

**The study of Hemoglobin levels in Neonatal Jaundice**<sup>1</sup>Harish Kumar B, <sup>2</sup>B. Rajini, <sup>3</sup>Akshay Berad<sup>1</sup> Assistant Professor, Dept. of Physiology, Mamatha Medical College, Khammam, Telangana.<sup>2</sup> Assistant Professor, Dept. of Physiology, Kakatiya Medical College, Warangal, Telangana.<sup>3</sup> Assistant Professor, Dept. of Physiology, CAIMS, Karimnagar, Telangana. India**Correspondence Author:** B. Rajini, Assistant Professor, Dept. of Physiology , Kakatiya Medical College, Warangal, Telangana, India**Conflicts of Interest:** Nil**Abstract**

Neonatal hyperbilirubinemia is a very common condition in newborn sometimes leading to kernicterus causing brain damage. There are various conditions, both physiological and pathological leading to hyperbilirubinemia in newborn. Although up to 60 percent of term newborns have clinical jaundice in the first week of life, few have significant underlying disease.<sup>1</sup> It is very important for pathologists and pediatricians to differentiate the physiological and pathological causes of hyperbilirubinemia. Neonatal jaundice can be an entirely benign physiologic process. It can also be the first sign of serious illness with associated toxicity. A detailed case sheet proforma was prepared and data collected from 51 neonates admitted for neonatal jaundice. All neonates with jaundice were subjected for bio-chemical analysis like serum bilirubin-Total, indirect, and direct complete blood picture, haemoglobin estimation. Thus a prospectively arranged clinical study on neonatal jaundice with onset in the physiological age range was carried and analysed. In study it was seen male sex is a risk factor for neonatal hyperbilirubinemia. Neonatal co-morbid conditions like birth asphyxia, delayed breast feedings (or) hypoglycemia, cephal hematoma, respiratory distress syndrome etc. are associated with hyperbilirubinemia. Prematurity and low birth weight babies are prone for hyperbilirubinemia with

maternal risk factors. Special care must be given to them in order to avoid future complications of hyperbilirubinemia.

**Keywords:** Neonatal jaundice , Bilirubin, Hemoglobin.**Introduction**

Jaundice is most common problem faced by neonates in the first week of life. Although physiological jaundice is more frequent as compared to pathological jaundice it is very important to differentiate between the two as pathological jaundice may lead to kernicterus and subsequently brain damage. There are various modalities of investigations e.g. Serum bilirubin, Direct and indirect coomb's test, Blood group, G-6PD deficiency, reticulocyte count by which we can reach at diagnosis. Treatment is also dependent upon the amount of serum bilirubin and various other laboratory investigations. Thus laboratory workup is very important for diagnosis and prevention of neonatal hyperbilirubinemia in newborn. With this background present study was conducted to study the haemoglobin levels among infants with neonatal hyperbilirubinemia. The most common cause of neonatal hyperbilirubinemia in India is physiological jaundice. Various other conditions in decreasing order are preterm infant, blood group incompatibility, Neonatal septicemia, G-6PD deficiency, cephalhematoma, drug induced, RBC membrane disorders and many others.

**Material and methods**

This study was conducted at Department of Paediatrics, Mahatma Gandhi Memorial Hospital and Department of Physiology, Kakatiya Medical College, Warangal.

A detailed case sheet proforma was prepared and data collected from 51 neonates admitted for neonatal jaundice. Complete physical examination of the neonates with clinical estimation of bilirubin levels by Kramer’s method of clinical assessment of jaundice cephalo pedal progression was carried out and confirmed by biochemical analysis.

All neonates with jaundice were subjected for biochemical analysis like serum bilirubin-Total, indirect, and direct complete blood picture, heamoglobin estimation. Thus a prospectively arranged clinical study on neonatal jaundice with onset in the physiological age range was carried and analysed. In the present study, neonates with jaundice between 36 hrs and 10 days of age in-term babies, were studied Heamoglobin levels in grams percentage. Newborns appear jaundiced when the serum-bilirubin is greater than 7 mg/dl. 25-50% term newborns and a higher percentage of pre-term newborns develop jaundice. This transient hyper-bilirubinemia has been called physiological jaundice.

**Methods:**

1. Serum bilirubin Total direct and Indirect. Estimation was done by Malloy and Evelyn method by Vandenbergh reaction.
2. Estimation of Heamoglobin percentage many methods of estimation of heamoglobin concentration are in use the one commonly used in the laboratory work is the Sahli’s acid hematin method.

The study population of 51 neonates with jaundice were analysed in terms of physiological bilirubinemia (<15mg%) and pathological bilirubinemia (>15mg%) for presence of significant risk factors for neonatal

hyperbilirubinemia. All variables tested for significance by using unpaired students ‘t’ test for probability of the highest ‘t’ value of chance at particular degrees of freedom. Variables considered significant if they had a ‘p’ value of < 0.05.

**Results: 1**

Table-1: Depicts Neonatal Age At Admission With Number And Percentage And Heamoglobin Levels.

S.No.	Age at admission in days	No.of Neonates	% of Neonates	Serum Bilirubin in mg%			Hb gm%
				Total	Indirect	Direct	
1.	0-1	0	0	0	0	0	0
2.	1-2	8	11.76	15.4	14.5	0.9	14
3.	2-3	10	24.35	15.18	14.15	1	14
4.	3-4	6	11.67	20.8	19.7	1.1	13.5
5.	4-5	10	18.56	16.05	17.05	1	14
6.	5-6	7	11.67	17.52	17.15	1.1	14.5
7.	6-7	4	6.88	18.25	18.6	0.6	14
8.	7-8	1	3.41	15.32	14.20	1	13
9.	8-9	6	11.67	15.7	14.8	1	14
10.	9-10	5	7.88	16.1	17.1	1	14

Table-1 shows neonatal age at admission with number and percentage and hemoglobin, bilirubin levels. It is observed that maximum neonates were in age of 1-5 days. Hb levels were between 13-14gm%. Total bilirubin levels were between 15-19mg%.

**Table-2:** Depicts Distribution Of Variables Among Neonatal Jaundice As Physiological And Pathological Bilirubinemia With Statistical Indices.

S. No.	Variables	Neonatal Jaundice						p' value
		Physiological 12			Pathological 39			
		T.S.B.15 or <15 mg%			T.S.B. > 15mg%			
		No. of babies	%	Average T.S.B.	T.S.B.No.	%	Average T.S.B.	
1.	Sex-Male	09/12	75	13.47	24/39	61.54	17.18	<0.001
2.	Low Birth Weight	06/12	50	14.40	12/39	30.77	17.33	<0.01
3.	Gestational Maturity (Pre-term)	03/12	25	13.80	09/39	23.08	16.90	<0.001
4.	Delayed Feeding/ Hypoglycemia	03/12	25	15.00	15/39	38.46	17.85	<0.001
5.	Birth Asphyxia	0/12	0	-	15/39	38.46	18.32	<0.02
6.	Cephalo Hematoma (Birth Injury)	0/12	0	-	03/39	7.69	22.80	<0.01
7.	Respiratory Distress Syndrome (RDS)	03/12	25	13.80	0/39	0	-	<0.01
8.	Hypothermia	0/12	0	-	03/39	7.69	16.20	<0.1
9.	Maternal 'O' Blood Group	03/12	25	11.60	21/39	53.85	17.88	<0.001
10.	Baby's 'A' Blood Group	03/12	25	15.00	09/39	23.08	18.94	<0.001
11.	Baby's 'B' Blood Group	06/12	50	13.80	12/39	30.77	22.65	<0.1

Table 2 shows number of babies with physiological and pathological jaundice along with there total Sr.bilirubin levels.It shows number of male and female of neonates. Percentage of low birth babies.

**Table 3 Number of cases of physiological and pathological neonatal jaundice**

Type of Neonatal Jaundice	Number of cases n=51	Percentage
Physiological	12	23.52%
Pathological	39	76.47%

From table 3 it is seen that 23.52% cases of were of physiological jaundice.76.47% cases were of pathological neonatal jaundice.

**Discussion**

In the present study 51 neonates were studied for hyper bilirubinemia in the physiological age range > 36 hrs to 10 days in term babies and 14 days in pre-term babies for neonatal jaundice.

Moderately elevated serum bilirubin levels of indirect type in the absence of excessive hemolysis and blood group in compatibility, heamoglobin 14 gm% could be due to other associated co-morbid neonatal conditions like pre-maturity, respiratory distress birth asphyxia etc[1,2,3,7]. More than 1/3 neonates (35.3%) of study population were

low birth weight babies and developed jaundice slightly higher PCV (44%) noticed[4]. Among 1.5 to 1.9 kg wt. group which could be due to exaggerated physiological dehydration (i.e. more transparent water loss due to more body surface area and thin epidermis)[5]. Birth injury with cephal hematoma is an extra source for heme and bilirubin metabolism, hence hyperbilirubinemia[6]. Respiratory distress syndrome often seen in pre-term babies is likely to produce hyperbilirubinemia due to prematurity, dehydration, hypoxia, acidosis hypoglycemia and hypothermia[1,3,6]. High specificity was recorded among variables in descending order are respiratory distress syndrome (RDS), birth injury, prematurity, babies blood group “A” and babies blood group “B”. Low birth weight babies, birth asphyxia and delayed feeding or hypoglycemia.

**Conclusion**

Male sex is a risk factor for neonatal hyperbilirubinemia. Neonatal co-morbid conditions like birth asphyxia, delayed breast feedings (or) hypoglycemia, cephal heamatoma, respiratory distress syndrome etc. are associated with hyperbilirubinemia. Prematurity and low birth weight babies are prone for hyperbilirubinemia with maternal risk factors. Mother’s with “O” blood group and babies with “A” and “B” blood group are associated with neonatal hyperbilirubinemia. The following variables found significant risk factors for neonatal hyperbilirubinemia with ‘p’ value <0.05 – male sex, low birth weight (LBW) babies, prematurity, delayed feeding or hypoglycemia, birth asphyxia, maternal blood group “O” and babies with blood group “A”. Neonatal hyperbilirubinemia is associated with various other clinical morbidities. Causes of hyperbilirubinemia should be investigated comprehensively. ABO and Rh typing should be done along with Coombs Test, reticulocyte count and G6PD screening. Special care must be given to

them in order to avoid future complications of hyperbilirubinemia.

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