

Neonatal Hyperbilirubinemia: Hospital Based Study in Western Region, Nepal

Sharada Sharma

Lecturer

T.U.I.O.M., Pokhara Campus

Email: sharada825@gmail.com

Abstract

Hyperbilirubinemia is the common cause of neonatal morbidity and mortality. The aim of this study is to identify neonatal hyperbilirubinemia and its early outcome. Retrospective data review was carried out in the Neonatal Care Unit and medical record section of Western Regional Hospital (WRH) for the year 2013. The data were analyzed and interpreted by using descriptive and inferential statistics through the computer program SPSS 20 version and presented in tables. Findings revealed that out of 815, 17.8 percent were the hyperbilirubinemia, 60 percent were male, mean age = 6.61(SD=4.55), 47.6 percent were Brahmin/Chhetry ethnicity, 55.2 percent were from rural residence and 69.6 percent were admitted from emergency/OPD of WRH. Regarding the duration of stay mean = 3.75(SD=2.02), 86.2 percent neonates were improved at discharge and 0.7 percent expired. There is statistically significant relationship between residence, and source of admission with early outcome of neonates at discharge ($p < 0.05$). The majority of the neonates admitted in the hospital were improved at discharge. Therefore early recognition of neonatal hyperbilirubinemia is an important public health concern.

Key words: Hospital based study, hyperbilirubinemia, neonatal, Nepal

Introduction

Hyperbilirubinemia is one of the most common problems encountered worldwide in newborns requiring evaluation and treatment. The clinical manifestation of hyperbilirubinemia (jaundices) occurs in 60% of normal newborns and 80% of preterm infants (Dutta, 2009; Kliegman et al., 2012).

Hyperbilirubinemia is an important cause of morbidity in the neonatal period, especially in the 1st week of life (Nepal, 2009). Incidence varies with ethnicity and geography and is higher in East Asians and American Indians and lower in Africans. The Incidence is higher in populations living at high altitudes (Moore et al., 1984). In some developing countries, the incidence of severe neonatal jaundice may be as much as 100 times higher than in more developed countries (Slusher, 2012). A study done among 293 neonates admitted at neonatal intensive care unit in BP Koirala Institute of Health Sciences (BPKIHS) revealed that the prevalence of neonatal hyperbilirubinemia was 42 percent (Kaini, Chaudhary, Adhikari, Bhattacharya & Lamsal (2006). Similarly findings of the retrospective study done in 73 cases in Kanti Children Hospital, nearly 50 percent cases had neonatal jaundice (Nepal, 2009) and it was the second cause of admission at neonatal intensive care unit of Kanti Children Hospital (Subedi, 2009). Neonatal hyperbilirubinemia may lead various complications such as kernicterus, deafness, neurological deficit, mental retardation and even death (Kliegman et al., 2012). Early detection and treatment of neonatal hyperbilirubinemia is important in the prevention of bilirubin-induced encephalopathy. Compared with conditions that require advanced pharmacologic and technologic treatment strategies, hyperbilirubinemia seems to be overshadowed and may lose the attention it deserves as a condition that has potentially devastating effects. Nurses must be vigilant when caring for babies with “just jaundice” by monitoring bilirubin levels, identifying infants at risk for developing severe hyperbilirubinemia, and implementing prescribed treatment effectively when indicated (Robin, 2009).

Therefore, the primary focus of this article is to identify the neonatal hyperbilirubinemia and its early outcome evidenced in western regional hospital Pokhara in the year 2013.

Data and Methods

Western Regional Hospital (WRH) is the 350 bedded hospital in the western region of Nepal. The hospital provides service as a referral centre throughout patients department as well as the different in patients wards including hemodialysis, maternity, operation theatre, post-operative,

geriatric, medical, surgical, emergency units, ICU and neonatal care unit. Retrospective data review was carried out through the admission and discharge register in the Neonatal Care Unit (NCU) and medical record section of WRH for the year 2013. Sample of this study was neonates with diagnosis of neonatal hyperbilirubinemia taken through purposive sampling technique. Before collecting data approval was obtained from the hospital authority where the study was conducted. Permission was obtained from ward in-charge and explained about the study purpose.

The data were classified according to the objective of the study then analyzed and interpreted by using descriptive (frequency, percentage, mean, standard deviation) and inferential statistics (chi-squared test) to determine the relationship between early outcomes of neonatal hyperbilirubinemia with background characteristics through the computer program SPSS 20 version (Statistical Package for Social Science) and presented in tables.

Ethical considerations

Before collecting data approval was obtained from the hospital authority where the study was conducted. Permission was obtained from ward in-charge and explained about the study purpose. The collected data was used only for the research purpose.

Results

In Western Regional Hospital Pokhara, Neonatal care unit was established in January 2001 with 5 beds, 1 incubator and one phototherapy machine. The unit has now 16 NCU beds, one ventilator, 4 Phototherapy machine, one incubator; non- functioning. Total patient admitted in the year 2013 January to December in NCU were 815. Among them, 145 (17.8%) neonates were admitted as hyperbilirubinemia. Hyperbilirubinemia is the second most common problem encountered in neonatal unit of WRH in 2013.

Table 1
Background Characteristics

n =145		
Characteristics	Number	Percentage
Age at the time of admission		
< 24 hrs	11	7.6
24- 72 hrs	5	3.4
>72 hrs to 1week	84	57.9
> 1 week	45	31.0
Mean (SD) = 6.61(4.55)		
Sex		
Male	87	60.0
Female	58	40.0
Residence		
Urban	65	44.8
Rural	80	55.2
Ethnicity		
Brahmin/Chhetry	69	47.6
Janajati (Gurung, Magar, Newar)	59	40.6
Others (Kami damai, sarki, Muslim, kumal)	17	11.7
Source of admission		
OPD/ Emergency	101	69.6
Maternity/ wards of WRH	44	30.4
Length of stay in hospital		
Up to 4 days	98	67.6
>4 days	47	32.4
Mean (SD) = 3.75(2.02)		

Source: Admission, Discharge Register 2013; Neonatal Care Unit, WRH

Table 1 reveals that 60 percent were male, 7.6 percent were less than one day of age, mean age = 6.61(SD=4.55) minimum age 1 day and maximum 25 days, 47.6 percent were Brahmin/Chhetry ethnicity, 55.2 percent were from rural residence and 69.6 percent were admitted from OPD/emergency of WRH. Regarding the duration of stay mean = 3.75(SD=2.02) minimum 1 day and maximum 10 days.

Table 2
Outcome according to Background Characteristics

n=145

Characteristic	Early Outcome at Discharge			χ^2	p-value
	Improved n(%)	Improved n(%)	*Not Improved n(%)		
Age					
< 24 hrs	11(7.6)	9(81.8)	2(18.2)	0.193	0.661
25hrs to 25 days	134(92.3)	116(86.5)	18(13.4)		
Sex					
Male	87(60.0)	76 (87.4)	11(12.6)	0.24	0.623
Female	58(40.0)	49(84.5)	9(15.5)		
Residence					
Urban	65(44.8)	61(93.8)	4(6.2)	5.78	0.016
Rural	80(55.2)	64(80)	16(20)		
Source of admission					
From OPD/Emergency	101(69.6)	91(90.1)	10(9.9)	4.24	0.039
Wards of WRH	44(30.4)	34(77.3)	10(22.7)		
Length of stay in hospital					
Up to 4 days	98(67.6)	82(83.7)	16(13.2)	1.63	0.201
>4 days	47(32.4)		43(91.5)	4(8.5)	

* For Outcome Not Improved; Referral, Leave against Medical Advice, Absconded, Discharge on Request, and Expired cases.

Source: Admission, Discharge Register 2013; Neonatal Care Unit, WRH

Table 2 presents the relationship between early outcomes of neonatal hyperbilirubinemia with background characteristics. There is statistically significant relationship between residence and source of admission with early outcome at discharge ($p < 0.05$) but there is no significant relationship between age, sex and length of stay in hospital of neonates with early outcome ($p > 0.05$).

Discussion

This study identified the prevalence and outcome of the neonatal hyperbilirubinemia in the neonates admitted in the neonatal care unit of Western Regional Hospital, Pokhara. Hyperbilirubinemia is the second most common problem encountered in neonatal unit of WRH. Similar findings reported in the retrospective study done at neonatal intensive care unit of Kanti Children Hospital (Subedi et al., 2009). Total neonates

admitted in the year 2013 January to December in NCU of WRH were 815. Among them 145 (17.8%) were diagnosed as neonatal jaundice / hyperbilirubinemia. Neonatal hyperbilirubinemia is extremely common because almost every newborn develops an unconjugated serum bilirubin level of more than 1.8 mg/dL during the first week of life. Incidence figures are difficult to compare because authors of different studies do not use the same definitions for significant neonatal hyperbilirubinemia or jaundice. In addition, identification of infants to be tested depends on visual recognition of jaundice by health care providers, which varies widely and depends both on observer attention and on infant characteristics such as race and gestational age (Bryon & Nancy, 2011).

Risk of developing significant neonatal jaundice is higher in male infants (Kliegman, 2012; Porter, 2002; Scrafford, 2013). This does not appear to be related to bilirubin production rates, which are similar to those in female infants. In this study Among 145 neonates, 60 percent diagnosed with hyperbilirubinemia were male. Similarly, findings of the retrospective study done in 73 cases in Kanti Children Hospital, 72.6 percent were male (Nepal, 2009).

The infant's age in hours is used when evaluating and managing bilirubin concentrations. Visual assessment of jaundice does not assess the total serum bilirubin reliably. Based on research, jaundice within the first 24 hours after birth is not physiologic jaundice and needs further evaluation (Dutta, 2009). In this study 7.6 percent neonates were within the 24 hrs of age at the time of admission. Similar findings reported in the previous studies (Nepal, 2009). Likewise 57.9 percent developed hyperbilirubinemia in the age >72 hrs to 1 week. Consistent with the study, similar findings reported in the earlier study done in Kanti Children Hospital (Nepal, 2009): The study revealed that 47.6 percent were Brahmin/Chhetry ethnicity, 55.2 percent were from rural residence and 42.8 percent were admitted from emergency of WRH. Regarding the duration of hospital stay mean = 3.75 (SD=2.02) range from 1 to 10 days in the neonatal unit.

All newborns should undergo a risk assessment for hyperbilirubinemia before discharge from the newborn nursery and have appropriate follow-up evaluation after discharge. Serum bilirubin > 15mg/dl was

taken significant as this is a routine practice in this hospital to admit and investigate all newborn with serum bilirubin >15 mg/dl. All the neonates having significant hyperbilirubinaemia were treated with phototherapy. Early outcomes were studied in the form of improved at discharge, referral to better center and death. The study revealed that 86.2 percent neonates were discharged after recovery, and 6.2 percent were referred to better center. Likewise death from kernicterus may occur, particularly in countries with less developed medical care systems (Slusher, 2012). Among all the neonates diagnosed with hyperbilirubinemia death was observed in only 0.7 percent neonates in this study. It might be because of limited neonates are admitted in the hospital; although NDHS, 2011 reported neonatal death is 33/1000 in Nepal. In contrast with the above findings death is quite higher in the small study conducted in rural Nigeria (Slusher, et al., 2013). At the time of discharge various background characteristics of hyperbilirubinemic babies such as age, sex, etc were analyzed in terms of early outcomes (Table 2). There is statistically significant association between residence, and source of admission with early outcome at discharge ($p < 0.05$) but there is no significant association between age, sex and length of stay in hospital of neonates with early outcome ($p > 0.05$). In contrast with this finding, none of the variables were found to be significantly associated with mortality in the previous study done in Kanti Children Hospital (Nepal, 2009). Retrospective design and small sample size are the main drawbacks of this study.

Conclusion

Neonatal hyperbilirubinemia is one of the most common problems in the neonates with male predominance. There is statistically significant association between residence, and source of admission with early outcome of neonate at discharge. The majority of the neonates admitted in the hospital were improved at discharge. Therefore, early recognition of neonatal hyperbilirubinemia is an important public health concern.

References

Agrawal, B., Belde, A., Sakpal P., Khiste. R. & Ingale, P. (2011). Neonatal jaundice: A Review. *International journal of biomedical and Advanced research* 2(10) doi:10.7439

- American Academy of Pediatrics Subcommittee on Hyperbilirubinemia (2004). Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation. *Pediatrics*114(1), 297-316.
- Bryon, J. L., & Nancy D. S. (2011). Hyperbilirubinemia in the Newborn Pediatrics in Review32 (8).
- Dutta, P.(2009). Neonatal Jaundice. Paediatric Nursing 2nd edition Jaypee:97-102.
- Kaini,N.R., chaudhary, D., Adhikari,V., Bhattacharya, S. & Lamsal, M.(2006). Overview of cases and prevalence of jaundice in neonatal Intensive Care unit. *Nepal Medical College Journal*8(2), 133-135
- Kliegman, R.M., Behrman, R.E., Stanton B.F., Schor N.F.& Geme, J.W. (2012). Jaundice and hyperbilirubinemia in the newborn. Nelson Textbook of pediatrics. 19th edition. Philadelphia: Saunders, 603–618.
- Moore, L.G., Newberry, M.A., Freeby, G.M., &Crnic, L.S.(1984). Increased incidence of neonatal hyperbilirubinemia in Colorado. *Am J Dis Child*138(2), 157-61.
- Nepal, D. Bastola, D., Dhakal,A.K., Mishra, U., & Mahaseth, C. (2009). Neonatal Hyperbilirubinemia and its outcome. *Journal of Institute of Medicine* 31(3).
- Porter, M.L., & Dennis B.L. (2002). Hyperbilirubinemia in the Term Newborn. Dewitt Army Community Hospital, Fort Belvoir, Virginia. *Am Fam Physician*. 15;65 (4):599-607.
- Robin L. W. (2009). Hyperbilirubinemia . *Critical Care Nursing Clinics of North America* 21(1): 97-120.
- Scrafford, C.G. et. al.(2013). Incidence of and risk factors for neonatal jaundice among newborns in southern Nepal 18(11):1317-28. doi: 10.1111.
- Slusher, T.M., & Olusaniya, B.O. (2012). Neonatal jaundice in low- and middle-income countries. Care of the jaundiced neonate. New York: McGraw-Hill:263-73.
- Slusher, T.M., Vreman, H.J., McLaren, D.W., Lewison, L.J., Brown, A.K.&Stevenson, D.K. (1995). Glucose-6-phosphate dehydrogenase deficiency and carboxyhemoglobin concentrations associated with bilirubin-related morbidity and death in Nigerian infants. *J Pediatr* 126(1):102-8.
- Subedi, K., Shrestha, R.S., Dhakwa, J.R. &Shrestha, N.J.(2009). Neonatal Intensive Care Unit, Kanti Children Hospital, Souvenir Kanti Children Hospital.