

# Knowledge, Attitude and Practice about Neonatal Jaundice among Mothers at a Tertiary Care Hospital: A Questionnaire-based Cross-sectional Study

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## ABSTRACT

**Introduction:** Neonatal jaundice, also known as hyperbilirubinaemia, is a commonly encountered clinical condition in the postnatal period due to the immaturity of an infant's liver's ability to metabolise bilirubin efficiently. Early detection and prompt intervention are necessary to reduce the risk of severe hyperbilirubinaemia and associated complications, such as kernicterus. Parents are more inclined to seek early medical attention if they have better knowledge and awareness, a positive outlook and are not influenced by antiquated sociocultural beliefs and practices.

**Aim:** To study the knowledge, attitudes and practices of mothers regarding neonatal jaundice in a tertiary care hospital.

**Materials and Methods:** This questionnaire-based cross-sectional study was conducted at Department of Paediatrics, A.J. Institute of Medical Sciences and Research Centre, Mangaluru, Karnataka, India. All 108 mothers admitted to the postnatal ward following delivery and those visiting the postnatal clinic in the tertiary care centre during one month in April 2023 were included.

Data were gathered using a structured questionnaire, which evaluated the mothers' knowledge, attitudes and practices. Demographics and categorical variables were described using frequencies and percentages.

**Results:** Out of 108 mothers, the majority belonged to the 25-34 years age group. Most of the mothers had good knowledge about detecting jaundice and its possible causes. A total of 64 (59.3%) mothers reported that cost was a barrier to accessing healthcare. Despite this, the study showed that 82 (75.9%) of them would still visit the hospital for a check-up, suggesting an overall good attitude. Only 2 (1.9%) believed in home remedies as a treatment. Knowledge gaps regarding danger signs and complications of neonatal jaundice were noted.

**Conclusion:** The present study indicates that mothers possess good knowledge, attitudes and practices regarding neonatal jaundice. Counselling the mothers and conducting awareness programmes for caregivers can help improve knowledge, leading to early detection and treatment.

**Keywords:** Awareness, Hyperbilirubinemia, Phototherapy, Postnatal, Prevention

## INTRODUCTION

The newborn's yellowish skin and membranes are referred to as neonatal jaundice, indicating high blood levels of unconjugated bilirubin [1,2]. According to Blackburn, newborns with jaundice have elevated bilirubin levels due to an imbalance between production and excretion [3]. Hyperbilirubinaemia is defined as a serum total bilirubin level above the 95<sup>th</sup> percentile on the hour-specific Bhutani nomogram [4]. Neonatal jaundice affects 60% of term infants and 80% of preterm infants within the first week of life [1].

The newborn's liver is too immature to convert unconjugated bilirubin for excretion, leading to physiological jaundice typically seen on the third or fourth day of life [5]. Most often, this condition is self-limiting and resolves within a week [6,7]. This jaundice is caused by a short red blood cell lifespan (70-90 days), a high red blood cell volume, or lower plasma binding capacity [6]. ABO and Rhesus (Rh) incompatibilities, polycythaemia and septicaemia can lead to pathological jaundice in newborns within 24 hours of birth, particularly when serum bilirubin levels exceed 5 mg/dL [6]. Most babies with physiological neonatal jaundice recover without any intervention. However, high levels of unconjugated bilirubin can result in bilirubin encephalopathy or kernicterus in some infants, potentially causing irreversible brain damage and death [8,9].

Untreated jaundice can lead to conditions such as cerebral palsy, mental retardation and deafness [10].

It is important to note that inadequate knowledge and poor practices, which are often passed down from previous generations, alongside parents' perceptions and attitudes towards neonatal jaundice, may explain the delay in seeking timely medical advice [11]. This delay can lead to inappropriate treatment approaches.

This study was conducted to address the above knowledge gaps, such as awareness of complications and the ability to detect danger signs. Additionally, it aims to identify the extent of false beliefs among mothers to provide better antenatal and postnatal counselling. This could potentially improve newborn care and reduce neonatal mortality.

With this background, the present study was conducted to assess the knowledge, attitudes and practices regarding neonatal jaundice in a tertiary care hospital in a coastal city of Karnataka, India.

## MATERIALS AND METHODS

This questionnaire-based cross-sectional study was conducted over the duration of one month in April 2023 at Department of Paediatrics, A.J. Institute of Medical Sciences and Research Centre, Mangaluru, Karnataka, India. Participation was voluntary

and participants were informed and assured of confidentiality and anonymity throughout the study by protecting their information and identity. Ethical committee clearance was obtained prior to the conduct of the interview (approval no: IEC/21771/2023/3).

**Inclusion criteria:** All mothers above the age of 18 years admitted to the postnatal wards, attending antenatal clinics, neonatal follow-up clinics and immunisation clinics during the study period were included.

**Exclusion criteria:** Mothers with mental disorders, those who experienced stillbirth, intrauterine death, or death following delivery and those who did not consent to the study were excluded.

**Sample size collection:** The sample size was calculated based on Aggarwal B et al., by applying the formula  $z^2pd/d^2$ , where 'z' is the constant; in the present case,  $z=1.96$ ; p is the prevalence; and  $q=1-p$ ; d is the allowable error, which could be considered as 25% for the present study [2]. In the present study,  $p=25\%$  and  $d=5\%$ . Hence, the minimum sample size calculated was 96.

Data collection employed systematic random sampling. This method ensured that all caregivers in the sampling frame had equal chances of being selected for the study. The postnatal nurses assigned serial numbers to mothers based on the order of delivery and random numbers were selected for the study.

### Study Procedure

A structured interview questionnaire was used to assess caregivers' knowledge, attitudes and practices regarding neonatal jaundice, along with relevant data. After reviewing pertinent literature and the study objectives, the questionnaire was designed [1,2,9,11]. For ease of analysis, the questionnaires were serially numbered. The authors peer-reviewed the questionnaire and translated the English version into Kannada. Two paediatricians, who were subject matter experts and not involved in the research, peer-reviewed and validated the questionnaire. The questionnaire consisted of 18 questions divided into four sections: demographic details (5 questions), knowledge (4 questions), attitude (5 questions) and practices (4 questions). No scoring system was used in the present study. Results were interpreted based on the mothers' answers as (yes/no/don't know) to the relevant questions. Participants were given five minutes to complete the questionnaire.

### STATISTICAL ANALYSIS

Before exporting to Statistical Package for Social Sciences software version 19.0, field data were entered into Microsoft Excel and cleaned. Demographics and categorical variables were described using frequencies and percentages. Responses assessed the mothers' knowledge, attitudes and practices.

### RESULTS

During one month, 108 mothers participated in the study after providing consent and completing the structured questionnaire. In the present study, the majority of the mothers, 74 (68.5%), belonged to the 25-34 years age group. Additionally, 56 (51.9%) were primigravida. No significant differences were found in parity and employment status among them. A total of 62 (57.4%) of the women had received a secondary education, while only 8 (7.4%) had received a tertiary education. Furthermore, 91 (84.3%) resided in urban areas [Table/Fig-1].

In the present study, more than half of the interviewed women, 64 (59.3%), knew how to detect neonatal jaundice based on yellowing

Demography	Category	n (%)
Maternal age (years)	18-24	24 (22.2%)
	25-34	74 (68.5%)
	>35	10 (9.3%)
Parity	Primigravida	56 (51.9%)
	Multigravida	52 (48.1%)
Education	Secondary	62 (57.4%)
	Primary	38 (35.2%)
	Tertiary	8 (7.4%)
Occupation	Working	61 (56.5%)
	Housewife	47 (43.5%)
Residence	Urban	91 (84.3%)
	Rural	17 (15.7%)

**[Table/Fig-1]:** Demographic details of the study participants.

of the eyes and skin. A total of 100 (92.6%) were aware of one or more possible causes of neonatal jaundice [Table/Fig-2].

Question	Category	Yes	No	I don't know
What is neonatal jaundice?	Yellow eyes	76	32	0
	Yellow skin	96	12	0
Do you know following are the causes of neonatal jaundice?	Premature delivery	16	83	9
	Infection	69	30	9
	Mother's diet/drug intake	16	83	9
	Blood group mismatch of mother and baby	9	90	9
	Insufficient breast milk	23	77	8
Do you know following are the danger signs of neonatal jaundice?	Fever	69	30	9
	Refusal of feed	27	73	8
	Excessive cry	44	56	8
	Convulsions	24	75	9
Do you know following are the complications?	Deafness	2	41	65
	Death	23	21	64
	Delayed development	29	14	65

**[Table/Fig-2]:** Maternal knowledge about neonatal jaundice.

Further data suggest that mothers had positive attitudes and understanding towards neonatal jaundice, even among those who had not previously had a baby with jaundice. Most mothers, 87 (80.6%), understood that it can be life-threatening if untreated and 91 (84.3%) recognised that blood tests are required for further evaluation. It is reassuring to note that 54 (50%) of the mothers' source of information was through hospitals and doctors [Table/Fig-3].

Question	Category	n (%)
Is it life-threatening if untreated?	Yes	87 (80.6%)
	Don't know	12 (11.1%)
	No	9 (8.3%)
Is jaundice common in newborns?	Yes	78 (72.2%)
	Don't know	15 (13.9%)
	No	15 (13.9%)
Is a blood test required to detect jaundice?	Yes	91 (84.3%)
	Don't know	13 (12.0%)
	No	4 (3.7%)
Do you have a previous baby with jaundice?	No	83 (76.9%)
	Yes	25 (23.1%)

What is the source of information?	Hospital	54 (50.0%)
	Relative/friends/Hospital	24 (22.2%)
	Relative/friends	17 (15.7%)
	Television/social media	9 (8.3%)
	Television/social media/Hospital	3 (2.8%)
	Television/social media/Relative/friends	1 (0.9%)

**[Table/Fig-3]:** Maternal attitude about neonatal jaundice.

A total of 64 (59.3%) of the mothers indicated that cost was a barrier to accessing healthcare. Despite this, the study shows that 82 (75.9%) of them would still visit the hospital for a check-up, suggesting an overall good attitude. Only 2 (1.9%) believed in home remedies as a treatment. Additionally, 42 (38.9%) of the mothers did not know any preventive practices [Table/Fig-4].

Question	Category	Yes	No	I don't know
What is your initial response when a baby develops jaundice?	Watch for a few days and then take to hospital	32	75	1
	Only home remedy	5	102	1
	Immediate hospital visit	92	15	1
	Take no action	0	107	1
Do you know following are the treatment practices?	Exposure to direct sunlight	24	82	2
	Consult doctor	80	26	2
	Phototherapy	39	68	1
	Exchange blood transfusion	4	102	2
	Home remedy or herbs	3	103	2
What are the barriers to healthcare access?	Cost	64	44	0
	Distance	28	80	0
	Transport	11	97	0
Do you know the preventive practices?	Maternal diet modification while breastfeeding	42	24	42
	Antenatal counselling	22	44	42
	Formula feeds	19	47	42

**[Table/Fig-4]:** Maternal practices about neonatal jaundice.

Total of 68% of the mothers believed in the necessity of consulting a doctor and recognised phototherapy as a treatment practice.

## DISCUSSION

The present study evaluated the knowledge, attitudes and practices of mothers regarding neonatal jaundice in a coastal city in Karnataka, India. The mothers' awareness can help reduce neonatal mortality by contributing to the health component of the Sustainable Development Goals (SDGs). Effective management of neonatal jaundice and a decrease in neonatal mortality depend on maternal understanding and early care-seeking [9].

In the present study, nearly half of the study population demonstrated good knowledge. In a study by Huang Y et al., in Shenzhen, China, only 46.4% of participating mothers had good knowledge about neonatal jaundice and 41.7% indicated they would seek information regarding it [1]. In comparison to our study and those by Kulkarni SK et al., and Magfour H et al., the percentage of mothers with good knowledge was higher in the present findings [10,11]. This difference could be attributed to better access to healthcare for participants in our study than for those in Huang Y et al.'s study [1].

According to the current study, low tertiary education levels may explain some mothers' inability to diagnose jaundice. Amegan-Aho KH et al., in Ghana found that 24.1% and 3.8% of mothers

incorrectly attributed neonatal jaundice to "consumption of bad food," despite more than 90% receiving antenatal care services [12]. However, 76.0% of mothers in their study demonstrated good awareness of neonatal jaundice.

In the present study, 82 (75.9%) indicated that they would still visit the hospital for a check-up, suggesting an overall positive attitude. Only 2 (1.9%) believed in home remedies as a treatment option. Additionally, 68 (63%) of the mothers acknowledged the need to consult a doctor and recognised phototherapy as a treatment practice, indicating positive attitudes and practices overall. Huang Y et al., conducted a study in which they found that mothers who had previously received education on neonatal jaundice from medical professionals were more inclined to exhibit good practices associated with jaundice than other mothers [1]. Similarly, a study conducted in Nigeria by Ezeaka CV et al., revealed that mothers who obtained information about neonatal jaundice from healthcare providers were significantly less likely to self-treat and more likely to seek medical care promptly [13].

It was also discovered that women who possessed good knowledge regarding newborn jaundice were more likely to have favourable attitudes and practices; this aligns with the 'Knowledge, Attitude and Practices' (KAP) model, which posits that increased knowledge serves as the foundation for positive attitudes and practices [14]. Goodman OO et al., conducted a community-based survey in Lagos, Nigeria, recruiting 358 mothers [15]. Among these, 247 (68.9%) had a poor level of knowledge in this community. Additionally, ineffective preventive practices were employed. The results of their study are more generalisable as it is community-based, unlike most of the other studies, including the present study, which is hospital-based. Recruiting a community population was considered a strength of their study. They concluded that despite a high level of awareness, overall knowledge was low. Even with a good attitude towards the condition, participants opted for ineffective treatment practices.

The results of the present study indicate that 54 (50%) of the mothers' source of information was through hospitals and doctors. This finding explains the better understanding and attitudes observed in this group of women. Most of the study population resides in urban areas, which may be a factor in hospitals being their primary source of information, as they have better access to healthcare compared to the rural population.

The data suggest that mothers have a good understanding of how to detect jaundice early. However, knowledge related to assessing severity (danger signs) and complications was notably poor, with 64 (59.3%) being unaware of potential complications.

At the study hospital, counselling regarding neonatal jaundice is regularly provided to mothers during daily rounds, at the time of discharge and during follow-up newborn check-ups. Awareness programmes are also conducted to improve knowledge among mothers and caregivers. The authors believe that the regular counselling and awareness programmes have significantly contributed to the favourable results obtained from this study, indicating overall good knowledge, attitudes and practices.

### Limitation(s)

The potential for selection bias exists due to the voluntary nature of participation. The present study was conducted within the confines of a tertiary care hospital, which limits its ability to accurately reflect the general population. Furthermore, the scale of the study is relatively small. The present study focused on mothers' knowledge

prior to the present survey interview and their attitudes towards that information. Although the questionnaire included a question about whether their neonate had previous experiences of jaundice, the authors did not collect details regarding the current newborn or conduct examinations for jaundice.

## CONCLUSION(S)

The present study demonstrates that mothers possess good knowledge, attitudes and practices regarding neonatal jaundice. However, gaps in knowledge concerning the danger signs and complications of neonatal jaundice have been identified. Regular counselling and awareness programmes should be conducted to address these gaps. The authors recommend implementing awareness programmes during outpatient department visits to enhance understanding. Additionally, there is an opportunity to conduct further studies with a larger sample size across multiple centres in South India, including rural, urban, primary and tertiary health centres.

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## REFERENCES

- [1] 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. Available from: <https://doi.org/10.1136/bmjopen-2021-057981>.
- [2] Aggarwal B, Agrawal A, Chaudhary P, Gupta G, Rana S, Gupta S. Neonatal jaundice: Knowledge, attitude beliefs, and practices of postnatal mothers in a tertiary care hospital in Uttarakhand, India. *Indian J Child Health*. 2017;04(04):603-08.
- [3] Blackburn ST. Maternal, fetal, & neonatal physiology: Elsevier Health Sciences; 2012, 4<sup>th</sup> edition, chapter 18.
- [4] Reiser DJ. Neonatal jaundice: Physiologic variation or pathologic process. *Crit Care Nurs Clin North Am*. 2004;16(2):257-69. Doi: 10.1016/j.ccell.2004.02.010.
- [5] Vandborg PK, Hansen BM, Greisen G, Jepsen M, Ebbesen F. Follow-up of neonates with total serum bilirubin levels  $\geq 25$  mg/dL: A Danish population-based study. *Pediatrics*. 2012;130(1):61-66. Doi: 10.1542/peds.2011-2760.
- [6] Hockenberry MJ, David W. Wong's nursing care of infants and children 10<sup>th</sup> edition. Vol. UNIT IX, T, Nursing Care of Infants and Children. 2015. 883 p.
- [7] Cox S, Werner C, Hoffman B, Cunningham F. Williams Obstetrics 22<sup>nd</sup> Edition Study Guide. McGraw-Hill Professional; 2005. Mar 31.
- [8] 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. *Pediatr Res*. 2013;74(Suppl 1):86-100. Doi: 10.1038/pr.2013.208.
- [9] Hussein H, Aziz AR. Assessment of mothers' knowledge and beliefs toward care of neonatal jaundice in pediatric teaching hospital in Holy Karbala City. *Indian J Public Health*. 2018;9:295. Doi: 10.5958/0976-5506.2018.00736.2.
- [10] Kulkarni SK, Dolas AL, Doibale MK. Risk factors of neonates with indirect hyperbilirubinemia in a tertiary care hospital. *International Journal of Basic and Applied Medical Sciences*. 2014;4(1):395-99.
- [11] Magfour H, Aqeel A, Maashi A, Maghfuri N, Jarad R, Kathiah A, et al. Mothers' perception of neonatal jaundice in Jazan Region, KSA. *J Clin Neonatol*. 2019;8(2):116.
- [12] Amegan-Aho KH, Segbefia CI, Glover NDO, Ansa GA, Afaa TJ. Neonatal jaundice: Awareness, perception and preventive practices in expectant mothers. *Ghana Med J*. 2019;53(4):267-72. Doi: 10.4314/gmj.v53i4.3.
- [13] Ezeaka CV, Ugwu RO, Mukhtar-Yola M, Ekure EN, Olusanya BO. Pattern and predictors of maternal care-seeking practices for severe neonatal jaundice in Nigeria: A multi-centre survey. *BMC Health Serv Res*. 2014;14:192. Doi: 10.1186/1472-6963-14-192.
- [14] Badran IG. Knowledge, attitude and practice the three pillars of excellence and wisdom: A place in the medical profession. *East Mediterr Health J*. 1995;1:08-16. Doi: 10.26719/1995.1.1.8.
- [15] Goodman O, Kehinde O, Odugbemi B, Femi-Adebayo T, Odusanya O. Neonatal jaundice: Knowledge, attitude and practices of mothers in Mosan-Okunola community, Lagos, Nigeria. *Niger Postgrad Med J [Internet]*. 2015;22(3):158. Available from: <http://dx.doi.org/10.4103/1117-1936.170741>.

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