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## Neonatal Jaundice: awareness, perception and preventive practices in expectant mothers

Kokou H. Amegan-Aho<sup>1</sup>, Catherine I. Segbefia<sup>2</sup>, Naa Djama O Glover<sup>3</sup>, Gloria A Ansa<sup>4</sup> and Taiba J Afaa<sup>5</sup>

*Ghana Med J* 2019; 53(4): 267-272 doi: <http://dx.doi.org/10.4314/gmj.v53i4.3>

<sup>1</sup>Department of Child Health, Korle Bu Teaching Hospital, Accra, Ghana, Department of Paediatrics and Child Health, University of Health and Allied Sciences, Ho, Ghana

<sup>2</sup>Department of Child Health, School of Medicine and Dentistry, College of Health Sciences, University of Ghana, Legon, Accra, Ghana

<sup>3</sup>Department of Child Health, Korle Bu Teaching Hospital, Accra, Ghana

<sup>4</sup>Department of Public Health, University of Ghana Hospital, Legon, Accra, Ghana

<sup>5</sup>Department of Child Health, School of Medicine and Dentistry, College of Health Sciences, University of Ghana, Legon, Accra, Ghana

**Corresponding author:** Taiba J Afaa

**E-mail:** [taibaafaa@yahoo.com](mailto:taibaafaa@yahoo.com)

**Conflict of interest:** None declared

### SUMMARY

**Background:** Neonatal jaundice (NNJ) is a preventable cause of neonatal morbidity and mortality. Improving mothers' knowledge will help with early recognition of NNJ, prompt and appropriate intervention. This study highlights the knowledge, attitude and practice regarding neonatal jaundice among expectant mothers attending the antenatal clinics of Korle-Bu Teaching Hospital and Mamprobi Polyclinic in Accra.

**Methods:** This was a cross-sectional study involving 175 expectant mothers. Interviewer based questionnaire was used to obtain data on knowledge, attitude and practice concerning NNJ. The study was conducted between 1<sup>st</sup> and 17<sup>th</sup> November 2013 at two antenatal clinics in Accra.

**Results:** Out of the 175 respondents, 135 (77.1%) had heard about NNJ but only 37 (27.4%) of them heard it from the hospital. Among those who had heard about NNJ, 98 (72.6%) knew at least one symptom of NNJ; 125 (92.6%) did not know the causes of jaundice or had the wrong information and there was no significant association with their level of education ( $\chi^2=6.757$ ,  $p=0.15$ ). Only 7(5.2%) knew one or more correct forms of treatment of NNJ; 67(49.6%) knew one or more danger signs and 86(63.5%) knew one or more complications.

**Conclusion:** Majority of expectant mothers attending antenatal clinics at a Teaching Hospital and a Polyclinic in Accra, Ghana are aware of NNJ but have poor knowledge about the causes, danger signs and treatment of NNJ, irrespective of their level of education or their parity.

**Keywords:** Jaundice, new born, mothers, knowledge, Accra

**Funding:** None declared

### INTRODUCTION

Jaundice, which is yellowish discolouration of the sclera and the skin, is common in term and preterm neonates. Severe unconjugated hyperbilirubinemia, if not managed urgently, is associated with acute and chronic bilirubin encephalopathy or kernicterus and even death.<sup>1</sup> Neonatal jaundice (NNJ) is a preventable cause of neonatal morbidity and mortality.<sup>2</sup> The common causes of significant unconjugated hyperbilirubinemia in the first week of life includes sepsis, glucose-6-phosphate dehydrogenase deficiency, blood group incompatibility and cephalhematoma.<sup>3</sup> Kernicterus is now virtually non-existent in developed countries. The United States has seen a marked

decrease in the incidence of kernicterus since the publication of the American Academy of Paediatrics guidelines on the detection and management of hyperbilirubinemia in 1994.<sup>4,5</sup> In the United Kingdom and Ireland, the rate of kernicterus was only 0.9 cases/100,000 live births between 2003 and 2005.<sup>6</sup> In developing countries, kernicterus is still a public health concern.<sup>7,8,9</sup> In Sub-Saharan Africa, severe NNJ is associated with increased prevalence of neurological impairment<sup>10,11</sup> and excess mortality.<sup>3</sup>

In Ghana, unpublished morbidity and mortality data from the Emergency Unit of the Department of Child Health of KBTH (excluding the Neonatal Intensive Care Unit) showed that in the year 2012, 348 (30.2%) out of the 1154 neonatal admissions at the emergency room were due to NNJ. The mean age at presentation was 5 days [range 3 – 7 days].

Out of these 348 neonates, 27 (7.8%) exhibited sign of bilirubin encephalopathy at presentation and 28 (8.0%) died. This phenomenon is due to the late presentation to the health facility. The common causes of neonatal mortality in Ghana as in other developing countries are prematurity and neonatal sepsis,<sup>12</sup> which are in themselves important risk factors for severe NNJ.<sup>13</sup>

Jaundice in babies born in a health facility is more likely to be recognized early either on the ward or at postnatal visits whilst babies who are born at home are more likely to present late to the hospital and suffer the consequences of the condition.<sup>14,15</sup> On the other hand, babies with severe NNJ who present later are more likely to develop kernicterus and also to receive exchange transfusion.<sup>3</sup> In both developed and developing nations, poor maternal knowledge on NNJ could lead to increased incidence of severe cases<sup>16,17</sup> even though these mothers had passed through antenatal care.

To reduce morbidity and mortality due to severe NNJ, women of childbearing age and pregnant women should be educated on early recognition of NNJ, prompt and appropriate intervention. Thus improving the mothers' knowledge about the subject is therefore crucial. The aim of the study was to determine the knowledge, attitude and practice regarding neonatal jaundice among expectant mothers attending two antenatal clinics in Accra.

## METHODS

This was a cross-sectional descriptive study conducted from 1<sup>st</sup> to 17<sup>th</sup> November 2013, at the antenatal clinics of Korle-Bu Teaching Hospital (KBTH) and Mamprobi Polyclinic, both in Accra, Ghana's capital city. KBTH is the largest hospital in Ghana and the main tertiary referral centre for the southern sector of the country.

The Mamprobi polyclinic is a primary health care facility located 1.1km distance from KBTH. All neonates seen at the polyclinic with complications such as jaundice are referred directly to the Department of Child Health of KBTH. Average monthly antenatal attendance at KBTH and Mamprobi polyclinic are 2095 and 3009 respectively.

The number of participants was 175 expectant mothers, recruited proportionally from both study centers considering the average monthly attendance. Consecutive participants, regardless of the gestational age of their pregnancy, attending routine antenatal clinic and who gave their informed consent, were interviewed using an investigator-administered questionnaire.

For participants who did not speak English, locally translated questionnaires in Twi and Ga were available as approved by the ethics committee. These were translated and back translated prior to the beginning of the study to minimize loss of meaning in translation.

The questionnaire comprised 30 questions divided into five sections: Section I (8 open-ended questions on maternal characteristics and past obstetric history); Section II (6 questions on the family's socio-economic status); Section III (8 questions on participant's knowledge on neonatal jaundice); Section IV (2 questions on the participant's attitude towards neonatal jaundice) and Section V (6 questions on maternal practice regarding neonatal jaundice, in case she had an offspring with neonatal jaundice).

## Data analysis

Data entries and analysis were done using SPSS version 23. The level of significance was set at  $p < 0.05$ . Descriptive and chi-square tests were performed.

## Ethical considerations

Ethical clearance was obtained from the Ethical and Protocol Review Committee of the University of Ghana Medical School (MS-Et/M.1 – P 3.6/2013 - 2014). Permission to conduct this study was obtained separately from the Head of the Department of Obstetrics and Gynaecology of KBTH, and the Medical Superintendent of the Mamprobi polyclinic.

## RESULTS

Out of a total of 175 expectant mothers who participated in the study, 73(41.7%) and 102(58.3%) were interviewed at the antenatal clinic of KBTH and Mamprobi Polyclinic respectively. The maternal characteristics are shown in Table 1.

The mean age of the expectant mothers was 29.4 years (SD = 5.5) with only 6(3.4%) teenage expectant mothers. Sixty-three (36.0%) were nulliparous and the majority of the mothers, 135(77.1%) have attended antenatal clinic least once. Six (3.4%) respondents had a previous baby with NNJ and of these, 1(16%) lost her baby due to NNJ. While 15(8.6%) respondents had no formal education, 134(76.6%) had at least secondary education with only 9(5.1%) being university graduates.

**Table 1** Maternal characteristics

Variables	n (%)
<b>Respondents' age (in years)</b>	
16 – 25	36 (20.6)
26 – 35	114 (65.1)
36 – 45	25 (14.3)
<b>Parity</b>	
0	63 (36.0)
1	47 (26.9)
2 or more	65 (31.1)
<b>Age of current pregnancy</b>	
First trimester	19 (10.9)
Second trimester	57 (32.6)
Third trimester	75 (42.8)
Not specified	24 (13.7)
<b>Number of ANC* attended during current pregnancy</b>	
1	40 (22.9)
2 – 3	37 (21.1)
≥ 4	98 (56.0)
<b>Highest level of education</b>	
No formal education	15 (8.6)
Primary	26 (14.9)
Secondary	125 (71.5)
Tertiary	9 (5.1)
<b>Type of residence</b>	
House/Flat/Condo/Self contained	51 (29.1)
Flat-shared kitchen/bathroom	12 (6.9)
Compound house	106 (60.6)
Kiosk/shack/uncompleted building	6 (3.4)
<b>Occupation</b>	
Civil servant	21 (12.0)
Self-employed	124 (70.9)
Private sector employee	10 (5.7)
Student	2 (1.1)
Unemployed	18 (10.3)
<b>Average monthly earning (GHS**)</b>	
1 - 100	40 (22.9)
101 - 1000	82 (46.9)
1001 - 2000	4 (2.2)
Unemployed/Do not want to disclose	49 (28.0)
<b>Combined monthly income (GHS**)</b>	
1 - 100	1 (0.6)
101 - 1000	4 (2.3)
1001 - 2000	31 (17.7)
2001 - 5000	8 (4.5)
Does not want to disclose/Partner's earning unknown	131 (74.9)
<b>Type of health insurance coverage</b>	
No insurance	27 (15.4)
NHIS***	145 (82.9)
NHIS*** + Private insurance	3 (1.7)

\*ANC = Antenatal clinic; \*\*GHS = Ghana Cedis; \*\*\*NHIS = (Ghana) National Health Insurance Scheme

In relation to insurance coverage, 145(82.9%) of the expectant mothers were registered with the National Health Insurance Scheme (NHIS). Asking the participants whether they had ever heard about NNJ was used to assess the awareness.

Out of the 175 respondents, 133 (76.0%) were aware of NNJ and were those considered for further analysis. Unlike the age of current pregnancy and the level of education, higher maternal age and parity were significantly associated with awareness with p values of <0.001 and 0.002 respectively (Table 2).

**Table 2** Awareness of NNJ in relation to selected maternal characteristics

Variable	Yes n (%)	No n (%)	P value
<b>Maternal Age</b>			
16 – 25	16 (44.4)	20 (55.6)	
26 – 35	93 (81.6)	21 (18.4)	<0.001
36 – 45	24 (96.0)	1 (4.0)	
<b>Parity</b>			
0	40 (63.5)	23 (36.5)	
1	32 (68.1)	15 (31.9)	0.002
2 or more	61 (93.8)	4 (6.2)	
<b>Age of pregnancy</b>			
First trimester	15 (78.9)	4 (21.1)	
Second trimester	39 (68.4)	8 (31.6)	0.444
Third trimester	60 (80.0)	15 (20.0)	
Not specified	19 (79.2)	5 (20.0)	
<b>Highest level of education</b>			
No formal education	11 (73.3)	4 (26.7)	
Primary	17 (65.4)	9 (34.6)	
Secondary	99 (79.2)	26 (20.8)	0.424
Tertiary	6 (66.7)		

Table 3 shows the expectant mothers' knowledge on NNJ among those aware of the condition. Only 35(26.3%) of those aware of NNJ got their information from a hospital. Even though 97(72.9%) knew at least one symptom of NNJ; 124 (93.2%) did not know the causes of jaundice or had the wrong information and there seemed to be no association with the level of education ( $X^2 = 5.043$ ,  $p=0.169$ ) from the chi-square test. Thirty-two (24.1%) and 5(3.8 %) of them claimed that consuming too much oil and mosquito bites, respectively, were responsible for NNJ. One respondent claimed that spiritual causes and another one thought that "kneeling down during labour" could cause NNJ. Only 6(4.5%) knew one or more specific forms of treatment of NNJ while 63(47.4%) knew at least one danger sign.

Majority of those aware of NNJ (84; 63.2%) knew one or more complications, out of which 56(66.7%) knew neonatal death only as a complication. In general, there was no statistically significant difference between respondents' age, educational level, and obstetric history and knowledge on the topic.

**Table 3** Knowledge about neonatal jaundice

Item	Frequency n(%)
<b>Source of information</b>	
Mass media	52 (39.1)
Relations/Friends	49 (36.8)
Hospital	35 (26.3)
Witnessed	4 (3.0)
Other	8 (6.0)
<b>How to detect jaundice in babies</b>	
Yellow eyes	95 (71.4)
Yellowing of the skin	18 (13.5)
Don't know	36 (27.1)
<b>Causes of neonatal jaundice</b>	
Infection	8 (6.0)
Disparity between blood of mother and baby	1 (0.8)
Too much oil consumption by mother	32 (24.1)
Mosquito bites	5 (3.8)
Other	11 (8.3)
Don't know	76 (57.1)
<b>Treatment of neonatal jaundice</b>	
Phototherapy	6 (4.5)
Exchange blood transfusion	1 (0.8)
"Medical treatment"	22 (16.5)
Exposure to sunlight	11 (8.3)
Herbs	7 (5.3)
Glucose water	5 (3.8)
Don't know	86 (64.7)
<b>Danger signs of neonatal jaundice</b>	
Fever	25 (18.8)
Refusal of feeds	22 (16.5)
Hypotonia	14 (10.5)
High-pitched cry	7 (5.3)
Down turning of the eyes	3 (2.3)
Arching of the back/neck	2 (1.5)
Convulsion	1 (0.8)
Others	11 (8.3)
Don't know	59 (44.4)

Total percentage is more than 100% due to multiple answers.

In case their baby developed jaundice, 127(93.2%) expressed their willingness to seek medical care. Out of the 127, 107(84.3%) said they will seek medical attention within the first 24hours but 4(3.7%) of them would seek medical attention after initially trying a drug bought from a pharmacy, expose to sunlight or use glucose water.

While 57(90.4%) of the nulliparous said they would seek medical attention immediately or within 24hr 80% and 50% of those who had 4 and 5 previous children, respectively, would seek medical attention in the first 24hours.

Among the 133 expectant mothers who were aware of NNJ, 6(4.5%) had a previous baby with jaundice. Jaundice was detected in one baby on the first day, 2 on the second day and the other 3 on the third day. Four of the jaundiced babies (66.7%) were delivered in public health facilities and the rest in private health facilities. Out of the 6 babies with NNJ, 4 (66.7%) were managed at a hospital, out of which 3 had phototherapy. Unfortunately, one baby died from the NNJ. The other 5 were healthy.

## DISCUSSION

The level of awareness to NNJ in our study (76.0%) was low as compared to that reported by Egube<sup>18</sup> and Ogunfowora<sup>19</sup> in Nigeria, with 85.9% and 100% respectively. The low level of higher education among our respondents could explain this finding. Indeed, only 5.1% of our respondents had tertiary education as compared to 60.7% and 46.6% in the studies by Egube et al.<sup>18</sup> and Ogunfowora<sup>19</sup> respectively. Mothers' years of formal education have been found to be strongly associated with health knowledge and use of health services.<sup>20</sup>

Low maternal education had a significant relationship with delayed health care seeking and the use of home remedies for NNJ.<sup>21</sup> However, there was no statistically significant association between the educational level and our respondents' awareness of NNJ. Rather, the likelihood of awareness increased with increasing maternal age or parity, suggesting a cumulative exposure to information on NNJ. In addition, hospital was only the third source of awareness in our study after friends/relatives and mass media.

Also, the knowledge of the causes and treatment of NNJ was very poor in our study. Only 6.8% of our respondents knew at least one correct cause of NNJ as compared to 54.5% reported by Egube et al.<sup>18</sup>. In Nigeria, Eneh and Ugwu<sup>22</sup> reported erroneous beliefs like eating too much groundnuts in pregnancy or mosquito bites as the main causes of NNJ. Likewise, a sizeable number of the expectant mothers we interviewed wrongly believe that consuming too much oil and mosquito bites can cause NNJ. It is worth noting that the majority of our respondents attended antenatal clinic at least once before we interviewed them. Ideally, community nurses and midwives at antenatal clinics give teaching on some pregnancy, delivery and postnatal problems such as NNJ. There is therefore a need to increase the NNJ content on antenatal teachings.

Due to the low literacy level, some mothers cannot read information on NNJ. However, the edition of the Child health records booklet<sup>23</sup> currently in use in Ghana has pictorials instead of words only to educate mother on NNJ.

This could be used in teaching mothers on NNJ during antenatal and postnatal clinics. Mothers therefore should be given the booklet ahead of their expected delivery date. Other sources like the mass media also need to be strengthened with accurate information as well. When educated appropriately, mothers can detect jaundice early and seek medical attention, especially as nurses may not be available to go into homes to follow up discharged babies.

The 2010 British National Institute for Health and Care Excellence (NICE) guidelines<sup>24</sup> recommend that parents and caregivers be educated about NNJ especially on how to check their baby for jaundice and what to do when jaundice is suspected. Babies at risk of significant hyperbilirubinemia must receive an additional visual inspection by a healthcare professional during the first 48 hours of life and bilirubin levels measured once jaundice is suspected (NICE) guidelines.<sup>24</sup>

The knowledge of the danger signs of NNJ was also low even though majority of our participants knew how to recognize jaundice in babies. This may be one of the reasons why most babies with NNJ present late to the hospital.<sup>14</sup> The knowledge about the complications of NNJ was however good. During the interview, most mothers probably realized that NNJ was potentially dangerous; therefore, majority of them deduced that death was one of the complications. While this may be positive in shaping the mothers' future attitude towards NNJ, it may not reflect their prior knowledge on the topic.

The mothers' attitude in case their baby developed jaundice was very good. Even though a minority, there were still mothers who would use sunbath in case of NNJ before seeking medical care. This historical remedy may also contribute to delay in care in case of severe jaundice. Another interesting finding was the fact that, the sense of urgency in seeking medical care was lower in mothers with higher parity, even though awareness on NNJ increased significantly with increasing parity. This, however, was not statistically significant. Mothers who used to have normal babies, may not be worried much about NNJ. For most new born, NNJ is of little consequence, but the potential remains for acute bilirubin encephalopathy and kernicterus from high-unconjugated bilirubin concentrations in term babies, or even lower levels in pre-term babies. (NICE) guidelines<sup>24</sup> Conjugated hyperbilirubinemia is always abnormal, and its cause must be

investigated and managed promptly.<sup>25</sup> We interviewed only expectant mothers during a limited timeframe at only two antenatal clinics in Accra, Ghana. Therefore, our findings may not be generalizable to the whole country.

## CONCLUSION

Majority of expectant mothers attending antenatal clinics at Korle Bu Teaching Hospital and Mamprobi Polyclinic are aware of NNJ but have poor knowledge of the causes, danger signs and treatment of NNJ, irrespective of their level of education, their parity, and their sources of information. Their attitude in seeking medical care in case of NNJ was however good. More education on NNJ should be given to expectant mothers during antenatal visits.

## ACKNOWLEDGEMENTS

Our special gratitude to the management of the Department of Gynaecology and Obstetrics of the Korle Bu Teaching Hospital and the Mamprobi Polyclinic where this study took place. Mr. Frederick Djan and Mr. Clement Narh contributed to the data analysis. Dr. Nana Ayegua Hagan Seneadza of the Department of Community Health, School of Public Health, University of Ghana, critically reviewed this manuscript. Ms. Cecilia Asabre, Dr. Bright Danyoh and Mrs. Jemima Amanor assisted in the data collection. Dr. Eunice Brown contributed to the initial brainstorming on this topic.

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