**Jaundice and treatment options: Knowledge, views and current practices among caregivers of children attending a Teaching Hospital in Owerri, Nigeria.**


## Abstract

**Introduction:** Neonatal jaundice (neonatal hyperbilirubinaemia), characterized by yellowish discoloration of the skin and sclera of newborn infants is caused by high serum bilirubin levels. Amongst infants, it is an important cause of preventable brain injury, mental handicap, physical disabilities and death; arising from poor understanding that leads to dangerous delays in seeking care and imitating appropriate management.

**Objective:** To evaluate the perception, knowledge, practices and attitudes of mothers related to neonatal jaundice (NNJ).

**Methods:** Convenience sampling technique was used to obtain data from consecutive parents who attended the well child/immunization clinic of the Federal Teaching Hospital Owerri, Nigeria, from January 2023 to April 2023. A structured questionnaire was utilized to assess knowledge, attitude and treatment related to neonatal jaundice.

**Results:** The valid response rate was 80%.Of the participating parents, 92.8% had knowledge about neonatal jaundice and this was associated with class I socioeconomic class (OR 11.88 95% CI:1.85to76.18) while 54.4% of the respondents acknowledged jaundice as an emergency.Knowledge of jaundice as an emergency was associated with a high education level (i.e. university degree or its equivalent; OR=8.33, 95% CI: 2.70 to 25.00, p=0.001), prior education on neonatal jaundice (OR=3.62, 95% CI: 1.64 to 7.99, p=0.001) and male babies (OR=1.71, 95% CI: 1.12 to 2.62, p=0.013). Although 62.3% of the participants recognized blood group/rhesus incompatibility as a cause of neonatal jaundice, 22.5% of them did not know neonatal jaundice was dangerous. Of the 243 whose wards had had jaundice, 78.6% recognized yellow eyes as a sign of jaundice, with 38.8% of them being managed in places other than a health facility. Amongst the participants, 71(45.1%) recognized the two effective treatment methods for neonatal jaundice. Thirteen (4.1%) of the participants knew that awareness could be created through the social media. Modest negative correlations between the knowledge of jaundice, its awareness as an emergency and the eventual outcome were observed (Kendall's tau-b ($\tau_b$) = -0.187, p =.033 and $\tau_b$= -0.254, p <.001, respectively).

**Conclusion:** Most of the subjects in this study had knowledge about jaundice and about half recognized it as an emergency. A large proportion of them were unaware of the effective treatment methods. Therefore, there is a critical need for better awareness through targeted public enlightenment and educational programs.



**Keywords:** Jaundice, Neonates, Knowledge, Treatment, Current practice.

## INTRODUCTION

Neonatal jaundice, refers to yellow staining of the skin or other organs caused by the accumulation of bilirubin in the body, mediated by the elevation of bilirubin in the blood.[1,2] This is a consequence of neonates predilection to bilirubin synthesis and their inadequate capacity to excrete it. The imbalance between production and excretion of bilirubin leads to increased bilirubin levels in the blood and discoloration of the skin and other membranes.[3, 4] A common clinical concern amongst neonates, with about 50%–60% of term infants and 80% of preterm infants developing jaundice within 1 week after birth.[5] Neonatal jaundice may be physiological (a benign condition) due to the inability of the immature newborn's liver to convert unconjugated bilirubin for execretion.[6,7] Pathological jaundice may be due to ABO and Rh incompatibility prematurity, infections, and septicemia.[8,9] When it causes severe hyperbilirubinemia it may cause kernicterus, which may advance to nerve deafness, choreoathetoid cerebral palsy, intellectual disability and even death.[10,11] Timely recognition and appropriate treatment of neonatal jaundice are key approaches to avert acute bilirubin encephalopathy. Key to achieving good result for management of jaundice in neonates is mothers' ability to observe jaundice,its evolution and early symptoms/signs of kernicterus. Reduction in the incidence of kernicterus had being reported to be associated with providing mothers with detailed information about neonatal jaundice and its risks.[12] This is more so, because several harmful practices are applied for the treatmentof NNJ, such as cutting of post auricular area of an infant, using herbal treatment, exposure of neonateto sunshine, and giving glucose water to the infant.[13-16]

There is paucity of data on maternal knowledge, attitudes and practices about neonatal jaundice in Owerri, Nigeria following search in several search engines.

Therefore, this study aimed to assess parents' knowledge, practice, and attitude as related to jaundice amongst neonates in Owerri, Nigeria. It is hoped that the information obtained would assist healthcare providers target identified gaps in drawing up programmes that will improve knowledge about jaundice in neonates among parents.

### Methodology

We conducted a descriptive cross-sectional hospital-based study involving 318 parents at the well child and immunization clinic of FTH Owerri, between January and April 2023. FTH is a 624-bed tertiary hospital that offers maternal and child health services and serves as a referral centre for general hospitals, maternity facilities and private hospitals within Owerri and its adjoining states. Convenience sampling technique was utilized in obtaining data from all consecutive parents who attended the well child clinic, using a questionnaire that covered baseline characteristics, knowledge, attitudes and practices about neonatal jaundice. Questionnaires were administered after obtaining informed consent from the parents, who were encouraged to ask for explanation on any of the questions from the researchers, but conversation amongst them was discouraged while completing the questionnaires. Question was interpreted into the local language if participants sought clarification, without further explanations to remove

bias. Ethical approval was obtained from the Ethical Committee of the institution.The SPSS version 23.0 (IBM Corp., USA) statistical software was used for data entry, validation and analysis. Pearson's $\chi^2$ statistic was used to examine the association between categorical variables. Differences, associations and relationships were said to be statistically significant when $p \leq 0.05$.

## RESULTS

Of the 318 participants, 193 (63.7%) were aged 25 – 34 years and were in the majority. Most of the respondents were female 306 (96.2%) with 25:1 female : male ratio. The ethnic stock of the bulk of the respondents was Igbo 297 (93.4%) and majority of the respondents belonged to social classes I or II, 271(68.6%). This further depicted in table I.

Table I. Sociodemographic characteristics of respondents

| **Variables** | **Frequency** ***n*** **(%)** |
|---|---|
| **Age range (years)** | |
| 18 – 24 | 33 (10.9) |
| 25 – 34 | 193 (63.7) |
| 35 – 44 | 72 (23.8) |
| 45 – 54 | 3 (1.0) |
| 55 – 64 | 2 (0.7) |
| **Gender** | |
| Female | 306 (96.2) |
| Male | 12 (3.8) |
| **Ethnicity** | |
| Igbo | 297 (93.4) |
| Yoruba | 2 (0.6) |
| Hausa | 1 (0.3) |
| Others | 18 (4.1) |
| **Social class** | |
| I | 126 (31.9) |
| II | 145 (36.7) |
| III | 62 (15.7) |
| IV | 43 (10.9) |
| V | 19 (4.8) |

Of the 318 participants, 298 (92.8%) had, heard about jaundice and 20 (7.2%) had not.A vast majority of the respondents obtained their knowledge from health talks (241, 80.9%) and family and friends (159, 53.4%). Traditional (82, 27.5%) and new media (50, 16.8%) were other sources of information among the respondents (Table II).

Table II. Source of knowledge of neonatal jaundice among respondents

| **Source of knowledge of jaundice** | **n** | **% (n =298)** |
|---|---|---|
| Hospital | 241 | 80.9% |
| Family and friends | 159 | 53.4% |
| Internet | 50 | 16.8% |
| Radio/TV | 47 | 15.8% |
| Billboard | 35 | 11.7% |
| Others | 12 | 4.0% |

Table III shows a list of the causes of neonatal jaundice as given by the participants. One hundred and ninety-eight (62.3%) of respondents noted blood group incompatibilities as a major cause of NNJ, 63(19.8%)thought that mosquito bites caused it while 23(7.2%) attributed poor antenatal care/poor adherence to routine drugs in pregnancy and prematurity 10(3.1%) as causes of jaundice.

Table III. Causes of jaundice by respondents

| **Causes of jaundice** | **n** | **% (n =318)** |
|---|---|---|
| Blood group/Rhesus incompatibilities | 198 | 62.3% |
| Malaria | 54 | 17.0% |
| Poor antenatal care/lack or routine drug usage | 23 | 7.2% |
| Maternal illness | 12 | 3.8% |
| Malnutrition/Vitamin deficiency | 11 | 3.5% |
| Prematurity | 10 | 3.1% |
| Malaria | 9 | 2.8% |
| Infection | 5 | 1.6% |
| Excess bilirubin | 3 | 0.9% |
| Others | 3 | 0.9% |
| Liver disease/immaturity | 2 | 0.6% |

Regarding treatment of NNJ, a large proportion of parents (229, 72%) were aware of/had used an ineffective treatment mode(exposure to sunlight, administration of Abidec®[multivitamin]and Ampiclox);of the number that knew of at least one effective treatment mode, 63(31.2%) knew phototherapy and 28(13.9%) exchange blood transfusion as treatments for jaundice (Table IV). Mothers with at least an O' level compared to a university degree were about three times more aware of alternative treatments to jaundice than their counterparts without O' leve l(OR = 3.3, 95%CI: 1.64 to 6.61).

Table IV. Treatment given for jaundice

| **Ineffective treatment** | **n** | **%** |
|---|---|---|
| | | **(n=229)** |
| Sun exposure | 207 | 90.4% |
| Administration of Abidec | 132 | 57.6% |
| Administration of Ampiclox | 33 | 8.7% |
| Others | 9 | 2.4% |
| **Effective treatment of jaundice** | | **(n=202)** |
| Phototherapy | 63 | 31.2% |
| Exchange Blood Transfusion | 28 | 13.9% |
| Antibiotics(In jaundice caused by sepsis antibiotics is an effective | 137 | 67.8% |
| treatment option.) | 94 | 46.5% |
| IntraVeinous Fluid | | |

On the question of whether they considered NNJ an emergency, 173(54.4%) acknowledged that jaundice was an emergency, while 145 (45.6%) did not. Knowledge of jaundice as an emergency was associated with a higher education level i.e. a university degree or its equivalent (OR=8.333, 95% CI: 2.70 to 25.00, p=0.001), prior education on neonatal jaundice (OR=3.62, 95% CI: 1.64 to 7.99, p=0.001) and male babies (OR=1.71, 95% CI: 1.12 to 2.62, p=0.013). Of 173 participant that felt that jaundice could be a cause of morbidity/mortality, 64(37.0%) thought that it could result in the death of the child, 9 (5.2%) recognized brain damage as a possible danger while39(22.5%) had no idea why it was an emergency (Table V).

Table V Reasons Jaundice was considered an emergency by respondents

| **Reason** | **n** | **%** |
|---|---|---|
| | | **(n =173)** |
| Death | 64 | 37.0% |
| No idea | 39 | 22.5% |
| Health challenges/sickness/complications | 35 | 20.2% |
| Others | 22 | 12.7% |
| Brain damage | 9 | 5.2% |
| Blindness | 7 | 4.0% |
| Developmental growth problems | 4 | 2.3% |
| Deafness | 1 | 0.6% |

Among the respondents 243 (76.4%) whose child/ren had had jaundice in the past, 191 (78.6%) recognized yellow eyes as a sign of jaundice,with a small number recognizing other important symptoms like abnormal cry, abnormal movement/posture(Table VI). About one third (38.8%) of participants had their jaundiced children managed in places other than at a health facility as shown in Table VII.

Table VI

| **Recognition of jaundice in ward(s)/child(ren)** | **n** | **% (n =243)** |
|---|---|---|
| Yellow eyes | 191 | 78.6% |
| Fever | 128 | 52.7% |
| Yellow skin | 103 | 42.4% |
| Poor suck | 42 | 17.3% |
| Abnormal cry | 28 | 11.5% |
| Abnormal movement | 23 | 9.5% |
| Abnormal sleep | 21 | 8.6% |
| Convulsion | 10 | 4.1% |
| Abnormal posture | 9 | 3.7% |
| Others | 4 | 1.6% |

Table VII:Where jaundiced children were managed

| **Site of care of jaundiced child** | **n** | **% (n =220)** |
|---|---|---|
| Hospital | 173 | 78.6% |
| Home | 58 | 26.4% |
| Maternity | 51 | 23.2% |
| Church | 21 | 6.5% |
| Others | 13 | 5.9% |
| Health centre | 7 | 3.2% |

There was a modest negative correlation between the respondents' knowledge of jaundice across the categories of survival and it was statistically significant ($\tau_b$= -0.187, p =.033); similarly, awareness of jaundice as an emergency among the respondents was statistically significantly and moderately negatively correlated with mortality ($\tau_b$= -0.254, p <.001).

Table VIII. Correlation between heard of jaundice, Awareness of jaundice as an emergency and outcome of neonatal jaundice in respondents (From the table Kendalls tau-b correlation, there two different variables (Heard of jaundice and Awareness of jaundice as an emergency) that were individually with two different Kendall tau-b values. It is two different variables).

| | **Outcome of neonatal jaundice n =213** | | | | |
|---|---|---|---|---|---|
| **Variable** | Alive n=148 | Alive with sequaelae n=49 | Dead n=14 | **Kendall's tau-b** | **p-value** |
| **Heard of jaundice** | | | | | |
| Yes | 145 (98.0) | 44 (89.8) | 14 (87.5) | -0.187 | 0.033 |
| No | 30 (2.0) | 5 (10.2) | 2 (12.5) | | |
| **Awareness of jaundice as an emergency** | | | | | |
| Yes | 94 (63.5) | 9 (18.4) | 11 (68.8) | -0.254 | <0.001 |
| No | 54 (36.5) | 40 (81.6) | 5 (31.3) | | |

**DISCUSSION**

The current study demonstrates that a considerable number of participants in the well child/immunization clinic of FTH Owerri, Nigeria, a low-income country have heard of jaundice. Our study demonstrates that participants have some knowledge of various aspects of neonatal jaundice, with hospital health talk being the source of information to most of the respondents. It confirms that blood group incompatibility was thought of as a major cause of jaundice. Jaundice was also acknowledged as an emergency by about half of the respondents, and had utilized one of the many ineffective modes of treatment.

The first significant finding of this study is the establishment of the fact that 92.8% of participants knew what neonatal jaundice is. This may be accounted for by high percentage of respondents with tertiary level of education. This knowledge level was better than that reported in other countries such as 22%,30%, 34%, 45.4%.[17,18,19,20] This knowledge however, is not correlated with adequate facts of certain characteristics of the condition, such as identifying the reason why jaundice is as an emergency and its effective treatment.Statistically significant knowledge of jaundice was observed to be associated with high socioeconomic class (OR 11.88 95% CI: 1.85 to 76.18).

Another striking finding was that more than two-thirds of parents in this study knew one or more appropriatecauses of NNJ while 33% did not know an appropriatecause of NNJ. There are still fallacies on the causes and treatment of neonatal jaundice among the participants. A sizeable number thought that poor antenatal care/lack of routine drug use, maternal malnutrition/vitamin deficiency, malaria causedneonatal jaundice. This mistaken belief may have also arisen from the fact that the sources of information amongst53.4% of the respondents were from family and friends, who may have also gotten the information about NNJ wrong themselves ab-initio, which is higher than findings by Ogunfowora.[21]This seemingly low knowledge about the causes of jaundice may imply that caregivers may resort to ineffective treatments options, with resultant delays in accessing effective medical treatment for neonatal jaundice, thus, contributing to the progression to kernicterus.[4] In addition, with availability/access to internet and smart phones, parents(16.8%) are accessing information from that source; however, they worry about reliability of parenting information from the internet.[22] These seemingly low numbers of intentional sourcing of information emphasize the need to improve the information seeking

attitude of parents about jaundice. This is so because health literacy impacts people's health information-seeking behaviour.[23]

Though, 54.4% of respondents considered NNJ a serious predicament that required medical attention, only 5.2% recognized brain damage as a possible danger; while 22% had no idea what could result from untreated jaundice. Considering jaundice as unimportant by some respondents could be a result of lack of knowledge that made them utilize ineffective treatment options such as use of traditional medicine to treat NNJ, that is common in underdeveloped countries.[24-26]Furthermore, the result that this knowledge gap is considerably wider among parents of the lower socioeconomic group, with poorer educational status, accentuates the pressing need for enhanced education and mass health enlightenment programmes on neonatal jaundice.

When the correlation between knowledge and outcome was assessed, a modest negative correlation that was statistically significant was observed; awareness of jaundice as an emergency and outcome of respondents' children that had experienced jaundice similarly negatively correlated with mortality in this study. Keenly understanding important knowledge will help to improve maternal awareness of neonatal jaundice and outcome. Since jaundice occurs in most newborns and the trait of successful treatment is timely recognition and appropriate therapy, provision of appropriate information is imperative. This is more so as greater knowledge is suggested as the basis for good attitudes and practices.[27]In low income countries, neonatal jaundice seems not to be getting the attention that it deserves, a condition that has potentially deleterious consequences. There is therefore need to provide information for parents to detect to jaundice early and seek effective treatment, since the hallmark of effectual management is early detection and right therapy.

## CONCLUSION

Generally, parents' had knowledge about jaundice, but did have appropriate knowledge regarding its causes, identification as an emergency and why it is an emergency. There is need to improve information-seeking attitude of parents about neonatal jaundice. Therefore, we recommend that medical staff/government urgently strengthen health enlightenment campaign/education programmes on NNJ in the hospitals, media(mass and social), men/women organizations and worship centers incorporating information about the causes, signs to be used in

identifying jaundice and appropriate treatment. Professional associations/ Non-governmental organizations need to provide reliable websites for parent's to obtain information about neonatal jaundice. Information provided should emphasize timely medical consultation and discourage reliance on unproven treatment methods; which aimed at reducing the neurological effect and mortality there from.

Limitation

There could be recall bias and since some of the respondents have had children that had jaundice so they may have gone and sourced for information which would affect information provided.

References


1. Wang WP. People's Medical Publishing House. *Pediatrics* 2018.
2. Abbey P, Kandasamy D, Naranje P. Neonatal jaundice. Indian JPediatr2019;86:830‑41.
3. Khan RS, Houlihan DD, Newsome PN. Investigation of jaundice. Medicine (Baltimore) 2015; 43:573–6.
4. Salia SM, Afaya A, Wuni A, et al. Knowledge, attitudes, and practices regarding neonatal jaundice among caregivers in a tertiaryhealth facility in Ghana. PLoS One 2021; 16:1–20.
5. American Academy of Pediatrics Subcommittee on Hyperbilirubinemia. Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation. *Pediatrics* 2004; 114:297‑316.
6. Anderson CM, Kandasamy Y, Kilcullen M. The efficacy of home phototherapy for physiological and non-physiological neonatal jaundice: A systematic review. J Neonatal Nurs 2021;28;,312-26
7. Olusanya BO, Teeple S, Kassebaum NJ. The Contribution of Neonatal Jaundice to Global Child Mortality: Findings From the GBD 2016 Study. Pediatrics 2018;141: e20171471
8. 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;4:603‑8.
9. Padidar P, Shaker M, Amoozgar H, et al. Detection of neonatal jaundice by using an android OS-based smartphone application. Iran J Pediatr 2019;29, e84397.
10. Riordan SM, Shapiro SM. Review of bilirubin neurotoxicity I: molecular biology and neuropathology of disease. *Pediatr Res* 2020; 87:327‑31.
11. Karimzadeh P, Fallahi M, Kazemian M, *et al*. Bilirubin induced encephalopathy. *Iran J Child Neurol*2020;14:7‑19. doi:10.22037/IJCN.V14I1.27890

12. Wennberg RP, Oguche S, Imam Z, *et al*. Maternal instruction about jaundice and the incidence of acute bilirubin encephalopathy in Nigeria. *J Pediatr*2020; 221:47‑54.
13. Goodman OO, Kehinde OA, Odugbemi BA, Femi-Adebayo TT, Odusanya OO. Neonatal Jaundice: Knowledge, Attitude and practices of mothers in Mosan-Okunola community, Lagos, Nigeria. Niger Postgrad Med J 2015, 22:158-63.
14. Ogunlesi TA, Abdul AR. Maternal knowledge and care. Seekingbehaviors for newborn jaundice in Sagamu, Southwest Nigeria. NigerJ ClinPract2015;18:33‑40.
15. Adeeb MNA, Kumarasamy K, Hamid SA, Mahat N, Arumugam K, Shukor SA. Knowledge and Attitude of Neonatal Jaundice‑Orang Asli Perspective. J SainsKesihat Malaysia 2016; 14:65‑8.
16. Adebami OJ. Appraisal of maternal knowledge of neonatal jaundice in Ilesa, Southwestern Nigeria: implications for the persistence of acute bilirubin encephalopathy in developing countries. Basic Res J Med Clin Sci 2015; 4:156‑63.
17. Shrestha S, Maharjan S, Shrestha S, *et al*. Knowledge about neonataljaundice among Nepalese mothers. *Jnl. BP Koirala Inst. Health Sci*.2019;2:34‑42.
18. Kasemy ZA, Bahbah WA, El Hefnawy SM, *et al*. Prevalence of and mothersknowledge, attitude and practice towards glucose-6-phosphate dehydrogenase deficiency among neonates withjaundice: a cross-sectionalstudy. *BMJ Open* 2020;10:e34079.
19. Hussein H, Aziz AR, *et al*. Assessment of Mothers ' Knowledge andBeliefs toward Care of Neonatal Jaundice in Pediatric TeachingHospital in Holy Karbala City. *Indian J Public Health* 2018;9:295.doi:10.5958/0976-5506.2018.00736.2
20. Huang Y, Chen L,Wang X, *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:e057981. doi:10.1136/bmjopen-2021-057981
21. Ogunfowora OB, Daniel OJ. Neonatal jaundice and its management: Knowledge, attitude and practice of community health workers in Nigeria. BMC Public Health 2006;6:19. http://dx.doi.org/10.1186/1471-2458-6-19
22. Kubb C, Foran HM. Online health information seeking by parents for their children: systematic review and agenda for further research. *JMed Internet Res* 2020;22:e19985.
23. Sorensen K, Van den Broucke S, Fullam J, *et al*. Health literacy and public health: a systematic review and integration of definitions and models. *BMC Public Health* 2012;12:80.
24. AalanHadi Al-Zamili, Zainab Allawi Saadoon. Knowledge, Attitude and Practice of Mothers to Neonatal Jaundice. *Medico-Legal Update* 2020;*20*,1065‑70.
25. Adebami OJ. Appraisal of maternal knowledge of neonatal jaundice in Ilesa, Southwestern Nigeria: implications for the persistence of acute bilirubin encephalopathy in developing countries. Basic Res J Med Clin Sci 2015;4:156‑63.

26. 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;53:267-72
27. Badran IG. Knowledge, attitude and practice the three pillars of excellence and wisdom: a place in the medical profession. *EastMediterr Health J* 1995;1:8‑16.