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ORIGINAL ARTICLE

KNOWLEDGE OF NEONATAL JAUNDICE AND ASSOCIATED FACTORS AMONG MOTHERS ATTENDING IMMUNIZATION CLINICS IN SELECTED LGAS OF NIGER STATE, NORTH-CENTRAL, NIGERIA

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Abstract

Background:

Neonatal jaundice (NNJ) remains a leading cause of admission in low-resource settings, with many presenting with late complications. Addressing the burden of neonatal jaundice in Nigeria will require adequate knowledge by the mother for prompt health-seeking interventions. Herein, we assess the knowledge of NNJ and associated factors among mothers in Niger State, North-Central Nigeria.

Methods

A cross-sectional descriptive study of mothers attending vaccination centres using a multi-staged random sampling method was carried out in three local government areas in Niger state. A pre-tested questionnaire was used to assess the mothers' knowledge and other relevant socio-demographics.

Results

A total of 417 mothers participated in this study, with a mean age of 22 ± 6 years. Most mothers were aged 20 to 35 years (350; 83.9%). Two hundred and twenty-three (53.5%) mothers have heard of neonatal jaundice. Among the mothers, only a few could recognize the symptoms (61; 14.6%), complications (60; 14.4%), and aetiology (16; 3.8%) of NNJ. Three hundred and seventy-five (89.9%) mothers had poor knowledge of NNJ. Factors that were associated with poor knowledge of NNJ included having four children or fewer with an adjusted odds ratio (AOR) of 3.5, 95% CI 1.618 to 7.573, no formal education (AOR

5.846, 95% CI 1.478, 23.118), and secondary level of education (AOR 3.707, 95% CI 1.111 to 12.369).

Conclusion

This study shows poor knowledge of NNJ among mothers in Niger State and calls for urgent intervention to raise awareness and health education among mothers.

Keywords: Neonates, Jaundice, knowledge, factors, mothers

Introduction

Neonatal jaundice (NNJ) is a common clinical condition and remains a significant cause of neonatal morbidity and mortality in sub-Saharan Africa[1]. In Nigeria, it ranks among the five common causes of neonatal mortality[2, 3]. Neonatal jaundice constitutes a significant cause of neonatal morbidity with delayed intervention is often associated with elevated serum bilirubin beyond tolerable levels in newborns. The consequences of this are features of severe NNJ, such as excessive crying, refusal to feed, and convulsions[4]. This may ultimately lead to death or sequelae such as speech, hearing, and movement abnormalities among the survivors[3, 5].

Early presentation is key to mitigate complications of NNJ. In Nigeria, challenges such as mothers' and caregivers' lack of awareness, socio-cultural issues, and poor health structure may affect mothers' attitude to seeking care. The mothers' and caregivers' knowledge and practices are among the important factors contributing to early presentation in NNJ. With good mothers' and caregivers' knowledge of the dangers associated with NNJ, there will likely be better health-seeking interventions and ultimately improved outcomes[6]. A report from a tertiary health institution in North-central Nigeria indicated that though NNJ ranks second among the morbidities admitted in their neonatal unit, however, it does not rank among the common causes of mortality in the centre[7]. This buttresses importance of hospital presentation. To the best of the author's knowledge, there has been no report on neonatal jaundice from the locality of this study, however, there had been reports indicating prevalence of wrong practices among parents for mitigating conditions like jaundice[8]. We, therefore, hypothesized that there is low knowledge of NNJ and associated factors among mothers in Niger State, north-central Nigeria. Hence, we aimed to assess the knowledge of neonatal jaundice and associated factors among mothers in Niger State, north-central Nigeria. This study will assist in understanding factors that hinder early presentation and the mother's possible approach to intervention when their baby has NNJ.

Subjects and Methods

Study location

Niger State is located in the North-Central zone of Nigeria and it has 25 local government areas (LGAs), the main tribes are Nupe, Hausa, and Gbagi[9]. The people in the state are mainly farmers, civil servants, traders, artisans, and organized private sectors. Mothers attending vaccination clinics were recruited for the study. This population was selected because of their experience in caring for newborns.

Study design

This cross-sectional descriptive study was carried out from June to August 2018 in Niger State.

Sample size estimation

The minimum sample size of 417 mothers was calculated using the Leslie and Zich formula for a cross-sectional survey[10] ("n = (z2pq)/d2") at a power of 95% and a 5% level of precision. Prevalence obtained from a similar study was used[6]. The sample size following attrition of 10% for possibility of non-response was 417.

Sampling Technique

A multi-stage sampling technique was adopted in this study as follows:

Stage I: We used a simple random technique (balloting) to select three of the 25 local government areas. The three selected LGAs are Mokwa, Kutigi and Edatti. All 3 LGAs belong to the Zone A senatorial district. All 3 selected LGAs had a total of 25 vaccination centres. The study locations were inside primary health centres or cluster locations designated in the community for the purpose of implementing vaccination programs.

Stage II: We selected three vaccination centres for each LGA. The list of primary healthcare centres / cluster locations selected for each LGA was through balloting. This amounted to nine vaccination centres selected in total. The total number of infants vaccinated at these nine immunization centres was an average of 1,025 per month. This was obtained from the mean over six months.

Stage III: The total sample size was divided equally among the three selected LGAs (139 subjects from each LGA). For each LGA, this was shared proportionately among the three vaccination centres selected for each LGA. Final participants were recruited consecutively from attendees at the vaccination centres based on the proportion accruable to them.

Inclusion and exclusion criteria

Only biological mothers were included. Caregivers who are not biological mothers and those who declined consent were excluded.

Data collections

A pre-tested questionnaire was used to obtain the relevant information for this study. It was a purpose-designed, interviewer-administered, semi-structured questionnaire. It was adapted from previous studies, thereby achieving some face-to-face validation[6]. The questionnaire (table 1) comprised of socio-demographics (section 1) and an assessment of the mother's knowledge of jaundice and what to do if a child has jaundice (section 2). The mothers' knowledge of NNJ was scored as 1 for rightly answered questions and 0 for wrongly answered questions. The total score for each respondent was a summation of all the scores obtained on questions assessing knowledge of jaundice among the respondents. The maximum score obtainable was 5. Mothers with a score of 3 or above were considered to have good knowledge. Those with summative scores less than three were considered to have poor knowledge. The categorization was informed by a review of the literature on the subject[6]. The questions scoring total knowledge showed internal consistency and reliability with a Cronbach's alpha value of 0.705. The researchers and

trained research assistants (pediatric residents from the Federal Medical Centre, Bida) administered the questionnaire.

Table I: Questions used to assess participant's knowledge of NNJ

Questions	*Options*
What colour is jaundice like in the eye	a) *White (b) Blue (c) Yellow (d) Red*
What are the causes of neonatal jaundice	a) *Breastfeeding (b) Drugs (c) Caesarean section (d) Infections*
How do you care for your newborn umbilicus	*(a)I don't know (b) Clean with methylated spirit (c) Apply engine oil on it (d) Hot fomentation*
What will you do if your child has neonatal jaundice	(a) *I will take them to the hospital (b) I will place the baby in the sun (c) I will give glucose water (d) I will give the local concoction*
What can jaundice do to your child?	a) *It causes fever (b) It affects growth (c) It affects the brain (d) It causes nothing.*

Cronbach's Alpha value: 0.705

Data analysis:

Data were entered and analyzed using IBM® SPSS version 21.0 (IBM Corporation, Virginia, U.S.A., 2012)[11]. Continuous variables (age) were expressed as mean and standard deviation (SD), and categorical variables (sex, occupation, parity, and educational levels) as numbers and percentages. Based on the classification of mothers' knowledge into those with good and poor knowledge, binary logistic regression and subsequently multivariable analysis of factors that were associated with poor knowledge of NNJ were carried out. Results obtained were expressed as an adjusted odds ratio (AOR) with 95% confidence intervals and p-values less than 0.05 were considered significant.

Ethical approval and consideration

Ethical approval was obtained from the Niger State Ethics and Research Committee with reference number "MOH/STA/95/I/V4". Each mother-infant pair was approached and given information about the study before seeking consent. Written consent was obtained from each mother. Anonymity was ensured by using a numbering system in place of the names of respondents, and absolute confidentiality was maintained while handling the data.

Results

Socio-demographic characteristics of respondents

A total of 417 mothers participated in the study, with a mean age of 22 ± 6 years. Most mothers were aged 20 to 35 years (350; 83.9%). About half of the mothers had secondary school education 233 (53.5%). Also, of all the mothers, 38.9% (162) were full-time housewives. Further details are shown in Table II.

Table II: Socio-demography of participants

Variable	Freq n=417	Percent (%)

Age in years		
18 - < 20	25	6
20 – 35	350	83.9
>35	42	10.1
No of children		
≤4	324	77.7
>4	93	22.3
Place of last delivery		
Home	81	19.4
TBA	14	3.4
Hospital	322	77.2
Mother's education		
No formal education	107	25.7
Primary	125	30.0
Secondary	154	36.9
Tertiary	31	7.4
Mother's occupation		
Professional	30	7.2
Teacher	33	7.9
Farmers	90	21.6
Petty trader	96	23.0
Housewife*	162	38.9
Student	6	1.4

*Full-time housewife

Awareness and knowledge of NNJ among mothers

Two hundred and twenty-three (53.5%) mothers have heard of jaundice. Only a few mothers could recognize the symptoms (61; 14.6%) and complications (60; 14.4%) of NNJ. Based on their knowledge of the causes of NNJ, only 16 (3.8%) of the mothers could recognize at least cause of NNJ. Further details are shown in Table III.

Table III: Awareness and Knowledge of neonatal jaundice among the Mothers

Variable	Freq	Percent
Have you heard of jaundice before now	223	53.5
Can you recognize it	181	43.4
Symptoms of jaundice		
Recognize 1 symptom	61	14.6
Recognize more than 1 symptom	9	2.2
I don't know	347	83.2
Complications of jaundice		
Recognize 1 complication	60	14.4
Recognize more than 1 complication	4	1.0
I don't know	353	84.7
Identification of the cause of jaundice		
Recognize 1 cause	16	3.8
Recognize more than 1 cause of jaundice	1	0.2
I don't know	400	95.9
Treatment for NNJ**		
The baby should be taken to a hospital	42	18.8
Baby should be given any medication	37	16.5
Baby should be given some local herbs	26	11.6
Baby should be placed under the sun	44	19.6
Baby should be given glucose water	61	27.2
Baby should not receive any intervention	14	6.3

**234 mothers

Knowledge of neonatal jaundice among the mothers

Of the 417 mothers, 42 (10.1%) showed good knowledge of NNJ, and the remaining had poor knowledge of NNJ (375; 89.9%), as shown in Figure 1.

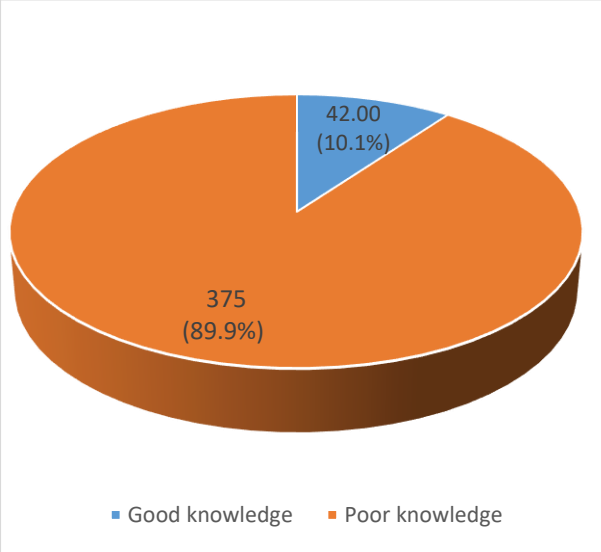

Figure 1: Knowledge of neonatal jaundice among the mothers.

Factors that are associated with knowledge of NNJ among the mothers

Factors that were associated with poor knowledge of NNJ included having four children and below with an odds ratio (OR) of 3.5, 95% CI 1.618 to 7.573, and lower levels of maternal education with no formal education (OR 5.846, 95% CI 1.478, 23.118), and secondary level odds ratio (OR) 3.707, 95% CI 1.111 to 12.369 (Table IV).

Table IV: Univariate analysis of factors associated with poor knowledge of NNJ

Variable	*Categories*	*OR*	*95% CI*	*P*
Age in years	18 - < 20			
	20 – 35	*1.171*	*0.241, 5.683*	*0.845*
	>35	*2.074*	*0.306, 14.066*	*0.455*
No of children	> 4			
	≤ 4	*3.5*	*1.618, 7.573*	***0.001***
Mother's education	No formal education	*5.846*	*1.478, 23.118*	***0.012***
	Primary	*2.292*	*0.726, 7.238*	*0.158*
	Secondary	*3.707*	*1.111, 12.360*	***0.033***
	Tertiary			
Mother's occupation	Professional			
	Teacher	*1.990*	*0.442, 8.971*	*0.370*
	Farmers	*1.211*	*0.316, 4.648*	*0.780*
	Petty trader	*1.731*	*0.427, 7.013*	*0.442*
	Housewife*	*1.471*	*0.435, 4.974*	*0.534*
	Student	*0.348*	*0.043, 2.834*	*0.324*
Place of delivery	Location			
	Home	*1*		
	Traditional birth Attendants	*1.625*	*0.190, 13.933*	*0.628*
	Hospital	*1.133*	*0.618, 2.479*	*0.912*

After adjusting for confounders on multivariate analysis, having four children and below with an odds ratio (OR) of 2.421, 95% CI 1.237 to 4.740 and no formal education in mothers with odds ratio (OR) of 4.167, 95% CI 1.335 to 13.008 were significant factors (Table V)

Table V: Multivariate analysis of factors associated with poor knowledge of NNJ

Variable	*Categories*	*OR*	*95% CI*	*P*
Age in years	18 - < 20	*1*		
	20 – 35	*0.758*	*0.172, 3.350*	*1.000*
	>35	*0.826*	*0.140, 4.872*	*0.682*
No of children	> 4	*1*		
	≤ 4	*2.421*	*1.237, 4.740*	***0.006***
Mother's education	No formal education	*4.167*	*1.335, 13.008*	***0.032***
	Primary	*1.987*	*0.737, 5.358*	*0.395*
	Secondary	*3.451*	*1.235, 9.645*	*0.078*
	Tertiary	*1*		
Mother's occupation	Professional	*1*		
	Teacher	*1.450*	*0.351, 5.995*	*0.740*
	Farmers	*1.600*	*0.500, 5.123*	*0.960*
	Petty trader	*2.543*	*0.743, 8.703*	*0.792*
	Housewife *	*2.114*	*0.700, 6.387*	*0.855*
	Student	*0.400*	*0.057, 2.812*	*0.630*

Discussion

Neonatal mortality rates have not changed much in Nigeria despite global health intervention programs such as the Millennium Development Goals and the Sustainable Development Goals[12]. This may be attributed to the specific focus of these programs on common causes of infant and under-5 mortality, such as pneumonia, measles, diarrhoea, acquired immune deficiency syndrome, and malaria[13]. Understanding factors that promote morbidity and mortality in neonates, such as in NNJ, therefore needs urgent attention towards developing public health interventions to address them.

This study assessed knowledge of NNJ and associated factors among mothers who brought their infants for vaccination. We observed poor knowledge of NNJ among the mothers. Similarly, studies from Northern and South-Western Nigeria reported poor knowledge among mothers of reproductive age respectively[14, 15]. Our finding of poor knowledge of NNJ may be because our study was conducted in a predominantly rural part of Niger State with a low literacy level. Contrary to our findings, however, a report from Kano, Northern Nigeria indicated more of their population having good knowledge of NNJ (46% v 30%)[16]. Our finding is a source of concern as a high rate of poor knowledge of NNJ may translate to late presentation in the hospital and subsequent avoidable complications with late interventions and, ultimately, poor outcomes[17].

Being unaware of NNJ and not being able to recognize it were common among our respondents. Contrary findings were reported by Onyearugha et al[17] and Goodman et al[18] in their studies. Onyearugba et al.'s study was hospital-based and may not represent what happens in the community, as reflected in our study. Likewise, Goodman's study was conducted in cosmopolitan Lagos, where the

literacy rate is higher than in our study settings. In addition, our study population is mainly rural and disadvantaged in regards to health facilities, public enlightenment, and opportunities. All this might have contributed to the mothers' poor recognition of the symptoms and complications of NNJ. Farouk et al[19] also reported paucity of knowledge on cause of NNJ in rural households. These findings also called for improved communication of common neonatal problems targeting rural women, especially during antenatal care[20].

We also observed that among the mothers, the most commonly suggested intervention for NNJ is administering glucose water. A previous study also reported local harmful interventions in NNJ, such as instilling breastmilk in the eyes, scarifications, and applying ointments in the eyes[21]. This observation is also a reflection of poor knowledge, which will contribute to a delayed presentation at the health facilities.

One factor associated with poor knowledge of NNJ was having four or fewer children. This finding is similar to the report by Ezeaka et al[22] and Adebami et al[23]. This may not be unconnected with the lack of experience with fewer children compared with grand multiparous women. Iliyasu et al[16] also reported having a child with jaundice in the past as a predictor of good knowledge. This study showed an association between poor knowledge and no formal educational attainment. A similar finding was reported by Chime et al[3] and Iliyasu et al[16] from Delta and Kano States respectively, This may be attributed to a better understanding of health information by mothers with formal education. Adedokun et al[24] reported education attainment as a key factor regarding healthcare utilization. An educated mother is usually keen on finding relevant information regarding caring for her newborn and using the information. Likewise, education will promote information sourcing and communication, enhancing the opportunity to learn and relearn appropriately. This, therefore, calls for improved policies on girl-child education.

This study was carried out in predominantly rural communities. There is a dearth of health facilities in these localities and they are mostly serviced by primary health centres. Primary health centres (PHCs) in such communities are usually managed by community health care workers who are sometimes ignorant of appropriate intervention for neonatal jaundice[25], therefore, they may lack knowledge on appropriate intervention for NNJ. Previous reports however, have suggested ante-natal care and delivery in health facilities as reasons for good knowledge[26]. The present situation may imply poor staffing of our health facilities or decline in standard of our education.

Limitations

Our study has the drawback of being a cross-sectional observational study which limits the strength for generalization of the findings. Likewise, the cause and effect of our findings are difficult to ascertain.

Conclusion

This study shows very poor knowledge of NNJ among mothers attending immunization clinics. Factors associated with poor knowledge of NNJ included mothers with

four children or less and those with lower levels of educational attainment.

Recommendations

These findings call for urgent health education on NNJ for mothers in Niger State. A public health approach to intervention is most appropriate for increasing mothers' knowledge on the subject, which will mitigate delays in presenting and subsequent appropriate intervention. This comprehensive intervention will focus on massive health education on jaundice at cluster areas, such as immunization and antenatal visit venues and community gatherings. Health education on other causes of neonatal death could also be disseminated at such centres.

Competing interest

The authors declare that they have no competing interests.

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