

Original Article

Neonatal Jaundice: Knowledge, Attitude and Practices of Mothers in Mosan-Okunola Community, Lagos, Nigeria

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ABSTRACT

Background: A community-based survey was conducted amongst mothers aged 15–49 years living in Mosan-Okunola, Lagos, Nigeria to determine the knowledge of, attitudes to, preventive and treatment practices towards neonatal jaundice (NNJ).

Materials and Methods: The mothers were selected using a multi-stage sampling technique. A pre-tested interviewer-administered structured questionnaire was used to obtain data. The knowledge of the mothers was scored and scores lower than 50% were graded as poor, 50–74% as fair and $\geq 75\%$ as good. The practice was also categorised as appropriate if one correct option was identified and was categorised as inappropriate where an incorrect option(s) was identified singly or in combination with a correct option.

Results: Three hundred and fifty-eight mothers were recruited. The mean age was 34.8 ± 9.05 years. Two hundred and seventy (75.4%) mothers had ever heard about the condition. Two hundred and forty-seven (91.4%) mothers correctly identified the condition and infection was the only most common known cause (47%). Only 34% of the mothers knew that NNJ could cause brain damage, and 40% identified refusal of feeds as a danger sign. Up to 64% of the mothers believed attending antenatal care could prevent the condition, and 58% were of the opinion that exposing babies to sunlight could prevent the condition. Sixty-eight percent (68.9%) of the mothers had a poor level of knowledge. Age and educational qualification did not show any statistically significant relationship with knowledge about NNJ ($P < 0.05$) but increasing maternal age had a significant association with an appropriate treatment practice ($P < 0.05$), the association was negative ($r = -0.32$).

Conclusion: Knowledge about NNJ was low in this community and ineffective preventive practices were utilised. Efforts should be made to increase it, and health workers should play a leading role.

KEY WORDS: *Kernicterus, knowledge, mothers, neonatal jaundice*

INTRODUCTION

Neonatal jaundice (NNJ) is the yellowing of the sclera and skin of the newborn, due to elevated bilirubin in the blood. Bilirubin is formed from haem and neonates produce bilirubin at more than twice the production rate in adults, primarily because of relative polycythaemia and increased red blood cell turnover.^[1] Twenty-four million (18% of 134 million live births ≥ 32 weeks of gestational age from 184 countries) neonates were found to be at risk for neonatal hyperbilirubinemia related adverse outcomes.^[2] In Pakistan, the incidence of NNJ was 39.7/1000 live births.^[3]

It is a common cause of paediatric emergency in Nigeria.^[4-6] NNJ usually occurs in the first 1 week of life by which time the mothers are likely to have left the hospital, as many mothers are discharged from the hospital 24–48 h post-partum. This may be part of the reasons for the late presentation of children with NNJ to hospitals in Nigeria.^[4-6] The effects of jaundice are often irreversible and include lethargy, poor

feeding, high pitched cry, hypertonia, seizures, high-frequency hearing loss, cerebral palsy and mental retardation evident at 3 years of age.^[7] Predisposing factors include fetomaternal ABO/rhesus incompatibility, prematurity, infections, exposure of glucose-6-phosphate dehydrogenase deficient babies to icterogenic substances such as naphthalene balls or menthol, polycythaemia, previous history of jaundice in sibling and some drugs.

In Iran, a study amongst post-partum mothers showed inadequate knowledge about causes, complications, symptoms and prevention of NNJ. Only 37% of the mothers correctly identified jaundice as appearing on the eyes, the skin, palms

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and soles of the feet. The knowledge of the mothers was found to have a significant association with the history of NNJ ($P = 0.033$), mother's age ($P < 0.001$) and child's birth rank ($P = 0.001$).^[8] Knowledge of treatment of NNJ in the country was reported as good, up to 48% of study participants indicated that both blood transfusion and phototherapy could be used in the treatment, and 38% had indicated the use of only phototherapy.^[8] A second study from Iran reported that 77% of mothers with infants who had NNJ had a moderate-to-high level of knowledge. Thirty-three percent of these mothers consulted a physician within 24 h of onset of jaundice while 14% waited and used traditional medicines before seeking medical advice.^[9]

In Nigeria, studies on NNJ have also been conducted amongst women attending antenatal clinics and immunisation clinic in Benin, Port Harcourt and Sagamu.^[10-12] The Benin study reported a high awareness and recognition of symptoms in the pregnant women attending antenatal clinics, but there was poor knowledge of causes and danger signs,^[10] which is similar to the findings from Port Harcourt^[11] and Sagamu.^[12] The study in Benin, Nigeria reported that 40% of women indicated phototherapy as a form of treatment, and 26% knew about exchange blood transfusion.^[10]

The attitudes of respondents to NNJ were generally good as many of the respondents in previous studies reported that they would bring their babies to the hospital if jaundice occurred.^[8,10,12] Treatment practices of the condition were divergent as a number of harmful practices such as cutting post-auricular area of an infant, burning of the body, the use of herbal treatment, exposure of infants to the sunshine and giving glucose water to infants.^[8-13] Studies in Nigeria reported a common practice of mothers administering antibiotics and multivitamins to babies with the condition.^[12,13]

Misconceptions about causes of NNJ were common to all these studies and included drinking of cold water by the pregnant woman, eating of groundnuts, eating of yellow coloured foods.^[8-13] These show gaps in knowledge that needed to be addressed. Considering the common occurrence of NNJ and the high morbidity, it poses if not recognised early enough to be properly managed, it is important to determine the knowledge, attitude and practices of mothers when this condition presents in order to put in place interventions that can enhance early presentation at hospitals and prevention of its sequelae. Therefore, the purpose of this study was to determine the knowledge and preventive practices of mothers in Mosan-Okunola, a community in Lagos, Nigeria towards NNJ.

SUBJECTS AND METHODS

The study was a descriptive cross-sectional study. Mosan-Okunola is 1 of 37 Local Council Development Areas (LCDAs) in Lagos State, created out of Alimosho Local Government Area (LGA). The community has a mix of public and private health facilities. Mosan-Okunola LCDA has 10 clusters used by the health authorities for health programmes such as national immunisation days, and insecticide-treated net distribution. The study group was women of the reproductive

group (15–49 years) and post-menopausal women. Female members of the household who were not mothers were excluded. Duration of study was 8 months (October 2014–May 2015).

SAMPLE SIZE DETERMINATION AND SELECTION OF PARTICIPANTS

The calculated minimum sample size for this study was determined using Fisher's formula for sample size estimation for descriptive studies. The statistical assumptions were a type 1 error rate of 5%, 70% knowledge of the condition^[13] and a precision of $\pm 5\%$ points. The calculated minimum sample size was 323 women. A multi-stage sampling technique was used for the study. In the first stage, four clusters were selected from the 10 clusters by balloting and 12 streets were also selected by balloting from each of the selected clusters. The streets in the area formed the sampling frame for the study. In the second stage, houses were then selected by systematic random sampling using a sampling interval of seven. In the third stage, the household to be interviewed in each house was selected by balloting, and only one eligible woman was interviewed in each household if they were more than one.

SURVEY INSTRUMENT, DATA COLLECTION AND ANALYSIS

Data were collected using a structured pre-tested interviewer-administered questionnaire. The instrument was developed after a careful review of literature on the subject. The instrument inquired if the mothers had ever heard of NNJ, the sources of information, knowledge of causes, complications, danger signs and actions they would take if their child developed NNJ, what they did to prevent jaundice and how the condition could be treated. The questionnaire was pre-tested in a different community, Ipodo, Ikeja LGA. Data were collected by six research assistants (medical officers and junior registrars) who were trained.

Data analysis was done using SPSS version 20 (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, version 20.0. Amonk, NY: IBM Corp). The respondents' answers were graded, and 19 questions were utilised in creating a knowledge score with each correct answer being scored one mark. Knowledge was graded as good $\geq 75\%$ (≥ 15 marks), fair 50–74% (10–14 marks) and poor 50% (≤ 9 marks). Treatment practices were categorised as appropriate where only one correct practice was identified, but categorised as inappropriate where an incorrect treatment practice was singly identified or in combination with a correct practice. Chi-square test was used to test the association between sociodemographic characteristics, knowledge score and treatment practices and a Spearman's correlation coefficient was used to determine the direction of the association. The level of significance was at $P < 0.05$.

ETHICAL CONSIDERATIONS

Ethical approval was obtained from the Health Research and Ethics Committee of the Lagos State University Teaching Hospital (LASUTH). The LCDA Health Department was also informed about the study. The purpose of research was explained to each respondent and written informed consent was obtained.

RESULTS

Three hundred and fifty-eight women were recruited into the study. The mean age was 34.8 ± 9.05 years. Almost half of respondents (46.6%) were in the 25–34 years age group. The majority (74.3%) of respondents had two or more children. More than half of respondents (64.5%) had a minimum of secondary school education [Table 1]. Only 270 (75.4%) respondents had heard about NNJ. One hundred and fifteen (42.6%) mothers claimed to have received most of the information from health workers, 51 (18.9%) received the information from family members, 30 (11.1%) from neighbours and 8 (3%) from friends (32.9%), while 43 (15.9%) identified television, 18 (6.7%) identified radio and 5 (1.9%) indicated posters as their sources of information.

Ninety-one percent of the 270 women (91.5%) correctly identified jaundice as yellowish discolouration of the eyes and skin. Less than half of respondents (47%) and 11% correctly identified infection and blood compatibility, respectively as causes of NNJ, while 25.9% of the respondents could not identify any cause of jaundice. Other causes of jaundice include cold water, eating of groundnuts, eating of palm oil and other foods mothers took during pregnancy or while breastfeeding were identified by 56.3% of the respondents. One hundred and ninety-nine (73.7%) mothers identified infancy as the period of life during which effect of NNJ is most pronounced. The most correctly identified effects of NNJ were brain damage (33.7%) and death (31.5%). Refusal of feeds (40%) and fever (29.6%) were the most frequently identified danger signs of NNJ [Table 2].

More than half (56.3%) of respondents reported that if their neonate developed jaundice, their initial likely action would be to watch for a few days before taking the child to the hospital. Thirty-seven (13.7%) reported that they would treat with herbs. Two hundred and forty-four (90.4%) respondents would be willing to take their baby to the hospital [Table 3]. The majority of respondents (64.1%) indicated regular attendance at antenatal care clinics as a means of preventing NNJ in their babies. Twenty-one percent (21.1%) of the respondents did

not consciously do anything to prevent NNJ. Only two (0.7%) respondents reported the practice of avoiding the use of naphthalene balls as a means of preventing NNJ. Over 50% of respondents will put the baby in the sun as treatment of NNJ while 35.6% will take the child to a hospital [Table 4]. One hundred and eighty-six (68.9%) respondents had poor knowledge of NNJ. There was no statistically significant association ($P > 0.05$) between knowledge score and maternal age or level of education [Table 5]. Maternal age had a positive but non-significant correlation with knowledge score ($r = 0.077$, $P = 0.211$). Maternal level of education also had a positively significant correlation with knowledge score ($r = 0.183$, $P = 0.003$). There was a statistically significant association ($P < 0.05$) between maternal age and appropriate treatment practices [Table 6] but the direction of the association was negative ($r = -0.32$, $P = 0.605$).

Table 2: Respondent's knowledge about NNJ

Knowledge area	Frequency (n=270)	Percentage
Definition of NNJ		
Yellowness of the eyes	247	91.5
Redness of the eyes	8	2.9
Infection of the skin	5	1.9
Others**	10	3.7
Causes of NNJ*		
Infection	127	47.0
Don't know	70	25.9
Blood incompatibility	30	11.1
Naphthalene balls	12	4.4
Prematurity	3	1.1
Others***	152	56.3
Part of the body where jaundice is first noticed in the neonate		
Eyes	235	87.0
Don't know	15	5.6
All over the body	13	4.8
Face	7	2.6
Danger signs of NNJ*		
Refusal of feeds	108	40.0
Don't know	81	30.0
Fever	80	29.6
No sign	16	5.9
High-pitched cry	11	4.1
Convulsion	5	1.9
Effects of NNJ*		
Brain damage	91	33.7
Death	85	31.5
Delayed development	56	20.7
No effect	54	20.0
Deafness	30	11.1
Convulsion	21	7.8
Physical handicap	8	3.0
Don't know	50	18.5

*Multiple responses, **Others include: Weight loss, discharge from the eyes, small baby, passing deep yellow urine, ***Others include drugs used by the mother, cold water, eating palm oil/groundnuts/other foods. NNJ: Neonatal jaundice

Table 1: Sociodemographic and family (parity) characteristics of respondents

Variable	Frequency (n=358)	Percentage
Age (years)		
15-24	36	10.1
25-34	167	46.7
35-44	89	24.9
>45	66	18.4
Parity		
0	13	3.6
1-4	290	81.0
>4	55	15.4
Level of education		
None	23	6.4
Primary	70	19.6
Secondary	138	38.5
Tertiary	127	35.5

Table 3: Respondents' attitudes to NNJ

Variable	Frequency (n=270)	Percentage
Initial likely action if baby develops jaundice		
Watch for a few days and then take to hospital	152	56.3
Worry	49	18.1
Give herbs	37	13.7
Do not know	28	10.3
Take no action	4	1.5
Willingness to take baby to hospital		
Yes	244	90.4
No	8	3.0
Don't know	18	6.6

NNJ: Neonatal jaundice

Table 4: Preventive and treatment practices of respondents

Variable	Frequency (n=270)	Percentage
NNJ prevention practices**		
Attendance at ANC	173	64.1
Others*	72	26.7
No conscious practice	57	21.1
Not drinking cold water	31	11.5
Prompt treatment of infections	30	11.1
Not eating groundnuts	17	6.3
Avoiding use of naphthalene balls	2	0.7
NNJ treatment practices**		
Put baby in the sun	156	57.8
Hospital treatment	96	35.6
None	74	27.4
Give herbs	24	8.9
Give sugar water/drugs	21	7.8

*Others include: Taking unripe paw-paw, taking herbs, use of multivitamins/drugs, avoiding the sun, preventing malaria in pregnancy, eating beans/protein, eating fruits, **Multiple responses. NNJ: Neonatal jaundice, ANC: Antenatal care clinics

There was no statistically significant association between the level of maternal education and an appropriate treatment practice ($P > 0.05$) although the association was positive and significant ($r = 0.13$, $P = 0.03$). Knowledge score did not have a statistically significant association with the appropriateness of treatment ($P > 0.44$) even though the correlation was positive but not significant ($r = 0.10$, $P = 0.09$).

DISCUSSION

One strength of this study is that it is community-based, unlike others which are hospital based.^[8-14] This may add to providing a more complete understanding of knowledge of mothers about NNJ to health care workers and guide in planning appropriate interventions rather than amongst mothers with children who have suffered from the condition. The awareness of NNJ in this study was high (75.4%); it is lower than rates reported from other studies in Nigeria partly because these studies were hospital based.^[11-13] The majority (91.5%) of

Table 5: Association between respondents' sociodemographic characteristics and knowledge score

Variable	Knowledge grade (%)			Total	Statistical test <i>t</i>
	Poor	Fair	Good		
Age					$P=0.48^*$, df=6
15-24	13 (92.9)	1 (7.1)	0 (0.0)	14 (100)	
25-34	83 (68.6)	33 (27.3)	5 (4.1)	121 (100)	
35-44	51 (67.1)	19 (25.0)	6 (7.9)	76 (100)	
>45	39 (66.1)	15 (25.4)	5 (8.5)	59 (100)	
Total	186 (68.9)	68 (25.2)	16 (5.9)	270 (100)	
Education					$P=0.23^*$, df=6
None	10 (76.9)	2 (15.4)	1 (7.7)	13 (100)	
Primary	34 (75.6)	10 (22.2)	1 (2.2)	45 (100)	
Secondary	68 (75.6)	18 (20.0)	4 (4.4)	90 (100)	
Tertiary	74 (60.7)	38 (31.1)	10 (8.2)	122 (100)	
Total	186 (68.9)	68 (25.2)	16 (5.9)	270 (100)	

*Fisher's exact tests

Table 6: Association between sociodemographic characteristic, knowledge score and treatment practices

Variable	Treatment practices Frequency (%)		χ^2	df	<i>P</i>
	Appropriate	Inappropriate			
Age			12.72	3	0.005
15-24	3 (17.6)	14 (82.4)			
25-34	35 (28.9)	86 (71.1)			
35-44	6 (8)	69 (92.0)			
>45	11 (19.0)	47 (81.0)			
Mother's education			2.88	3	0.411
No formal	1 (7.7)	12 (92.3)			
Primary	5 (11.1)	40 (88.9)			
Secondary	16 (17.8)	74 (82.2)			
Tertiary	33 (27.0)	89 (73.0)			
Knowledge score			0.509*	2	0.44*
Poor	36 (19.4)	150 (80.6)			
Fair	17 (25.0)	51 (75.0)			
Good	2 (12.5)	14 (87.5)			

*Fishers exact

respondents knew that NNJ was yellowness of the eyes and 87% of the mothers correctly indicated the eyes as the part of the body where jaundice is first noticed is similar to findings in other studies in Iran,^[8,9] and Port Harcourt, Nigeria.^[12] The commonest source of information from this study is the health worker (42.6%), while others (friends, family members and neighbours) ranked second as a source of information. This finding is comparable to previous studies in Nigeria^[11,12] where the health worker was the most commonly identified source of information. The mass media as a source of information ranked low in this study as with other studies.^[10-12]

Despite the high level of awareness amongst mothers, knowledge was low on many aspects of the condition; whether it was on common causes, recognition of danger signs or complications. The knowledge of the causes of NNJ was low as 25.9% of the respondents did not know of any

cause, and 56.3% had reported wrong causes such as eating of groundnut or palm oil, drinking of cold water showing a lot of misconceptions. The only fairly well-known cause of NNJ in this study was infections (47% of mothers) while knowledge of other common causes was remarkably low. This finding is similar to other findings in Iran,^[8,9] Benin,^[10] Port Harcourt,^[11] and Sagamu,^[12] but higher than the 8% obtained from respondents in a multi-centre study (Lagos, Port Harcourt and Abuja) in Nigeria.^[14] Almost 40% of respondents in this study (38.5%) did not know the effect or had indicated that NNJ had no effect on the child in keeping with findings in Benin,^[10] and Sagamu^[12,13] and may be indicative of likely poor actions by these mothers.

Knowledge of danger signs was fair in this study as 35.9% of respondents had indicated there was either no danger sign or they did not know any. The low level of knowledge of danger signs contrasts with a study from Malaysia where up to 70% of mothers knew that jaundice could cause death and brain damage.^[15] The inability of the mothers in this study to recognise danger signs quickly may be contributory to a late presentation at health facilities and the high rates of kernicterus seen in Nigeria.^[4,16]

Respondents' attitudes to NNJ in this study were generally good as the majority (90.4%) of respondents had willingness to take baby to the hospital if their babies developed NNJ. The initial likely actions of the mothers were, however, suggestive of a potential delay in seeking help at hospitals as 56% of the respondents had reported they would watch for some days before taking to the hospital. This was corroborated by the findings in Sagamu^[13] where it was observed that mothers with both good and poor knowledge had delayed at least 48 h before seeking care at the hospital.

Majority of the mothers in this study (64%) attended antenatal care as a means of preventing NNJ and up to 45% of the mothers consciously avoided certain things (such as cold water, groundnuts and palm oil) which could not prevent NNJ. The mothers were involved in a variety of practices to prevent NNJ and are likely to have utilised both useful practices (such as attendance of antenatal, prompt treatment of infections and avoidance of naphthalene balls on baby's clothing) and some ineffective practices such as avoiding palm oil and groundnuts. In terms of preventive practice, it is not surprising that <1% of mothers would avoid the use of naphthalene balls (which is widely used) as only 11% could recognise it as a predisposing factor. The use of ineffective practices in this study has been reported in other places.^[9,17]

The practices of the respondents regarding the treatment of NNJ in this study varied. The commonest practice, however, was putting the baby in the sun which was done by 58% of the respondents in keeping with a study from Turkey.^[18] A multi-centre study in Nigeria also reports more than half (56%) of respondents indicated using potentially harmful methyl substances in treating NNJ or for some other purposes.^[14]

Up to 70% of our respondents had poor knowledge of the subject. This is in keeping with studies on the subject in Nigeria^[10-13] but is rather surprising with the high

proportion (36%) of respondents in this study who had tertiary education. Though other studies have found that maternal education was significantly associated with knowledge on NNJ,^[9,15] our study did not find such an association. This may be due to a generally low level of health literacy even amongst mothers with a high level of education. It may also be that information obtained on the subject is not sufficient to produce an adequate level of knowledge. Therefore, concerted action is necessary if the high rates of complications from NNJ seen in Nigeria are to be reduced.^[4,16] Maternal age was found to have an inverse relationship with the use of appropriate treatment practice. This is not unexpected as younger mothers are more likely to have many sources of information than older women and would more readily bring their children to health facilities than older women. The study being cross-sectional in nature was unable to establish any relationship between knowledge of the subject and the actions they would take if they were faced with a child suffering from NNJ. It also suffers from courtesy and recall biases, but efforts were made to minimise these by assuring respondents of the confidentiality of the information obtained.

CONCLUSION

This study shows that although there was a high awareness of NNJ amongst mothers in this community, knowledge on several aspects of the condition was poor. The mothers had good attitudes towards the condition but utilised ineffective preventive and treatment practices. We recommend that NNJ be given more prominent attention in antenatal care clinics; health workers should provide more detailed information and utilise every contact with women of reproductive age to provide information on the subject. The mass media should be encouraged to disseminate more information on the condition.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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