

HYPOALBUMINEMIA IN JAUNDICE NEONATORUM AMONG TERM NEWBORNS AT A TERTIARY CARE HOSPITAL

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Abstract;

Background; Jaundice which occurs in about 60% term and more than 80 % preterm neonates. It remains on the most common morbidities observed in the first week of life of newborns and is most prevalent cause of re-hospitalization after their discharge from birth hospitalization. This study was conducted to document the frequency of hypoalbuminemia in neonatum jaundice as there is no such study conducted in Pakistan. **Objective;** To determine the frequency of hypoalbuminemia in jaundice neonatorum in term infants. **Material and methods;** A total of 265 patients fulfilling the inclusion criteria from indoor department of pediatrics Nishtar hospital Multan were included in the study from May 2016 to May 2017. Demographic information of patients (gestational age, mode of delivery, gender, weight) was taken and recorded in study proforma. Three ml blood sample was collected from all participants for serum albumin levels and hypoalbuminemia was defined as serum albumin level of less than 2.5 g/dL by laboratory test. Data was analyzed with statistical analysis program (SPSS version 11.5). **Results;** Of these 265 study cases, 150 (56.6%) were boys while 115 (43.4%) were girls. Mean gestational age of our study cases was 39.84 ± 1.67 weeks (with minimum gestational age was 37 weeks while maximum was 42 weeks). Mean gestational age of the boys was 40.41 ± 1.42 weeks while that of girls was 39.10 ± 1.69 weeks. Our study results have indicated that majority of our study cases i.e. 160 (60.4%) had gestational age ranging from 40- 42 weeks. Majority of these babies i.e. 222 (83.8%) were born through vaginal mode of delivery. Mean weight of our study cases was 3084.08 ± 344.422 grams (with minimum weight was 2550 grams while maximum weight was noted to be 3750 grams). Majority of our study cases i.e. 150 (56.6%) were from rural areas and 115 (43.3%) belonged to the urban areas. Of these 265 study cases, 104 (39.2%) were from poor socioeconomic background while 125 (47.2%) had middle income. Mean level of serum albumin was 2.55 ± 0.31 g/dl (with minimum albumin level was 2.2 and maximum was 3.6). Hypoalbuminemia was seen in 141 (53.2%) of our study cases.

Conclusion; In our study, very high frequency of hypoalbuminemia has been noted in neonates presenting with jaundice. Neonatal jaundice was more prevalent in boys than girls. Hypoalbuminemia was significantly associated with rural residential status, vaginal mode of delivery and poor socioeconomic status.

Keywords; Hyperbilirubinemia, hypoalbuminemia, jaundice.

Introduction:

Jaundice is a commonly encountered entity in neonatology wards which occurs predominantly in 60 % term and 80% preterm newborns during first week of life^{1,2}. In these patients when total serum bilirubin (TSB) is raised than 5 mg/dl to 7 mg/dl, it is visible in skin and eyes of newborns compared with adults where it is only visible in eyes when TSB levels exceed 2mg/dl. Three main contributing factors have been reported to cause increased levels of TSB with varying degrees of contribution from each; these factors include “increased production from degradation of red cells, decreased clearance by the immature hepatic mechanisms and reabsorption by enterohepatic circulation (EHC)”. Raised serum bilirubin level can potentially lead to certain neurological disorders having adverse consequences in some of these affected newborns having jaundice³. Albumin which is serum-binding protein in the body functions to transport different substances such as bilirubin, metals, ions, fatty acids, hormones and different exogenous drugs. Albumin comprises of more than 70% of normal plasma colloid

oncotic pressure and half of the protein content. Range of reference values of albumin in serum are 3.5 – 4.5 g/dL while 350 – 500 g is total body content and is synthesized in hepatic cells only (15 grams per day among healthy subjects). However these albumin synthesis rates may differ greatly with different types of physiological stress, its half-life is almost 20 days showing 4 % degradation daily⁴. Hypoalbuminemia is defined as “albumin level of less than 3.4 g/dL for patients 7 months or older and less than 2.5 g/dL” in term infants.⁵ The etiology of hypoalbuminemia is complex. In general, it is described to diminished synthesis in malnutrition, malabsorption and hepatic dysfunction or increased losses in nephropathy or protein-losing enteropathy.⁶ Very less data is available about reference range of serum albumin levels in term and preterm newborns.⁷ Horowitz IN and his associates has reported in a study that frequency of hypoalbuminemia in jaundice neonatorum in term infants was 20%.⁸ Hasosah MY and his associates has reported in another study that frequency of hypoalbuminemia in jaundice neonatorum in term infants was 55%.⁹

This study was conducted to document the frequency of hypoalbuminemia in neonatum jaundice as there is no such study conducted in Pakistan.

MATERIAL AND METHODS:

Patients fulfilling the inclusion criteria (either gender, birth weight more than 2500 grams weighed by weighing machine, gestational age 37-42 weeks on ultrasound having jaundice neonatorum) from indoor department of pediatrics Nishtar hospital Multan were included in the study from May 2016 to May 2017. Informed consent was taken from parents of the new born infants. Patients having serum bilirubin level >18 mg/dL, gestational age >42 weeks on ultrasound, severe haemolytic disease and admission to the NICU due to low birth weight were excluded from our study.

Demographic information of patients (gestational age, mode of delivery, gender, weight) was taken and recorded in study proforma. Neonatal Jaundice was defined when by examining the infant within 24 hours after delivery in a well-lit room and blanching the skin with digital pressure which reveal the yellowish color of the skin and subcutaneous tissue which was confirmed by laboratory test serum bilirubin level >13 mg/dL. Three ml blood sample was collected from all participants for serum albumin levels and hypoalbuminemia was defined as serum albumin level of less than 2.5 g/dL by laboratory test. Data was analyzed with statistical analysis program (SPSS version 11.5). Frequency and percentage was computed for qualitative variables like gender, gestational age groups, mode of delivery and hypoalbuminemia. Mean \pm SD was presented for quantitative variables like gestational age, serum albumin levels and weight. Effect modifiers like gestational age, mode of delivery and gender were controlled by stratification. Post stratification chi square test was applied $p \leq 0.05$ was considered statistically significant.

Results:

A total of 265 newborns meeting inclusion and exclusion criteria of our study were included in this study. Of these 265 study cases, 150 (56.6%) were boys while 115 (43.4%) were girls. Mean gestational age of our study cases was 39.84 ± 1.67 weeks (ranging; 37 – 42 weeks). Mean gestational age of the boys was 40.41 ± 1.42 weeks while that of girls was 39.10 ± 1.69 weeks while 160 (60.4%) had gestational age ranging from 40- 42 weeks. Majority of these babies i.e. 222 (83.8%) were born through vaginal mode of delivery. Mean weight of our study cases was 3084.08 ± 344.422 grams (ranging; 2550 grams to 3750 grams), furthermore 220 (83%) had weight ranging from 2500 grams to 3500 grams. Majority of our study cases i.e. 150 (56.6%) were from rural areas and 115 (43.3%) belonged to the urban areas. Of these 265 study cases, 104 (39.2%) were from poor socioeconomic background while 125 (47.2%) had middle income. Mean level of serum albumin was 2.55 ± 0.31 g/dl (with minimum albumin level was 2.2 and maximum was 3.6). Hypoalbuminemia was seen in 141 (53.2%) of our study cases and it was stratified with regards to gender, gestational age, mode of delivery, residential status, socioeconomic status and weight and p values were calculated to be $p=0.083$, $p=0.529$, $p=0.000$, $p=0.047$, $p= 0.001$ and $p= 0.071$ respectively.

Table No. 1

Cross-tabulation of hypoalbuminemia with regards to gender

(n=265)

Gender	Hypoalbuminemia		P – value
	Yes (n=141)	No (n=124)	
Male (n=150)	87	63	0.083
Female (n=115)	54	61	
Total	265		

Table No. 2

Cross-tabulation of hypoalbuminemia with regards to gestational age.

(n=265)

Gestational age	Hypoalbuminemia		P – value
	Yes (n=141)	No (n=124)	
37-39 weeks (n=105)	53	52	0.529
40-42 weeks (n=160)	88	72	
Total	265		

Table No. 3

Cross-tabulation of hypoalbuminemia with regards to Mode of delivery

(n=265)

Mode of delivery	Hypoalbuminemia		P – value
	Yes (n=141)	No (n=124)	
Vaginal delivery (n=222)	140	82	0.000
Cesarean section (n=43)	01	42	
Total	265		

Table No. 4
Cross-tabulation of hypoalbuminemia with regards to weight
 (n=265)

Weight (In grams)	Hypoalbuminemia		P – value
	Yes (n=141)	No (n=124)	
2500-3500 (n=220)	123	97	0.071
More than 3500 (n=45)	18	27	
Total	265		

Table No. 5
Distribution of serum albumin levels with regards to hypoalbuminemia
 (n=265)

Hypoalbuminemia	Albumin level (g/dl)		P – value
	Mean	Standard deviation	
Yes (n=141)	2.33	0.07	0.000
No (n=124)	2.81	0.29	

Discussion;

Jaundice which occurs in about 60% term and more than 80 % preterm neonates¹⁰. It remains on the most common morbidities observed in the first week of life of newborns and is most prevalent cause of re-hospitalization after their discharge from birth hospitalization¹¹⁻¹⁵. This study was conducted to document the frequency of hypoalbuminemia in neonatum jaundice as there is no such study conducted in Pakistan.

A total of 265 newborns meeting inclusion and exclusion criteria of our study were included in this study. Of these 265 study cases, 150 (56.6%) were boys while 115 (43.4%) were girls. Male gender predominance in newborns with jaundice has been reported in some other studies as well. A study conducted in Egypt by Gamalaleidin et al¹⁶ reported 54.2% boys having neonatal jaundice, these findings are similar to that of our study results. Similarly Alvi et al¹⁷ has reported 62 % boys versus 38 % girls having neonatal jaundice which is again similar to that of our study results.

Mean gestational age of our study cases was 39.84 ± 1.67 weeks (with minimum gestational age was 37 weeks while maximum was 42 weeks). Mean gestational age of the boys was 40.41 ± 1.42 weeks while that of girls was 39.10 ± 1.69 weeks. Our study results have indicated that majority of our study cases i.e. 160 (60.4%) had gestational age ranging from 40- 42 weeks. Similar results have been reported by Hasosah MY et al⁹. Majority of these babies i.e. 222 (83.8%) were born through vaginal mode of delivery. Gamaleldin et al¹⁶ reported 74 % vaginal route of delivery, similar to our study results.

Mean weight of our study cases was 3084.08 ± 344.422 grams (with minimum weight was 2550 grams while maximum weight was noted to be 3750 grams), furthermore our study results have indicated that majority of these study cases i.e. 220 (83%) had weight ranging from 2500 grams to 3500 grams. Similar findings have

been reported by Gamaleldin et al¹⁶. Majority of our study cases i.e. 150 (56.6%) were from rural areas and 115 (43.3%) belonged to the urban areas. Of these 265 study cases, 104 (39.2%) were from poor socioeconomic background while 125 (47.2%) had middle income.

Hypoalbuminemia has been documented in some studies among targeted population and Hypoalbuminemia was seen in 141 (53.2%) of our study cases. Horowitz IN and his associates has reported in a study that frequency of hypoalbuminemia in jaundice neonatorum in term infants was 20%.⁸ Hasosah MY and his associates has reported in another study that frequency of hypoalbuminemia in jaundice neonatorum in term infants was 55%.⁹ These findings of Hasosah MY et al⁹ are in compliance with that of our study results while our study results are different from that of Horowitz et al⁸.

Conclusion;

In our study, very high frequency of hypoalbuminemia has been noted in neonates presenting with jaundice. Neonatal jaundice was more prevalent in boys than girls. Hypoalbuminemia was significantly associated with rural residential status, vaginal mode of delivery and poor socioeconomic status. Clinicians treating such patients should carry out serum albumin level in routine for proper management of neonatum jaundice. This will help us to decrease neonatal morbidity and mortality in targeted population. Very few studies have been done on this topic so it is suggested to conduct more studies from different parts of world.

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