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Prevalence of Jaundice among Neonates Admitted in a Tertiary Hospital in Southwestern Nigeria

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Abstract

Jaundice has been identified to be a notable cause of hospital admission and mortality for neonates in developing countries. This makes reducing the burden of neonatal jaundice integral to the achievement of Sustainable Development Goal (SDG) 3. To monitor the progress made so far, routine monitoring of prevalence of neonatal jaundice and the treatment facilities available in healthcare centres are essential. Therefore, this study aimed to assess the prevalence of jaundice among neonates admitted in the special care baby unit (SCBU) Ekiti State University Teaching Hospital (EKSUTH). The survey was retrospective in nature, it employed secondary data that consisted of relevant information relating to newborns delivered at the study location between January 2018 to December 2019. The total of inborn admitted to the SCBU during the study period was 622. The neonates had an average admission age of 1.78±4.50 days and an average hospital stay duration of 4.2±4.51 days. The prevalence of neonatal jaundice was 15%, and one-tenth of the neonatal deaths within the period was attributable to jaundice. Furthermore, term neonates had a significantly higher risk of having neonatal jaundice compared to preterm neonates. Only 6.2% of preterm babies had jaundice as opposed to 17.2% in term babies. The occurrence of neonatal jaundice and its related mortality cannot be overlooked. The results indicate that a portion of neonates were still affected in recent time. Healthcare centres need to be equipped with adequate treatment facilities to effectively manage the disease burden.

Introduction

Jaundice can be described as the yellowish discolouration of the skin and sclera which is usually caused by excessive bilirubin in the skin and mucous membranes [1]. Neonatal jaundice is one of the most common conditions that require medical attention in new-borns. It appears because of the imbalance between bilirubin production and its excretion [2]. During pregnancy, the mother helps in the excretion of the foetus's bilirubin via placenta. After birth, the new-born must adjust and discard blood bilirubin by itself. This might be elevated values of bilirubin in new-borns up to concentrations causing the yellow colouration of skin and mucosae [3]. This is due to organs immaturity and inability to cope with the rhythm needed for the bilirubin to be extracted from the organism [3]. Neonatal jaundice occurs worldwide to around 60% of term and 80% of preterm new-borns in the first week of life [4-6].

Over the years, there have been several studies that reported neonatal jaundice as a key contributor to neonatal morbidity and mortality [7-10]. Due to the lack of harmonized protocols for management and classification of jaundice in low-and middle-income countries, comparison of jaundice across different locations has proven to be difficult [11]. According to a world survey, about 1.1 million new-borns would develop severe jaundice annually and majority of them would reside in sub-Saharan Africa and South Asia [12]. Neonatal jaundice is the leading cause of illness and death associated with new-borns in Africa especially in West Africa and needs to be prioritized with global intervention [13,14].

Due to the relatively higher prevalence of jaundice among neonates in Southwestern Nigeria and the paucity of studies in Ekiti State, this study seeks the prevalence of neonatal jaundice and its associated factors among admitted neonates in special baby

unit Ekiti State University Hospital.

Methodology

Study Location

The study location was Special Care Baby Unit (SCBU) of the EKSUTH (Ekiti State University Teaching Hospital). The SCBU is where neonates in EKSUTH are admitted. The unit has a permanent consultant, locum consultants, resident doctors, house officers and nurses. Available facilities in the unit include 10 cots, 8 incubators and 4 phototherapy units. The units separate in born neonates and out born neonates.

Study Population

The target population consist of neonates hospitalized at Special Care Baby Unit of the EKSUTH from 1st January 2018 to 31st December 2019.

Study Design

This is a retrospective descriptive study of causes of mortality among new-borns admitted into the SCBU over two years period between January 2018 and December 2019.

The information notes of all patients were reviewed and information to be retrieved with include maternal address (inside or outside town), age on admission, duration of hospital stay, weight at birth, nature of ailment and diagnosis at time of death (not primary cause of death).

Ethical Consideration

Ethical clearance was obtained from the Ethical and Research Committee of the Ekiti State University Teaching Hospital.

Result

Baseline Information

As represented in Table 1, of the total 622 inborn admitted, the prevalence of neonatal jaundice was 15% (57% Male and 43% Female). Majority of the mothers (89.1%) lived within Ado Ekiti town, while 20.7% of the new-born are Preterm. More than half of the neonates had normal birth weight and 37% have low birth weight. The neonate average age at admission is 1.78±4.497days. The neonates admitted also had an average weight of 2.77±0.92 kg, average body length of 3.71±3.651cm and the average head circumference of 33.45±4.59cm and average hospital stay duration of 4.2±4.51 days. The mortality rate of the neonatal unit over the two-year period was discovered to be 12.9%.

Variables	Frequency	Percentage % (N=622)
Maternal Address		
Within town	554	89.1
Outside town	68	10.9
Prevalence of jaundice	93	15%
Sex		
Male	343	55.1
Female	279	44.9
Preterm	129	20.7
Period of admission		
1st	161	25.9
2nd	140	22.5
3rd	161	25.9
4th	160	25.7
Birth weight		
Low	230	37%
Normal	321	51.60%
High	71	11.40%
Mortality	80	12.9

Table 1: Neonates' baseline information.

One-tenth of the neonatal deaths within the period were attributable to jaundice and only 6.2% of preterm babies had jaundice which is lower than 17.2% in Term babies. There were no statistically significant associations derived between babies delivered in town and those delivered outside of town (p=0.254). However, babies born within town are 1.601 times more likely to develop jaundice than those born outside of town. There were no statistically significant associations derived between male and female sex (p=0.698). There were statistically significant associations derived between babies born at term and babies born premature (p=0.002). Babies born at term were 3.151 more likely to develop neonatal jaundice than those born premature. There were statistically significant associations derived between period of birth and prevalence of Jaundice (p=0.025). Babies born in the first half of the year were 1.665 more likely to have neonatal

jaundice than babies born in the second half. There were statistically significant associations derived between weight of babies and development of Jaundice. The prevalence of Jaundice in Low birth weight (29.0%) and Normal weight babies (69.9%) were higher than in Over-weight babies (1.1%). Babies with Jaundice were 1.67 times less likely to die compared with babies that had other morbidities at the hospital.

Variables	Jaundice		Chi value	P-value	C.I & OR
Address based on proximity	Yes	No	1.302	0.254	1.601
					0.709 to 3.619
Within town	86 (15.5%)	468 (84.5%)			
Outside town	7 (10.3%)	62 (89.7%)			
Sex					
Male	53 (15.5%)	290 (84.5%)			1.092
					0.700 to 1.704
Female	40 (14.3%)	239 (85.7%)	0.15	0.698	
Age at birth					
Term	85 (17.2%)	408 (82.8%)	9.8	0.002	3.151
					1.484 to 6.689
Preterm	8 (6.2%)	121 (93.8%)			
Period of birth/ admission					
First half of the year	55 (18.3%)	246 (81.7%)	5.058	0.025	1.665
					1.065 to 2.604
Second half of the year	38 (11.8%)	283 (88.2%)			
Mortality					
Yes	8 (10.0%)	72 (90.0%)	1.77	0.183	0.597
					0.278 to 1.285
No	85 (15.7%)	457 (84.3%)			
Weight categories					
Low birth weight	27 (11.7%)	203 (88.3%)	19.192	0.000	
Normal birth weight	65 (20.2%)	256 (79.8%)			
Overweight	1 (1.4%)	70 (98.6%)			

Table 2: Factors Associated with Neonatal jaundice.

Considering other factors such as; age at admission, head circumference and length of hospital stay, it was determined that neonates with jaundice were admitted at an average age of 3.91 days compared with babies with other pathologies of 1.41 days. This might mean that other pathological conditions were discovered early in neonates than neonatal jaundice. Also, neonates with jaundice had a higher mean Head circumference of 35.6538 cm compared with babies of other pathologies of 33.27 cm and neonates with Jaundice has a shorter length of hospital stay than other neonates admitted with other pathological conditions.

Variables	F	T	df	P-value	Confidence interval
Age at admission	1.205	5.053	620	0.000	1.532 to 3.479
Head circumference	4.103	2.569	364	0.011	-0.55910 to 4.20742
Length of hospital stay	7.467	-1.328	620	0.185	-1.351 to 0.261

Table 1: Neonates' baseline information.

Discussion

The prevalence of neonatal jaundice among the admitted neonates in this study was 15% which is similar to previous studies in Nigeria which ranged from 10-36% in major studies [15-18]. In a recent study conducted in Addis Ababa, Ethiopia [19], 13.3% prevalence of neonatal jaundice was reported and 9.2% has been reported earlier in Kenya [20]. It has been reported that neonatal jaundice is responsible for major admissions, morbidity and mortality among neonates from a country-wide survey in Myanmar [21,22]. This study reported 12.9% mortality associated with neonatal jaundice which is higher to 10.4% reported in a study in Cairo University Children's Hospital, Egypt [23] and about triple of 4.4% that was reported in a study conducted in India [24]. Also, a higher mortality rate of 14.3% has been reported in Kenya [20]. Other studies in Nigeria reported mortality rates related to neonatal jaundice; 34%, 15% and 5.5% in Port Harcourt, Ile Ife and Lagos respectively [25-27].

There were slightly more jaundiced male neonates than female from this study (57.0% male and 43.0%); this is consistent with the report of [13]. However, this is in contrary to previous studies where it was revealed that male gender is one of the predisposing factors for neonatal jaundice [16,28]. According to a study, the male gender has a lower level of Glucose-6-phosphate dehydrogenase deficiency (G6PD) than their counterpart as proposed that the defect is X-linked recessive which results in the male gender having more tendency to have Neonatal jaundice than females [29].

Results showed that the mean age on admission of the neonates with jaundice was 3.91days compared with babies with other pathologies of 1.41 days which is in agreement with 3.44±2.50 days in a study by [16]. Majority that were jaundiced in this study were admitted in the early stage of their lives as shown in table 2. This implies that neonatal jaundice is commonly detected by caregivers after child delivery. Therefore, the possibility of neonate receiving care early enough depends on the ability to detect the disease early enough. In a study by [30], the knowledge of mothers was assessed in Nigeria, only 25% of mothers had an adequate knowledge of Neonatal jaundice. It is noteworthy that mothers should have adequate knowledge of Jaundice, so that early diagnosis can be made and neonates can be given prompt care.

This study proved that there were statistically significant associations derived between neonates born at term and those born premature (p=0.002). Neonates born at term were 3.151 more likely to develop neonatal jaundice than those born premature. This finding agrees with the report of [31] that neonatal jaundice was higher among term neonates than preterm neonates. This may be because of the assumption that NNJ among term neonates is more physiological in nature which has led to failure to consider the pathological risk factors [31].

One of the major causes of neonatal jaundice is early discharge of neonates which often leads to readmission of neonates who later developed jaundice [32]. Findings from this study suggests that there was no statistical significant association between prevalence of jaundice and length of hospital stay (p=0.185) as neonates with Jaundice had a shorter length of hospital stay than other neonates admitted with other pathological conditions. A review across western countries reported that shorten length of hospital stay was as a result of containment charge and availability of hospital bed [33]. Other studies in Nigeria have also reported how early discharge of neonates and length of hospital have contributed to prevalence of NNJ [30,34].

Conclusion

From this study, the prevalence of neonatal jaundice is similar to previous studies in developing countries. The occurrence of neonatal jaundice and other neonatal mortalities cannot be overlooked, it is important that healthcare workers identify the contributing factors to neonatal mortality and proper management of neonatal jaundice. As the average age of admission is just over 3 days, efforts should be made by healthcare workers in early identification of neonates at risk of neonatal jaundice before they are discharged. Also, proper health education should be given to mothers on neonatal Jaundice, for early identification and management.

Data Availability Statement

All relevant data are included in the paper.

Conflict of Interest

The authors declare no conflict of interest.

References

1. Khan RS, Houlihan DD, Newsome PN (2015) Investigating jaundice. Medicine 43: 573-576.

2. Dennery PA, Seidman DS, Stevenson DK (2001) Neonatal hyperbilirubinaemia. New Engl J Med 344: 581-590.

3. Iacob D, Boia M, Iacob RE, Manae A (2011) Neonatal Jaundice - Etiology and Incidence. Jurnalul Pediatrului 14(55-56).

4. Slusher TM, Angyo IA, Bode-Thomas F, McLaren DW, Wong RJ (2004) Transcutaneous bilirubin measurements and serum total bilirubin levels in indigenous African infants. Pediatrics 113: 1636-1641.

5. Bhutani VK, Zipursky A, Blencowe H, Khanna R, Sgro M, et al. (2013) Neonatal hyperbilirubinemia and Rhesus disease of the newborn: Incidence and impairment estimates for 2010 at regional and global levels. Pediatr Res 74 Suppl 1: 86-100.

6. Bolajoko OO, Kaplan M, Hansen TWR (2018) Neonatal hyperbilirubinaemia: a global perspective. Lancet Child Adolesc Health. 2: 610-620.

7. Maisels MJ (2009) Neonatal hyperbilirubinemia and kernicterus-not gone but sometimes forgotten. Early Hum Dev 85: 727-732.

8. Olusanya BO, Akande AA, Emokpae A, Olowe SA (2009) Infants with severeneonatal jaundice in Lagos, Nigeria: incidence, correlates and hearingscreening outcomes. Trop Med Int Health 14: 301-310.

9. Hameed NN, Na' Ma AM, Vilms R, Bhutani VK (2011) Severe neonatal hyperbilirubinemia and adverseshort-term consequences in Baghdad, Iraq. Neonatology 100: 57-63.

10. Sgro M, Campbell D, Barozzino T, Shah V (2011) Acute neurological findings in a national cohort of neonates with severe neonatal hyperbilirubinemia. J Perinat 31: 392-396.

11. Greco C, Arnolda G, Boo N, Iskander IF, et al. (2016) Neonatal Jaundice in Low- and Middle-Income Countries: Lessons and Future Directions from the 2015 Don Ostrow Trieste Yellow Retreat. Neonatology 110: 172-180.

12. Bhutani VK, Stark AR, Lazzeroni LC, et al. (2013) Predischarge screening for severe neonatal hyperbilirubinemia identifies infants who need phototherapy. J Pediatr 162: 477-482.

13. Chime HE, Egenede JA, Arute JE (2011) Prevalence of Neonatal Jaundice on Central Hospital, Warri, Delta State, Nigeria. International Journal of Health Research 4: 123-126.

14. Olusanya BO, Ezeaka CV, Ajayi-Obe EK, Mukhtar-Yola M, Ofovwe GE (2012) Paediatricians' perspectives on global health priorities for new-born care in a developing country: a national survey from Nigeria. BMC Int Health Hum Rights 2: 9.

15. Tikmani SS, Warraich HJ, Abbasi F, Riavi A, Darmstadt Fl, et al. (2010) Incidence of Neonatal hyperbilirubinemia: a population based prospective study in Pakistan. Trop. Med Int. Health 15: 502-507.

16. Olatubi I, Ibitoye OF, Sadibo O, Bolarinwa OS, Adamolekun MM (2019) Prevalence of neonatal jaundice at a tertiary health institution in Ondo state, Nigeria. Journal of Pre-Clinical and Clinical Research 13: 114-117.

17. Onyearugha CN, Onyire BN, Ugboma HA (2011) Neonatal jaundice: Prevalence and associated factors as seen in Federal Medical Center Abakaliki, Southeast Nigeria. Journal of Clinical Medicine and Research 3: 40-45.

18. Ipek IO, Bozayakut A (2008) Clinically signifiant neonatal hyperbilirunemia: an analysis of 546 cases in instabul. J. Trop. Pediatr 54: 212-213.

19. Haile MT, Girma H (2020) Prevalence and Contributing Factors of Neonatal Jaundice in Neonatal Intensive Care Unit at St Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia, 2019. Journal of Health, Medicine and Nursing.

20. Mwaniki MK, Gatakaa HW, Mturi FN, Chesaro CR, Chuma JM, et al. (2010) An increase in the burden of neonatal admissions to a rural district hospital in Kenya over 19 years. BMC Public Health 10: 591.

21. Myanmar Department of Health (MDH) (2013) Annual hospital statistics 2010-2011.

22. Selvaraju S (1999) Preliminary report: a survey on severe neonatal jaundice cases admitted to selected hospitals in Malaysia. Proc Natl Perinat Health Conf 70-79.

23. Gamaleldin R, Iskander I, Seoud I, Aboraya H, Aravkin A, et al. (2011) Risk factors for neurotoxicity in newborns with severe neonatal hyperbilirubinemia. Pediatrics 128: e925-e931.

24. Dutta D, Bhattacharya MK, Bhattacharya SK, Chaudhuri A, Lahiri M, et al. (1992) Influence of admission weight on neonatal mortality amongst hospitalised neonates in Calcutta. J Indian Med Assoc 90: 308-309.

25. Eneh AU, Oruamabo RS (2008) Neonatal jaundice in a special care baby unit (SCBU) in port harcourt, nigeria: a prospective study. Port Harcourt Medical Journal 2: 110-117.

26. Adeolu AA, Arowolo OA, Alatise OI, et al. (2010) Pattern of death in a Nigerian teaching hospital; 3-decade analysis. Afr Health Sci 10: 266–272.

27. Emokpae AA, Mabogunje CA, Imam ZO, et al. (2016) Heliotherapy for Neonatal Hyperbilirubinemia in Southwest, Nigeria: A Baseline Pre-Intervention Study. PLoS One 11: e0151375.

28. Scrafford CG, Mullany LC, Katz J, Khatry SK, LeClerq SC, et al. (2013) Incidence of and risk factors for neonatal jaundice among newborns in southern Nepal. Trop Med Int Health 18: 1317-1328.

29. George IO, Akani NA (2011) Evaluation of Glucose - 6 - Phosphate dehydrogenase deficiency in icteric newborns in Nigeria. Am. J. Trop. Med. Public Health 1: 73-78.

30. Ezeaka VC, Ekure EN, Fajolu IB, Ezenwa BN, Akintan P (2016) Mothers' Perception of neonatal Jaundice in Lagos, Nigeria: An urgent need for greater awareness. S Afr J Child Health 10: 227-230.

31. Wei KL, Yang YJ, Yao YJ, Du LZ, Wang QH, et al. (2012) Epidemiologic survey on hospitalized neonates in China. Transl Pediatr 1: 15-22.

32. Mercier CE, Barry SE, Paul K, Delaney TV, Horbar JD, et al (2007) Improving newborn preventive services at the birth hospitalization: A collaborative, hospital-based quality-improvement project. Pediatrics 120: 481-488.

33. Benahmed N, San Miguel L, Devos C, Fairon N, Christiaens W (2017) Vaginal delivery: how does early hospital discharge affect mother and child outcomes? A systematic literature review. BMC Pregnancy Childbirth 17: 289.

34. Lain SJ, Roberts CL, Bowen JR, Nassar N (2015) Early discharge of infants and risks of readmission for Jaundice. Pediatrics 135: 314-321.