

Analysis of Mothers' Knowledge, Beliefs and Practice towards Neonatal Jaundice in Bingham University Teaching Hospital Jos, Plateau State, Nigeria

M. Shehu^{1*}, H. Shehu² and T. O. Ubanyi³

¹Department of Paediatrics, College of Medicine and Health Sciences, Bingham University, Teaching Hospital, Jos, Nigeria.

²Department of Surgery, College of Medicine and Health Sciences, Bingham University, Teaching Hospital, Jos, Nigeria.

³Department of Community Medicine and Primary Health Care, College of Medicine and Health Sciences, Bingham University, Jos, Nigeria.

Authors' contributions

This work was carried out in collaboration among all authors. Author MS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors HS and TOU managed the analyses of the study. Author TOU managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJPR/2020/v4i230144

Editor(s):

(1) Dr. Ejeliogu, Emeka Uba, University of Jos, Jos University Teaching Hospital, Nigeria.

Reviewers:

(1) Antarmayee Panigrahi, Institute of Dental Sciences, Soa (Deemed to be University), India.

(2) Nawa Raj Subba, Purbanchal University, Nepal.

(3) Nancy Varghese, Kerala University of Health Science, India.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/59322>

Original Research Article

Received 20 May 2020
Accepted 26 July 2020
Published 05 August 2020

ABSTRACT

Neonatal jaundice is defined as the yellowish discoloration of the skin and sclera due to accumulation of unconjugated bilirubin. This is common in newborns and if not detected and treated early can lead to severe morbidity and mortality.

Aim: The aim of the study was to analyze the knowledge, attitude and practices of mothers in Bingham University Teaching Hospital on Neonatal Jaundice.

Method: This was a descriptive cross-sectional study which was carried out among mothers coming for ante and post-natal clinics in Bingham University Teaching Hospital from March to June

*Corresponding author: Email: maryamshehu1405@gmail.com;

2019, using consecutive sampling of mothers that came for ante and post-natal services that consented to the study. The knowledge, attitude and practice of Neonatal Jaundice (NNJ) was assessed using a pretested questionnaire which was analyzed using SPSS version 22.

Results: The results showed that 80% of mothers >40 years are able to define jaundice correctly compared to the 30% in mothers <26 years. Thirty-seven percent of mothers did not know any single cause of NNJ. Knowledge on NNJ was significantly associated with occupation, education and parity with fisher's exact test of 0.045, 0.034 and 0.026 respectively. Only 16% of the mothers knew that phototherapy is the major form of treatment for NNJ, most will expose their babies to sunlight. Some traditional beliefs about the cause of NNJ includes bad blood, bad breastmilk, change in weather and evil eye.

Conclusion: There is need for more health education talks, campaigns and enlightenment of mothers on NNJ.

Keywords: Attitude; knowledge; practice; neonatal jaundice; mothers; Jos.

1. INTRODUCTION

Neonatal jaundice usually described as the yellowish discoloration of the skin and sclera due to accumulation of unconjugated bilirubin is very common. In most infants, this can be termed as physiological having little or no effect on health outcomes. However, neonatal jaundice could sometimes require hospital visits and possible readmission after discharge usually in the first week of life [1,2]. High levels of bilirubin pose great dangers to the infants as unconjugated bilirubin is neurotoxic and could have debilitating consequences overtime [2]. Every year, about 1.1 million infants would develop severe hyperbilirubinemia with majority of affected infants living in Sub-Saharan Africa and South Asia. Higher rates of EBT (Exchange blood transfusion) has also been reported among doctors working in low- and middle-income countries (LMICs). This oftentimes reflects late presentation at these settings [3,4] and would influence disease outcome later. Infants are usually brought in as emergencies even at this time in Nigeria [4]. Evidence suggest that early diagnosis and prompt treatment will reduce the morbidity and mortality associated with neonatal jaundice [5]. The role a mother plays in the care of the child is unquantifiable. The mother is usually the first to recognize a deviation from the normal in her child. Her ability to recognize jaundice could pave way for early treatment of neonatal jaundice. Attention is focused on mothers compared to fathers as studies have shown that mothers directly influence childcare practices more than fathers. This makes mothers responsible for the early detection of neonatal jaundice after discharge and a key stakeholder in health [4,6-10]. Factors such as culture, socio-economic status, and educational status are significant in the decision a mother takes to seek

care for her child [7]. All these factors would directly influence mothers' knowledge, attitude and practice towards neonatal jaundice. Looking at a study done in Iran on Knowledge, Attitude and behaviour on Jaundice, mothers' knowledge of neonatal jaundice was limited [8]. This result agreed with another study done in India which also recorded low levels of knowledge among mothers regarding neonatal jaundice [11]. Coming back to Nigeria, a study carried out in Ogun State by Olusoga et al on-mother's perception of jaundice reported only 23 (12.2%) participants had some knowledge in that they were able to mention one known cause of the condition. [12] On the other hand, 58 (30.7%) participants had erroneous belief concerning the cause of NNJ while the majority, 108 (57.1%) did not know any cause of NNJ. A study in Lagos Nigeria by Ezeaka et al also revealed that >75% of the participants were unable to correctly identify the causes of neonatal jaundice despite the fact that blood group incompatibility, prematurity, infections and glucose-6-phosphate dehydrogenase deficiency have been reported by several authors in Nigeria as common aetiological factors. [13] Some respondents attributed the cause of jaundice to yellow fever in the newborn. This goes to show that more work still needs to be done in educating mothers on the cause of jaundice especially regarding addressing cultural norms in the care of the newborn. Another important factor that cannot be overlooked is maternal education. There is strong evidence showing direct relationships between maternal level of education and health outcomes as education empowers women to commit to improving health status, [14,15] it could be said that mothers who are educated tend to have better knowledge on neonatal jaundice than mothers who had no formal education. A study carried out by Ebube et al

revealed respondents' knowledge of NNJ increased with increasing level of education [16]. Knowledge gap is significantly wider in mothers from the lower socioeconomic group, who have poorer educational status, this reiterates the point for improvement in female education. Poor socio-economic factors, low level of education and poverty all have a negative influence on health [17]. In developed countries, emphasis is being placed on prenatal screening and monitoring backed up with an efficient referral system. This place a large percentage of the burden of early recognition and prompt treatment on the health system rather than the mother [18,19]. For this reason, the high-income countries have experienced a marked reduction in cases of severe NNJ due to early diagnosis and prompt treatment [20]. Mothers bear the brunt of the responsibility in recognizing neonatal jaundice in Nigeria. The study seeks to explore the knowledge, attitude and practices of mothers to neonatal jaundice.

2. MATERIALS AND METHODS

2.1 Study Design

This was a cross-sectional study carried out among mothers who attended antenatal and postnatal clinics in Bingham University Teaching Hospital (BHUTH) Jos, Plateau State, Nigeria from March 2019 to June 2019. Bingham University Teaching Hospital is a 250-bedded teaching hospital that offers medical, surgical, maternal and child health services to the different tribes, religious and socio-economic population within and outside Plateau state. The hospital is a referral center for primary and secondary health care centers. Sample size was calculated using the formula $Z^2 \times p \times (1-p)/d^2$.

2.2 Sampling Method

Data were collected consecutively from women that attended the antenatal and post-natal clinics.

2.3 Exclusion Criteria

Women who did not consent to the study and women who were staff of the clinic.

2.4 Inclusion Criteria

Women who consented to the study and were attending antenatal or postnatal clinic.

2.5 Data Collection

The antenatal clinics were held on Mondays and Thursdays, while postnatal clinics were held on

Wednesday. The questionnaire which was self-administered was used which included statements dealing with information on demography, knowledge, attitude and practice of participants with regards to NNJ.

The questionnaire was intended to acquire from the respondents' data on age, marital status, parity, occupation, educational level, awareness of and capacity to recognize jaundice, information on causes, danger signs, complications, treatment, and immediate step to take when they notice jaundice.

2.6 Data Analysis

One hundred and forty questionnaires were analyzed. The data collected were analyzed using SPSS version 22. Frequency tables and bar charts were used to describe the data. Chi-square statistical test and Fisher's exact test were used to show if there were association between the socio-demographic characteristics of the respondents and their knowledge and attitude towards NNJ. The level of significance was set at $P < 0.05$ and confidence level at 95%.

3. RESULTS

The number of respondents who participated in the study was 140. Most of them were within the age range of 31 - 35 years with 52 (37%), while the least age was those greater than 40 years with only 5 (3.6%). Of the 140 participants 102 (72%) were married, 52 (37.1) had a university education and 40(28.6%) were multipara.

The correct definition of NNJ was gotten by 80% of the mothers aged greater than 40 years which was better than mothers within the aged range of 20-25 years with 30% and worse in mothers 15-20 years with none of them getting the correct definition. Mothers that are civil servants, married and educated with a post graduate degree had higher percentages of those that got the definition correctly.

Blood group incompatibility was believed to be the highest cause of NNJ by the respondents with 24 (21.2%), closely followed by infections with 23 (20.3%). About 37% of the mothers did not know a single cause of NNJ.

Fever was the most prominent danger sign in NNJ that could be elicited by mothers between

the age range of 36-40 years with 75%. Although, there was no significant association between knowing the danger signs and age, with Fisher's exact test of 0.514. However, there was significant association between danger signs and education, occupation and parity, with Fischer's exact score of 0.045, 0.034 and 0.026 respectively. High pitch cry was not recognized as a danger sign by almost all the mothers.

In answering the question on how NNJ should be treated, 20 (16.8%) of the participants said they had no knowledge, 54 (45.4%) incorrectly chose exposure to sunlight, while 20 (16.8%) correctly identified the use of phototherapy, and 5(4.2%) chose exchange blood transfusion (EBT) as modalities of treatment. Herbal medication was chosen as a modality of treatment by only 1 (0.8%) of the mothers.

Table 1. Demographic distribution of the study

Variable	Frequency	Percentage
Age group (years)		
15-20	7	5.0
21-25	13	9.3
26-30	30	21.4
31-35	52	37.1
36-40	17	12.1
>40	5	3.6
No response	16	11.4
Total	140	100.0
Religion		
Christian	103	73.6
Muslim	14	10.0
No response	23	16.4
Total	140	100.0
Marital Status		
Single	2	1.4
Married	102	72.9
Divorced	4	2.9
Widowed	1	.7
No response	31	22.1
Total	140	100.0
Occupation		
Housewife	8	5.7
Business	13	9.3
Civil servant	8	5.7
Teacher	5	3.6
Others	6	4.3
No response	100	71.4
Total	140	100.0
Education		
Primary	2	1.4
Secondary	27	19.3
Cert/Diploma	38	27.1
University	52	37.1
Postgraduate	13	9.3
No response	8	5.7
Total	140	100.0
Parity		
Prim gravida	23	16.4
Multigravida	40	28.6
Grand multipara	4	2.9
No response	73	52.1
Total	140	100.0

Table 2. Knowledge of neonatal jaundice

Variable	What is Neonatal Jaundice		
	Correct	Wrong	Total
Age group			
15-20	0(0.0)	7(100.0)	7(100.0)
21-25	4(30.8)	9(69.2)	13(100.0)
26-30	18(60.0)	12(40.0)	30(100.0)
31-35	20(38.5)	32(61.5)	52(100.0)
36-40	7(41.2)	10(58.8)	17(100.0)
>40	4(80.0)	1(20.0)	5(100.0)
Total	53(42.7)	71(57.3)	124(100.0)
Religion			
Christian	41(39.8)	62(60.2)	103(100.0)
Muslim	6(42.9)	8(57.1)	14(100.0)
Total	47(40.2)	70(59.8)	117(100.0)
Occupation			
Housewife	3(37.5)	5(62.5)	8(100.0)
Business	3(23.1)	10(76.9)	13(100.0)
Civil Servant	5(62.5)	3(37.5)	8(100.0)
Teacher	3(60.0)	2(40.0)	5(100.0)
Others	4(66.7)	2(33.3)	6(100.0)
Total	18(45.0)	22(55.0)	40(100.0)
Marital Status			
Single	0(0.0)	2(100.0)	2(100.0)
Married	43(42.2)	59(57.8)	102(100.0)
Divorced	1(25.0)	3(75.0)	4(100.0)
Widowed	0(0.0)	1(100.0)	1(100.0)
Total	44(40.4)	65(59.6)	109(100.0)
Education			
Primary	0(0.0)	2(100.0)	2(100.0)
Secondary	7(25.9)	20(74.1)	27(100.0)
Cert/Diploma	16(42.1)	22(57.9)	38(100.0)
University	27(51.9)	25(48.1)	52(100.0)
Postgraduate	7(53.8)	6(46.2)	13(100.0)
Total	57(43.2)	75(56.8)	132(100.0)
Parity			
Prim gravida	10(43.5)	13(56.5)	23(100.0)
Multigravida	23(57.5)	17(42.5)	40(100.0)
Grand multipara	0(0.0)	4(100.0)	4(100.0)
Total	33(49.3)	34(50.7)	67(100.0)

Table 3. Causes of NNJ

Causes of NNJ	Frequency	Percentage (%)
Blood Incompatibility	24	21.2
Infectious disease	23	20.3
Hematological/Hereditary disease	11	9.7
Use of naphthalene ball (camphor)	4	3.5
Some medications given in labour	3	2.7
G6PD-deficiency	3	2.7
Prematurity	2	1.8
Breast milk jaundice	1	0.9
I don't know	42	37.2
Total	113	100

Table 4.1. Danger signs against demographic characteristics

Variable	What are the danger signs							df	Fisher's Exact	
	Fever	High pitch cry	Weakness	Upward rolling of the eyes	Refusal to pee	Convulsion	Arching of the back			Total
Age group									LR	
15-20	2(50.0)	**	0(0.0)	1(25.0)	1(25.0)	0(0.0)	0(0.0)	4(100.0)	25	0.514
21-25	3(27.3)	**	0(0.0)	1(9.1)	2(18.2)	1(9.1)	4(36.4)	11(100.0)		
26-30	11(40.7)	**	3(11.1)	5(18.5)	0(0.0)	1(3.7)	7(25.9)	27(100.0)		
31-35	23(46.0)	**	5(10.0)	8(16.0)	4(8.0)	2(4.0)	8(16.0)	50(100.0)		
36-40	12(75.0)	**	1(6.3)	2(12.5)	0(0.0)	0(0.0)	1(6.3)	16(100.0)		
>40	1(20.0)	**	0(0.0)	2(40.0)	1(20.0)	0(0.0)	1(20.0)	5(100.0)		
Total	52(46.0)	**	9(8.0)	19(16.8)	8(7.1)	4(3.5)	21(18.6)	113(100.0)		
Religion										Fisher's
Christian	44(47.8)	0(0.0)	6(6.5)	15(16.3)	8(8.7)	1(1.1)	18(19.6)	92(100.0)	6	0.086
Muslim	5(41.7)	1(8.3)	2(16.7)	1(8.3)	0(0.0)	1(8.3)	2(16.7)	12(100.0)		
Total	49(47.1)	1(1.2)	8(7.7)	16(15.4)	8(7.7)	2(1.9)	20(19.2)	104(100.0)		
Marital Status										LR
Single	0(0.0)	**	0(0.0)	0(0.0)	1(50.0)	0(0.0)	1(50.0)	2(100.0)	15	0.589
Married	47(51.6)	**	6(6.6)	16(17.6)	6(6.6)	3(3.3)	13(14.3)	91(100.0)		
Divorced	2(50.00)	**	0(0.0)	1(25.0)	1(25.0)	0(0.0)	0(0.0)	4(100.0)		
Widowed	0(0.0)	**	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(100.0)	1(100.0)		
Total	49(50.0)	**	49(50.0)	6(6.1)	17(17.3)	8(8.2)	15(15.3)	98(100.0)		

LR = Likelihood-Ratio

Table 4.2. Danger signs against demographic characteristics contd

Variable	What are the danger signs							Total	df	Fisher's Exact
	Fever	High pitch cry	Weakness	Upward rolling of the eyes	Refusal to pee	Convulsion	Arching of the back			
Occupation										Fisher's
Housewife	2(25.0)	1(12.5)	2(25.0)	1(12.5)	1(12.5)	0(0.0)	1(12.5)	8(100.0)	24	0.045
Business	6(50.0)	0(0.0)	0(0.0)	1(8.3)	0(0.0)	1(8.3)	4(33.3)	12(100.0)		
Civil/servant	5(71.4)	0(0.0)	0(0.0)	1(14.3)	0(0.0)	0(0.0)	1(14.3)	7(100.0)		
Teacher	0(0.0)	0(0.0)	0(0.0)	3(75.0)	0(0.0)	0(0.0)	1(25.0)	4(100.0)		
Others	0(0.0)	0(0.0)	1(20.0)	1(20.0)	2(40.0)	0(0.0)	1(20.0)	5(100.0)		
Total	13(36.1)	1(2.8)	3(8.3)	7(19.4)	3(8.4)	1(2.8)	8(22.2)	36(100.0)		
Education										LR
Primary	1(50.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(50.0)	0(0.0)	2(100.0)	24	0.034
Secondary	7(36.8)	1(5.3)	0(0.0)	1(5.3)	6(31.6)	0(0.0)	4(21.1)	19(100.0)		
Cert/Dip.	16(44.4)	0(0.0)	2(5.6)	6(16.7)	4(11.1)	1(2.8)	7(19.4)	36(100.0)		
University	23(46.9)	0(0.0)	6(12.2)	10(20.4)	0(0.0)	3(6.1)	7(14.3)	49(100.0)		
Postgrad	8(61.5)	0(0.0)	1(7.7)	2(15.4)	0(0.0)	0(0.0)	2(15.4)	13(100.0)		
Total	55(46.2)	1(0.8)	9(7.6)	19(16.0)	10(8.4)	5(4.2)	20(16.8)	119(100.0)		
Parity										LR
Prim gravida	4(17.4)	1(4.3)	4(17.4)	4(17.4)	2(8.7)	2(8.7)	6(26.1)	23(100.0)	12	0.026
Multigravida	21(55.3)	0(0.0)	4(10.5)	7(18.4)	2(5.3)	0(0.0)	4(10.5)	38(100.0)		
Grand multipara	0(0.0)	0(0.0)	0(0.0)	1(25.0)	2(50.0)	0(0.0)	1(25.0)	4(100.0)		
Total	25(38.5)	1(1.5)	8(12.3)	12(18.5)	6(9.2)	2(3.1)	11(16.9)	65(100.0)		

What is your source of information?

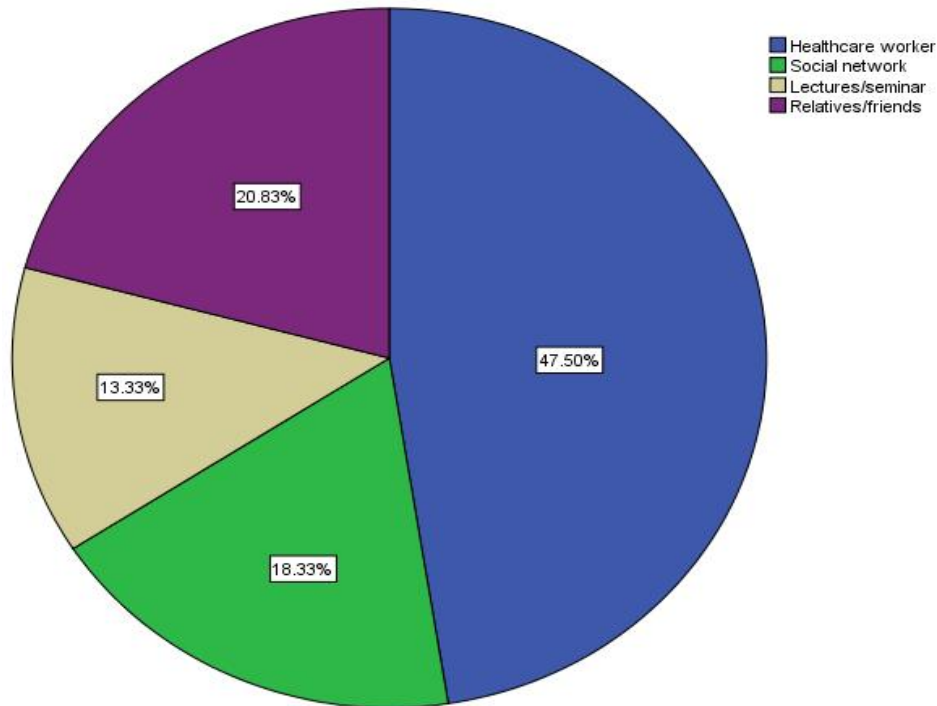


Fig. 1. Bar chart on source of information

Table 5. Treatment of NNJ

Treatment of NNJ	Frequency	Percentage
Expose to sunlight	54	45.4
Phototherapy	20	16.8
Antibiotics	10	8.4
Glucose water	9	7.6
Exchange blood transfusion	5	4.2
Herbal medication	1	0.8
I don't know	20	16.8
Total	119	100

Delayed developmental milestone was the commonest known complication with 41 (24.7%), closely followed by death with 34 (20.4%). The least mentioned complication was seizure disorder with 8 (4.8%).

The traditional belief to the cause of jaundice that the mothers had ranged from bad blood with 50.5%, bad breast milk with 20.8% and evil eye with 5.4%.

Table 6. Distribution of complication of NNJ

Complication	Frequency	Percentage
Blindness/deafness	30	18.07
Delayed Developmental Milestone	41	24.70
Death	34	20.48
Cerebral palsy	18	10.84
Seizure disorder	8	4.82
I don't know	35	21.09
Total	166	100.0

The attitude of mothers towards the treatment of NNJ was not too good as 48% of the mothers said they will bring the babies to the hospital, only 1.7% will use traditional medication. However, about 29% will use sunlight.

4. DISCUSSION

The demographic characteristics of this study showed that the age range of the mothers were more in the reproductive age group, with less than 5% being above 40 years. This is expected because the study was done among mothers

Table 7. Distribution of common traditional beliefs of NNJ

Common traditional belief	Frequency	Percentage
Bad breast milk	19	20.88
Bad blood	46	50.55
Evil eye	5	5.49
Eating yellow colored food	8	8.79
Change in weather	13	14.29
Total	91	100.0

Table 8. What will you do If you see a child with NNJ

What I will do when I see a child with jaundice	Frequency	Percentage
Expose to sunlight	49	29.17
Treat with drugs	11	6.55
Give herbal medication	3	1.79
Refer to the hospital	81	48.21
Do Nothing	8	4.76
Give glucose water	16	9.52
Total	168	100.0

coming for pre-natal and post-natal care in the hospital. This is similar to what was obtained in Benin with a greater percentage of the mothers falling within the age range of 26-35 years and less than 1% being in the range of 46-55 years [16].

Despite the high morbidity and mortality associated with hyperbilirubinaemia, it is disheartening to see that a lot of young mothers could not describe the condition. However, a lot of the older women could define the condition. A plausible explanation could be because they have been exposed to babies with such conditions during the early years of their reproductive age. The result corroborates study done by Ezeaka et al where about two-third of the mothers could not correctly define jaundice [13].

The major source of information from this study was from health workers, while the least source was from lectures and seminars. This is expected as these are mothers that are either in the hospital for ante-natal or post-natal services, where they are exposed to a lot of health workers and are being given health talks. This is in contrast with results obtained by Alfouwais et al where the major source of information was from relatives/friends [21].

The result obtained from this study showed that many of the mothers believed that the common cause of NNJ includes blood group incompatibility and sepsis. This could be attributed to the fact that many of the mothers

have a university education. This contrasts with what was obtained by Rabiyeepoor et al in Iran [22], where greater than 70% of them did not know that blood incompatibility is a cause of NNJ. The reason for this could be because only about 8% of the mothers had university education compared to more than one-third in our study.

The commonest danger sign noticed in our study was fever with about two-third of the mothers mentioning it. The next common danger sign known was back arching. The knowledge on danger signs was significantly associated with education, occupation and parity. This collaborates studies done by Aggarwal et al, Alfouwais et al and Moawad et al, where knowledge was found to be related to education, occupation and parity. [11,21,23] This calls for improved female education and mass health enlightenment programmes on newborn jaundice. In contrast, the study done by Yuen Ng et al in Malaysia showed that knowledge of NNJ has no relationship with parity and other socioeconomic variables [6]. A plausible reason for this could be because of the difference in methodology, country and year of study.

There are two main effective treatment modalities for hyperbilirubinaemia, these are phototherapy and EBT. In this study only 16% and 4% of the mothers knew these forms of treatment respectively. Most of the mothers believed that exposure to sunlight is a form of treatment. This is worrisome seeing that the major source of information in this study was

from healthcare workers. Yuen Ng et al said that studies have shown that some health workers are responsible for this wrong information [6]. The use of sunlight as a form of treatment for babies with jaundice is common in Africa [7,10,13,16,18].

Neonatal jaundice is a cause of severe morbidity and mortality, [2,5,12,16,18] the knowledge of this could help in preventing the delay in the presentation of babies with NNJ, to reduce the morbidity and mortality. The complication of delayed developmental milestone was known by about one-fourth of the mothers, closely followed by death and blindness/deafness. This is similar to what was obtained by Ezeaka et al, with about one-fourth of the mothers knowing about brain damage, mental retardation and delayed developmental milestones as complication. [13] About one-fifth of the mothers do not know any complication of NNJ. This is comparable to the 33% gotten by Egube et al. [16]

The practice of the mothers concerning NNJ is not too good as only about half of the mothers will take or refer the babies to the hospital. One third will expose the babies to sunlight, while about 6% will treat the babies with some medication. The fact that most of the mothers believed that exposure to sunlight is a form of treatments explains why up to one-third will immediately expose their babies to sunlight when they develop jaundice. The result obtained was less than the more than two third that will seek medical advice from the study of Moawad et al and egube et al. [16,23]

5. CONCLUSION

The mothers attending ante-natal and post-natal clinics in BHUTH have some degree of knowledge on NNJ. However, they have some negative beliefs and practices toward babies with NNJ. Therefore, thorough health education talks on NNJ should be instituted at antenatal and postnatal clinics. There is the need to increased knowledge about the effective treatment of NNJ and consequences of severe hyperbilirubinaemia by well-trained health care workers who will need to attend refresher courses from time to time.

6. RECOMMENDATION

There should be Public Health intervention in the hospital throughs health education, campaigns, ANC counselling on NNJ. The healthcare workers should focus more on young mothers, businesswomen, housewives,

single/divorced/widowed women and those with below secondary school level of education.

CONSENT

Informed consent was obtained verbally from the mothers and confidentiality maintained.

ETHICAL APPROVAL

Ethical clearance was obtained from the research and ethical committee of the Bingham University Teaching Hospital (BHUTH) Jos, Plateau State.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. 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.* 2004;74(1): 86-100.
2. Mitra S, Rennie J. Neonatal jaundice: aetiology, diagnosis and treatment. *Br J Hosp Med.* 2017;78(12):699-704.
3. Ogunlesi TA, Ogunfowora OB. Predictors of acute bilirubin encephalopathy among Nigerian term babies with moderate-to-severe hyperbilirubinaemia. *J Trop Pediatr* 2011;57:80-6.
4. American Academy of Pediatrics (AAP). Management of hyperbilirubinaemia in the newborn infant 35 or more weeks of gestation. *Pediatrics* 2004;114:297-316. PMID: 15231951
5. Slusher TM, Zamora TG, Appiah D, Stanke JU, Strand M, et al. Global burden of severe neonatal hyperbilirubinemia: a systematic review and meta-analysis. *JAMA Pediatrics.* 2014;10:1001-2898
6. Su Yuen Ng, Sze Yee Chong. What Do Mothers know about Neonatal Jaundice? Knowledge, Attitude and Practice of Mothers in Malaysia. *Med J Malaysia.* 2014;69(6):252-6.
7. Ogunfowora OB, Adefuye PO, Fetuga MB. What do expectant mothers know about neonatal jaundice?. *Int Electron J Health Educ.* 2006;9:134-40.
8. Nasrin Khalesi, Fatemeh Rakhshani. Knowledge attitude and behaviour of

- mothers on neonatal jaundice. Journal of Pakistan Medical Association. 2008; 58(12).
9. Thomas D. Intra-household resource allocation: and inferential approach. Journal of Human Resources, Fall, 2008; 25:635-664
 10. Ogunlesi TA, Olanrewaju DM. Socio-demographic factors and appropriate health care-seeking behavior for childhood illnesses. J. Trop Pediatr 2010;56:379-85.
 11. Bindu Aggarwal, Archana Agrawal, Piyush Chaudhary, Girish Gupta, Sudhir Rana, Sourabh Gupta. Neonatal Jaundice: Knowledge, attitude beliefs, and practices of postnatal mothers in a tertiary care hospital in Uttarakhand, India. Indian J Child Health 2017;4(4).
 12. Dixon KT. Newborn jaundice and kernicterus. Greater awareness and action needed. Adv Nurse Pract 2004;12(12):43-6.
 13. Ezeaka VC, Ekure EN, Fajolu IB, Ezenwa BN, Akintan PE. Mothers' perception of neonatal jaundice in Lagos, Nigeria: An urgent need for greater awareness South African Journal of Child Health. 2016;10(4):227-230.
 14. Chen E, Martin AD, Matthews KA. Socioeconomic status and health: Do gradients differ within childhood and adolescence?. Soc Sci Med. 2006;62(9): 2161-70.
 15. Gage TB, Fang F, O'Neill E, Dirienzo G. Maternal education, birth weight, and infant mortality in the United States. Demography. 2013;50(2):615-35.
 16. Egube BA, Ofili AN, Isara AR, Onakewhor JU. Neonatal jaundice and its management: Knowledge, attitude, and practice among expectant mothers attending antenatal clinic at University of Benin Teaching Hospital, Benin City, Nigeria. 2013;16(2):188-194.
 17. Office of the Surgeon General (US), Center for Mental Health Services (US), National Institute of Mental Health (US); Aug 2001
 18. Olusanya BO, Ogunlesi TA, Slusher TM. Why is kernicterus still a major cause of death and disability in low-income and middle-income countries? Arch Dis Child. 2014;99(12):1117-1121.
 19. United Nations Children's Fund (UNICEF). The State of the World's Children. A Fair Chance for Every Child. New York, NY: United Nations Children's Fund (UNICEF); 2016
 20. Bhutani VK: Editorial: building evidence to manage newborn jaundice worldwide. Indian J Pediatr. 2012;79:253-255.
 21. Alfouwais NM, Seada LS, Alahmadi RY, Alassiri AA, Alenazi AA, Aljuaeed MS. Assessment of Knowledge, Attitude and Practice of Saudi Parents towards Neonatal Jaundice (NNJ): A Cross-sectional Study. Egyptian J Hosp Med 2018;70:1686-1694.
 22. Rabiyeepoor S, Gheibi S, Jafari S. To Study the Knowledge and Attitude of Postnatal Mothers on Neonatal Jaundice in Motahari Hospital, Iran. Clin Med Res 2014;1-5.
 23. Moawad EMI, Abdallah EAA, Ali YZA. Perceptions, practices, and traditional beliefs related to neonatal jaundice among Egyptian mothers A cross-sectional descriptive study. Medicine 2016;95:36-43.

© 2020 Shehu et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/59322>