Prevalence and Etiology of Neonatal Jaundice in a Tertiary Care Hospital

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ABSTRACT

Introduction: Neonatal jaundice is a major clinical condition worldwide occurring in upto 60% of term and 80% preterm newborn in the first week of life. Neonatal jaundice is defined as total serum bilirubin level above 7 mg/dl. **Aims**: This study was done to find out the prevalence and etiology of neonatal jaundice in neonates admitted to Neonatal Intensive Care Unit (NICU) of Nepalgunj Medical College Teaching Hospital (NGMCTH) Kohalpur, Banke. **Methods**: It was a prospective cross sectional hospital based study conducted from November 2018 to November 2019 in Neonatal Intensive Care Unit of Nepalgunj Medical College Teaching Hospital. All neonates with clinical jaundice and hyperbilirubinemia with total serum bilirubin of ≥7 mg/dl were subjected to complete history taking, through physical examination and investigations. **Results**: Out of 892 neonates who developed clinical jaundice, 640 neonates whose parents gave consent were included in the study. The prevalence of neonatal jaundice was found to be 39.85% with male to female ratio of 1.79:1. In the present study pathological jaundice was seen in 74.94% whereas physiological jaundice in 23.66%. Among the various etiologies of pathological jaundice, neonatal sepsis (44.52%) was found to be the most common cause followed by ABO incompatibility (12.18%) and Rh incompatibility (7.03%). **Conclusion**: The prevalence of neonatal jaundice in present study was 39.85% and the most common cause was neonatal sepsis .The prevalence of jaundice was more in preterm than in term neonates. Neonatal jaundice is very common morbidity in NICU especially in preterm babies.

***Keywords**:* Etiology, Neonatal jaundice, Prevalence

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INTRODUCTION

Jaundice refers to discoloration of sclera, mucous membrane and skin owing to accumulation of bilirubin in the blood stream which causes yellow pigmentation of plasma, leading to discoloration of heavily perfused tissues.[1] Neonatal jaundice (hyperbilirubinemia) is defined as a total serum bilirubin level above 7 mg/dL.[2] Serum bilirubin level of most new born rises to >2 mg/dl in the first week of life. This level usually rises in full term infants to a peak of 6-8 mg/dl by 3-5 days of age and then falls, this is known as physiological jaundice. Pathologic jaundice is defined as appearance of jaundice within 24 hours after birth and a rapidly rising total serum bilirubin concentration (rise of serum bilirubin levels >0.5mg/dl/hr or more than 5 mg per dL per day).[2] Neonatal jaundice is a major clinical condition worldwide occurring in up to 60% of term and 80% of preterm newborn in the first week of life. Prematurity, low birth weight and infection are the main causes of neonatal jaundice in developing countries.[3] Neonatal jaundice is very common problem in Nepal and responsible for major morbidity of neonates.[4] Bilirubin is potentially toxic to the central nervous system, early detection and appropriate management of neonatal jaundice is of paramount importance to avoid neurological damage to brain of newborn babies which could lead to mental retardation, seizure disorder and cerebral palsy in future. Therefore awareness of prevalence, common causes and risk factors of neonatal jaundice is an important prerequisite to ensure early detection and proper management of neonatal jaundice.

METHODS

A hospital based study was carried out to determine the prevalence and etiology of jaundice in neonates admitted in NICU, NGMCTH Kohalpur from November 2018 to November 2019. Neonates admitted in NICU with clinical jaundice with serum bilirubin ≥7 mg/dl were included for the study. Those

neonates whose parents refused to take part in the study were excluded. Ethical clearance was obtained from Institutional Review Committee, Nepalgunj Medical College and Teaching Hospital, Kohalpur, Banke, Nepal.

Details of neonates in terms of age, sex, birth weight, period of gestation and presenting complains were recorded in predesigned proforma. The family history was recorded regarding recurrent jaundice and jaundice in sibling during neonatal period or later, any history of anemia, blood transfusion, developmental disorders or metabolic disorder among the family members.

Venous blood was taken and investigated for serum bilirubin (total, direct, indirect) and blood group (ABO and Rh) of baby and mother. Sepsis profile (TLC, DLC, CRP, micro ESR, Band cell/ neutrophil ratio), hemoglobin and peripheral blood smear for evidence of hemolysis was done if required.

All the data were analyzed by using SPSS version 20.

RESULTS

Out of total 2238 newborns admitted to NICU, 892(39.85%) newborns developed clinical jaundice.

Status of jaundice	Number	Percentage (%)
Jaundice present	892	39.85
Jaundice absent	1346	60.15
Total	**2238**	**100**

Table I: Prevalence of Neonatal Jaundice.

Gestational age	Preterm (<37 weeks)		Term (37-42 weeks)		Post term(>42 weeks)	
	N	%	N	%	N	%
Jaundice present	357	44.51	530	38.32	5	9.43
Jaundice absent	445	55.49	853	61.68	48	90.57
Total	**802**	**100**	**1383**	**100**	**53**	**100**

Table II: Prevalence of Neonatal jaundice according to gestational age.

Prevalence of jaundice was more in preterm than in term and post term newborns. 357 (44.51%) preterm babies had jaundice. (Table II) Among them, 640 neonates whose parents gave consent were studied to find the etiology. There were 489 neonates with pathological jaundice and 151 neonates with physiological jaundice. There were 411(64.21%) male and 229(35.79%) female neonates with jaundice. The male to female ratio was 1.79:1.

Gestational age	Number	Percentage (%)
Preterm(<37 weeks)	280	43.75
Term(37-42 weeks)	356	55.63
Post term(>42 weeks)	4	0.62
Total	**640**	**100.00**

Table III: Gestational age wise distribution of cases of neonatal jaundice.

Term babies were more (55.63%) in number than preterm in our study. (Table III).

Gestational age	Bilirubin range (mg/dl)	Bilirubin(mg/dl)	
		Mean	Std. Deviation
Preterm	9.42-30.54	16.78	3.58
Term	8.25-29.68	13.54	5.43
Post term	9.31-19.38	12.35	4.83

Table IV: Serum bilirubin level with gestational age.

The mean bilirubin level in preterm was 16.78 ±3.58 mg/dl and in term it was 13.54±5.43 mg/dl (Table IV).

Etiology	Number	Percentage (%)
Neonatal sepsis	285	44.52
Physiological jaundice	151	23.66
ABO incompatibility	78	12.18
Rh incompatibility	45	7.03
G6PD deficiency	20	3.12
Cephalhematoma	5	0.78
Sickle cell anemia	3	0.46
Breast milk jaundice	12	1.87
Infant of diabetic mother	11	1.71
Maternal use of oxytocin	10	1.71
polycythemia	10	1.56
Idiopathic	9	1.40
Total	**640**	**100.00**

Table V: Distribution of cases according to etiology.

The most common cause of neonatal jaundice was neonatal sepsis comprising of 285(44.52%) patients followed by physiological jaundice and ABO and Rh incompatibility. (Table V).

DISCUSSION

Neonatal jaundice is a major clinical condition worldwide occurring in up to 60% of term and 80% of preterm newborn in the first week of life. In most cases it is benign problem in neonates.

Out of total 2238 newborns admitted to NICU during the study period of one year, 892 newborns developed clinical jaundice showing the hospital based prevalence of neonatal jaundice in present study as 39.85 %. However the prevalence of neonatal jaundice in preterm was high (44.51%) as compared to term and post term neonates whose prevalence were 38.32 % and 9.43 % respectively. The prevalence of neonatal jaundice reported by various authors from India varies from 22% to 54.6%.[3, 6] In the present study prevalence of neonatal jaundice is 39.85%. This finding is almost in conformity with the finding of Bahl et al. and Bajpai et al. From India and Rasul et al. from Bangladesh.[3, 7, 8] However figure reported by Kaini et al in 2006 in B.P.Koirala Institute of health sciences (BPKIHS), Dharan,

Nepal shows the prevalence of neonatal jaundice to be 14% .[9] Out of 892 clinically jaundiced neonates, 640 neonates whose parents gave consent were included in the study to find out the etiology of jaundice.

Out of 640 jaundiced neonates male constituted 64.21 %(n=411) and female 35.79 % (n=229) with male to female ratio of 1.79:1 suggesting a male predominance in the study group. This could be because of predominance of males in total newborns admitted in the hospital during the study period (M: F ratio being 1.31:1) and males are given more preference than female for seeking health care facilities.Finding in the present study are in confirmatory to that of Rijal et al from Nepal Medical College Teaching Hospital, Kathmandu who have reported male predominance in their study (male =59.3% and female=40.7%).[10] Similar result was found by Deepeshwara et al. in 2009 in Kanti Children Hospital where male babies (72.6%) outnumbered female babies (37.4%).[11]

Out of 640 neonates, preterms were 43.75% (280), term were 55.63% (356) and post term were 0.62% (4) in our study. The mean total serum bilirubin level in term neonates was 13.54±5.43 mg/dl whereas 16.78±3.58 mg/dl and 12.35±4.83 mg/dl in preterm and post term neonates respectively in present study. The mean total serum bilirubin level in preterm neonates (16.78±3.58 mg/dl) were higher as compared to mean serum bilirubin level in term neonates (13.54±5.43) . A similar observation has been reported by Watchko et al in a study on preterm with hyperbilirubinemia.[12]

Out of 640 jaundiced neonates pathological jaundice was found in 74.94% neonates. This finding is similar to other study .[9] Out of different pathological causes observed in the study group, neonatal sepsis was the commonest and observed in 44.52% cases. . Similar findings were shown by other studies also[9,11] ABO incompatibility (mother O+ve, baby other than O) accounted for 12.18% cases of neonatal jaundice in our study. Kaini et al in 2006 and Kalakheti et al in 2009 in B.P.Koirala Institute of health sciences (BPKIHS), dharan reported the prevalence of ABO incompatibility to be 11.1% and 11.7% respectively and their observation are similar to present study. [9, 13]

Rh incompatibility (mother Rh-ve, baby Rh+ve) as a cause of neonatal jaundice was observed in 7.03% (n=45) cases in present study. Rasul et al. also reported a similar observation in a tertiary care hospital in Bangladesh where 5.4% cases had Rh incompatibility.[8] Similar result was also found in studies done in Nepal from Kanti children hospital where they reported the prevalence of Rh incompatibility to be 4.1% and by Chitlangia et al. from BPKIHS, Dharan where they reported Rh isoimmunization to be 6.7% .[11, 14]ABO incompatibility was approximately twice as common as Rh incompatibility in present study. The incidence of Rh incompatibility has decreased as a result of the introduction of Rh (D) immunoglobulin to Rh negative mothers. This could explain the decreased incidence of Rh incompatibility as compared to ABO incompatibility in present study.

G6PD deficiency and sickle cell anemia were present in 20(3.12%) and 3(0.46%) cases. Infant of diabetic mother and maternal use of oxytocin accounted for 1.71% each whereas breast milk jaundice and polycythemia caused jaundice in 1.87% and 1.56% cases respectively. In 9(1.40%) cases the causes could not be found out and labeled as idiopathic.

The prevalence of physiological jaundice in the present study was 23.66%. Rasul et al in a prospective cross-sectional study reported the prevalence of physiological jaundice to be 26.7%.[8] which is similar to our study.

LIMITATIONS

This study did not assess the risk factors associated with the etiologies of this condition. Identification of the risk factors may help to reduce the complications of this condition. It also did not assess long term outcome of the patients.

CONCLUSION

Out of 2238 newborns admitted to NICU, 892 newborns developed jaundice. Out of these, 640 jaundiced neonates were included in the study .The prevalence of neonatal jaundice in present study was 39.85% with male to female ratio 1.79:1. Prevalence of neonatal jaundice in preterm, term and post term was 44.51%, 38.32% and 9.43% respectively. Among the various etiologies of neonatal jaundice, neonatal sepsis (44.52%) was found to be the most common cause which is followed by physiological jaundice (23.66%) and ABO incompatibility (12.18%). The mean serum billirubin level in the present study was 16.78±3.58 mg/dl in preterm, 13.54±5.43 mg/dl and 12.35±4.83 mg/dl in term and post term neonates respectively.

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