 hours of birth. National data demonstrates widespread reliance on non-medical interventions across Iraqi governorates. Studies in Baghdad report that up to 84% of mothers utilize unsafe traditional methods for newborn issues, and while 71.5% can spot basic symptoms, only 34% understand clinical causes. Similar trends are seen in Karbala and Sulaymaniyah, where cultural norms, household light exposure, and the use of protective charms often override medical consultation, emphasizing the need to closely evaluate maternal perceptions in Mosul.

1.4 AIM OF THE STUDY

The study aims to comprehensively assess maternal beliefs, perceptions, knowledge, and practices toward neonatal jaundice among mothers in Mosul City, north of Iraq.

Specific Objectives

- To describe the sociodemographic characteristics of the study population.
- To identify maternal beliefs regarding the severity and management of neonatal jaundice.
- To determine maternal perceptions and understanding of NNJ danger signs and triggers.
- To evaluate maternal knowledge and attitudes toward timely medical care-seeking.

2. PATIENTS AND METHODS

2.1 Study Setting

The study was conducted across four primary healthcare centers (PHCCs) in Mosul City, Nineveh Governorate, Iraq. Two centers were selected from the left side of the

city (Al-Qudds PHCC and Al-Sharqqy PHCC) and two from the right side (Tamuz PHCC and Al-Zengilly PHCC).

2.2 Study Design and Study Period

A descriptive, hospital-based, cross-sectional study design was utilized to achieve the research objectives. The study was conducted over six months, with data collection carried out from January 2, 2025, to June 30, 2025.

2.3 Study Sample and Population

The sample size was statistically calculated using the standard equation $N = Z^2 \times P \times (1-P) / d^2$, yielding a target of 368. Ultimately, 350 Iraqi mothers consulting the immunization units at the selected PHCCs were enrolled. Inclusion criteria comprised mothers and caregivers of neonates (≤ 28 days of age) who provided verbal consent. Mothers of infants older than 28 days or those refusing participation were excluded.

2.4 Data Collection and Procedures

Data were compiled via direct, face-to-face interviews using a specially designed structured questionnaire. Each interview lasted approximately 5 minutes and was conducted across 3 working days per week (4 hours per day). The questionnaire gathered sociodemographic data, maternal beliefs, clinical perceptions, knowledge levels, and management practices.

2.5 Ethical Considerations

Official ethical clearance was obtained from the Scientific Council of the Arab Board of Health Specializations and the Ninawa Directorate of Health (Project No. 2025063) before initiation. Formal verbal consent was secured from every participant.

3. Statistical Analysis

Data were tabulated and managed using Microsoft Office 365 Excel and analyzed statistically via Minitab Statistical Software Version 22.

4. RESULTS

4.1 Sociodemographic Characteristics of Participants

The study analyzed 350 mothers with a mean age of 29.2 ± 6.0 years (range: 14–49). The majority of participants fell within the 20–29 age bracket (48.6%) and were housewives (83.4%) residing entirely in urban settings (100.0%). Educational attainment varied: 24.0% were illiterate, while 32.6% held college degrees. Hospital-based deliveries were recorded for 98.3% of the sample, and 73.1% reported prior experience with NNJ in their households as shown in Table 1.

Table 1: Sociodemographic characteristics of studied participants (n=350).

Variables	Mean $\pm$ SD / No.	Range / %
Age (years)	29.2 $\pm$ 6.0	14–49
Number of children	2.9 $\pm$ 1.6	1–7
Age Categories		
<20	14	4.0%
20–29	170	48.6%
30–39	150	42.9%
>40	16	4.6%
Education Level		
Illiterate	84	24.0%
Primary	82	23.4%
Secondary	70	20.0%
College and above	114	32.6%
Occupation		
Housewife	292	83.4%
Employee	58	16.6%
Residence		
Rural	0	0.0%
Urban	350	100.0%
Number of Children		
<3children	174	49.7%
≥ 3 children	176	50.3%
Place of Delivery		
Home / Midwife	6	1.7%
Hospital	344	98.3%
Prior Jaundice Experience		
Yes	256	73.1%
No	94	26.9%

4.2 Knowledge of Timing, Causes, and Signs of NNJ

Mothers demonstrated high recognition for prominent visual symptoms: 97.7% correctly identified yellowish skin and 89.1% identified yellowish eyes. However, severe gaps emerged regarding hidden etiologies and

risks. Only 36.0% knew that maternal blood group incompatibility triggers NNJ, and 21.7% falsely blamed maternal food intake. Alarming, 81.1% did not know any complications, with only 17.1% correctly identifying brain damage as shown in Table 2.

Table 2: Knowledge of mothers about timing, causes, and signs of neonatal jaundice.

Variables	Sub-categories	No. (n=350)	%
Recognizing Signs (Yes)	Yellowish eyes*	312	89.1%
	Yellowish skin*	342	97.7%
	Passing deep yellow urine*	4	1.1%
	Poor feeding and lethargy*	258	73.7%
Commonly in the first week?	No	16	4.6%
	Yes.*	334	95.4%
Normal after second week?	Yes	270	77.1%
	No.*	80	22.9%
Normal in first week?	No	4	1.1%
	Yes.*	346	98.9%
Normal on first day?	Yes	54	15.4%
	No.*	296	84.6%
Causes of NNJ (Yes)	Infection	26	7.4%
	Prematurity*	66	18.9%
	Mother's blood group/Rh incompatibility*	126	36.0%
	Eating certain food	76	21.7%
	Naphthalene Balls	2	0.6%
	Metabolic causes	0	0.0%
Anatomical Origin of Sign	Eyes*	104	29.7%
	Face	230	65.7%

	Body / Skin	16	4.6%
Complications if untreated	Brain damage*	60	17.1%
	Nothing happens.	6	1.7%
	Death*	0	0.0%
	Don't know	284	81.1%
Signs of Serious Illness	Yellowish palm and sole of feet*	46	13.1%
	Crying a lot*	18	5.1%
	Not feeding well*	238	68.0%
	Sleeping more than before*	240	68.6%
	Abnormal movements / Convulsions*	6	1.7%

*Correct/recommended answers.

4.3 Attitudes and Perception Toward NNJ

While 90.9% of mothers agreed that jaundiced infants should ideally be assessed at medical facilities, active practice intentions showed delays. Only 17.7% would seek immediate care at the onset of symptoms, whereas

80.0% stated they would wait until the baby became "very yellow." Additionally, 36.0% favored administering glucose water at home as shown in Table 3.

Table 3: Attitudes and perceptions of mothers toward NNJ.

Variables	Options	No. (n=350)	%
Initial Management Choice	Do nothing.	12	3.4%
	Give glucose water.	126	36.0%
	Expose the baby to sunlight.	10	2.9%
	Go to the clinic/hospital.*	202	57.7%
Should visit health facility?	Yes*	318	90.9%
	No	32	9.1%
When to seek healthcare?	At the time she noticed jaundice*	62	17.7%
	If the baby is not feeding well*	4	1.1%
	If the baby is getting very yellow	280	80.0%
	If the baby is crying abnormally*	4	1.1%

4.4 Practices Related to Neonatal Jaundice

Among the 274 mothers reporting historical experience with an icteric infant, 51.4% consulted a medical professional, while 33.6% relied on family advice, and 15.0% resorted directly to traditional folk methods.

Prophylactic sunlight use was highly prevalent, with 61.7% exposing infants to sun rays. Only 55.4% recalled receiving formal counseling regarding NNJ from healthcare staff as shown in Table 4.

Table 4: Practices of mothers related to NNJ.

Variables	Categories	No. (n=350)	%
Experienced NNJ previously?	Yes	274	78.3%
	No	76	21.7%
Management if Yes (n=274)	Visited a doctor	142	51.4%
	Used traditional remedies	40	15.0%
	Sought advice from family/friends	92	33.6%
Postnatal Check-up Frequency	Often	258	73.7%
	Sometimes	92	26.4%
Exposed infant to sunlight?	Yes	216	61.7%
	No	134	38.3%
Educated by healthcare worker?	Yes	194	55.4%
	No	156	44.6%

4.5 Maternal Beliefs Toward NNJ

Belief systems demonstrated low perceived severity: only 38.9% viewed NNJ as a serious medical condition. Medical intervention was definitively chosen by only 41.7%, while 57.1% remained unsure. Traditional home remedies were explicitly endorsed by 28.0% of participants as shown in Table 5.

Table 5: Studied mothers' beliefs toward NNJ.

Variables	Options	No. (n=350)	%
Is NNJ a serious condition?	Yes*	136	38.9%
	No	214	61.1%
Best Preventive Measure	Proper breastfeeding*	244	69.7%
	Baby monitoring & call help*	56	16.0%
	Sun exposure	40	11.4%
	Don't know	10	2.9%
Will seek medical care?	Yes*	146	41.7%
	No	4	1.1%
	Not sure	200	57.1%
Believe in home remedies?	Yes	98	28.0%
	No*	252	72.0%
Caused by cultural/envirom factors?	Yes	88	25.1%
	No*	262	74.9%

5. DISCUSSION

1. Sociodemographic Characteristics: The sample evaluated in Mosul represented a relatively young demographic cohort (mean age $\approx$ 29 years) that was exclusively urban and dominated by housewives (83.4%). This reflects standard structural compositions seen in regional clinical trials across Iraq. Maternal education acted as a mixed variable: nearly one-quarter (24.0%) were illiterate, while 32.6% achieved university graduation. The presence of mixed literacy heavily influences baseline information scores, matching observations by Alfaifi et al. in Saudi Arabia, where maternal education stood out as the absolute strongest predictor of appropriate newborn management. The high rate of historical family exposure to jaundice (73.1%) aligns with Iraqi regional data by Hameed et al., which validates that previous household occurrence improves general sign identification but does not inherently safeguard against improper management choices.

2. Knowledge of Timing, Causes, and Signs of NNJ: Mosul mothers showed high clinical awareness regarding external symptom visualization, with 97.7% recognizing yellow skin and 89.1% tracking yellow sclera. This superficial awareness matches data from Ghana and Nepal, where basic clinical yellowing is easily identified by mothers. However, deep knowledge voids surfaced regarding pathophysiological drivers and serious neurological consequences. Only 36.0% correctly identified maternal blood group mismatch as a source of hemolysis, while 21.7% incorrectly suspected maternal food items. Crucially, 81.1% of participants did not know any complications, and only 17.1% were aware of irreversible brain injury (kernicterus). This deficiency corresponds with Ethiopian data by Demis et al., where 60.8% of mothers completely lacked awareness of neurotoxic danger signs. Normalizing jaundice beyond the second week (77.1%) remains a dangerous trend that delays the detection of biliary atresia or severe ongoing hemolysis.

3. Attitudes and Perceptions Toward NNJ: A noticeable discrepancy exists between theoretical medical appreciation and practical implementation.

While 90.9% stated that jaundiced neonates belong in a hospital setting, 80.0% would delay seeking care until the infant became "very yellow." This practice introduces hazardous delays during the narrow therapeutic window for effective phototherapy or exchange transfusion. In contrast, Wang et al. documented that Chinese mothers exposed to formal postpartum instructions demonstrated significantly faster care-seeking timelines. Home remedies remain popular first-line choices, with 36.0% of mothers explicitly choosing to administer oral glucose water, an outdated practice that reduces caloric intake and potentially delays required professional assessment.

4. Practices Related to Neonatal Jaundice: Out of 274 mothers who managed an icteric child historically, only 51.4% consulted professional medical services immediately. The remainder depended on peer advice (33.6%) or alternative remedies (15.0%). Prophylactic or curative exposure to unfiltered home sunlight was reported by 61.7% of mothers. This practice is common in low-resource environments but introduces risks of hypothermia, dehydration, and sunburn without delivering consistent therapeutic light frequencies. Furthermore, the fact that only 55.4% recalled receiving jaundice counseling from clinical staff shows a missed opportunity for education during routine pre- and postnatal check-ups.

5. Beliefs Toward Neonatal Jaundice: The low perceived severity of NNJ is a primary driver of delayed presentation, with only 38.9% of mothers considering the condition serious. When combined with the finding that 57.1% were hesitant or unsure about seeking medical care for jaundice, it underscores the need for clear educational interventions. While 69.7% correctly viewed breastfeeding as a protective practice, the persistent reliance on traditional treatments (28.0%) indicates that cultural beliefs continue to coexist alongside medical recommendations, as observed in community health assessments across LMICs.

6. CONCLUSIONS AND RECOMMENDATIONS

The findings indicate that mothers in Mosul have a high level of recognition of the visible signs of neonatal jaundice, particularly yellow discoloration of the skin and eyes; however, their understanding of its underlying causes, potential complications, and long-term consequences remains limited. A substantial proportion of mothers were unaware that untreated neonatal jaundice can result in severe neurological damage, highlighting significant knowledge gaps. Furthermore, care-seeking behavior was often delayed, with most mothers reporting that they would seek medical attention only after the jaundice became severe. Traditional beliefs and practices also remain common, as many mothers continue to rely on home remedies and direct sunlight exposure instead of evidence-based medical care. In addition, counseling provided by healthcare professionals was insufficient, with only slightly more than half of the participants reporting that they had received formal education regarding neonatal jaundice. Based on these findings, targeted educational interventions should be integrated into routine antenatal and postnatal care to improve maternal awareness of neonatal jaundice, its causes, warning signs, and potential complications. Culturally appropriate health education should also address misconceptions and discourage the use of ineffective traditional practices such as glucose water and direct sunlight exposure. Healthcare facilities should strengthen neonatal jaundice screening by implementing objective bilirubin assessment before early postpartum discharge, while frontline healthcare providers, including primary care nurses and immunization staff, should be trained to use every routine maternal and child healthcare encounter as an opportunity to assess and reinforce maternal knowledge of neonatal jaundice.

REFERENCES

1. Ogunfowora OB, Adefuye PO, Fetuga MB. What Do Expectant Mothers Know about Neonatal Jaundice? *International Electronic Journal of Health Education*, 2006; 9: 134-40.
2. Bhutani VK, Zipursky A, Blencowe H, Khanna R, Sgro M, Ebbesen F, et al. Neonatal hyperbilirubinemia and Rhesus disease of the newborn: incidence and impairment estimates for 2010 at regional and global levels. *Pediatric Research*, 2013; 74(1): 86-100.
3. Seneadza NAH, Insaadoo G, Boye H, Ani-Amponsah M, Leung T, Meek J, et al. Neonatal jaundice in Ghanaian children: Assessing maternal knowledge, attitude, and perceptions. *PLoS One*, 2022; 17(3): e0264694.
4. Mwaniki MK, Atieno M, Lawn JE, Newton CR. Long-term neurodevelopmental outcomes after intrauterine and neonatal insults: a systematic review. *The Lancet*, 2012; 379(9814): 445-52.
5. Demis A, Getie A, Wondmienieh A, Alemnew B, Gedefaw G. Knowledge on neonatal jaundice and its associated factors among mothers in northern Ethiopia: a facility-based cross-sectional study. *BMJ open*, 2021; 11(3): e044390.
6. Huang Y, Chen L, Wang X, Zhao C, Guo Z, Li J, et al. Maternal knowledge, attitudes and practices related to neonatal jaundice and associated factors in Shenzhen, China: a facility-based cross-sectional study. *BMJ open*, 2022; 12(8): e057981.
7. Hameed NN, Abdul-Hussain NJ, Ahmed ME. Assessment of mother's Knowledge, practices and believes toward home management of Neonatal jaundice in two pediatric teaching hospitals. *Journal of the Faculty of Medicine Baghdad*, 2019; 61(3, 4).
8. Alfaifi JA, Alqahtani YA, Alqahtani MM, Alqarni A, Alshahrani A, Alshomrani RA. Knowledge and attitudes of parents regarding neonatal jaundice in Bisha City, Saudi Arabia. *Cureus*, 2023; 15(9): e44916.