Neonatal jaundice sociodemographic study in bint alhuda teaching hospital

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بسم الله الرحمن الرحيم

﴿ قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ ﴾

صَدَقَ اللهُ العَلِيُّ العَظِيم

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Dedication

Every challenging work needs self-efforts as well as

Guidance of elders especially those who were very

Close to our heart

My humble effort I dedicate to my sweet and loving

Father Mother,

Whose affection, love, encouragement and prays of day

And night make me able to get such success and honor,

List of Tables

Abstract

Aim of study

The aim of this study was to determine the characters of Neonatal jaundice & seasonal variation ,study in bint alhuda teaching hospital.

PATIENTS AND METHODS:

This is a descriptive study conducted in bint alhuda teaching hospital Dhi-Qar ,Iraq , from pediatric population based on a restrictive survey over a period of three months (1st January to 29th March 2022). The data was collected from 100 samples including 39 female and 61 male.

RESULTS:

One hundred neonates were included in the study of which 61 (61.0%) were males and 39 (39.0%) were females with mean age 7.30 (±3.87). The mean level of TSB was 12.54 (±4.59). Majority of the individuals 76 (76.0%) were full term gestational age while 24 (24.0%) were preterm. About 91 (91%) of neonate were treated by phototherapy. Higher percent of blood group of mothers was O+ and A+, 35 (34.7), 28 (27.7%) respectively. The same result observed in baby 26 (25.7%), and 38 (37.6%).

CONCLUSION:

The present study concluded that mean age of study samples 7.30 (±3.87), majority of them had full term gestational age, Majority of them were not have family history of neonatal jaundice. There is statistical relation in comparison between male and female (Gestational age, Treatment, and Mode of delivery). Further studies recommended for a larger sample size with wide nation region and increase questionnaire items to get more accurate results.

Chapter one: Introduction

Introduction

Neonatal jaundice (NNJ) is one of the leading causes of neonatal morbidity accounting for between 10% and 35% of neonatal admissions.[1],[2] While most neonates experience physiologic NNJ, the incidence of significant levels of NNJ varies with race or ethnicity. Some authors have observed jaundice prevalence rates ranging from 35%[2] to

45.6%[3] in different nations in the world. Ethnic variability in the incidence and severity of NNJ may be related to differences in the distribution of the genetic variants in bilirubin metabolism.[4]

Serum bilirubin concentration reflects a combination of the effects of bilirubin production, conjugation and enterohepatic circulation. The factors that affect these processes account for the bilirubinemia that occurs in virtually all newborns.

Physiological jaundice of the newborn is as a result of a complex interaction of a number of factors which include an increased load to the liver due to relatively high foetal red cell mass in the newborn, reduced red cell lifespan when compared to adult red cells and also an increased release of haem from ineffective erythropoiesis.[1] Other causes of physiologic jaundice are a reduced hepatic uptake of bilirubin due to relatively low ligandin (Y protein) levels and reduced conjugation from relatively low UDGP-T activity; inefficient bilirubin excretion; and increased enterohepatic circulation due to the absence of gut bacteria that break down bilirubin, gut stasis from any cause and increased activity of beta glucuronidase. Physiological jaundice does not usually exceed 10 mg/dl in term and 15 mg/dl in preterm babies and it is clinically undetectable after 14 days.[5]

The time that NNJ appears may be a pointer to its nature. NNJ appearing within 24 h could be due to haemolytic disease of the newborn, Rhesus, ABO and minor blood group incompatibility, infectious origin or glucose-6 phosphate dehydrogenase deficiency.[6] NNJ appearing between 24 and 72 h of life could be physiological, could be due to sepsis neonatorum, polycythemia and concealed haemorrhages such as

cephalohaematoma or subarachnoid bleeding. It could also be due to increased enterohepatic circulation. Beyond 72 h of life, the identified causes are sepsis neonatorum, neonatal hepatitis, extrahepatic biliary atresia and breast milk jaundice. Breast milk is a competitive inhibitor of hepatic uridine diphosphate glucuronosyltransferase (late onset breast-milk jaundice). Infants that are exclusively breastfed have an increased risk for severe hyperbilirubinaemia in the first 2–5 days of life compared to formula-fed infants.[7]

One review of 12 studies involving more than 8000 neonates in the first week of life revealed that compared to formula-fed infants, breastfed infants had significantly higher maximum total serum bilirubin (TSB) levels.[8] Exclusively breastfed infants are thus at a higher risk of developingNNJ.[8]

Pathological jaundice should be suspected when there is a high red cell mass such as in polycythaemia, increased haemolysis due to blood group incompatibilities or isoimmunisation syndromes such as ABO, rhesus and other minor blood groups. Other causes of pathological jaundice are deficiency of red cell enzymes such as glucose-6 phosphate dehydrogenase, defects in red cell membrane, infections, the use of haemolytic agents and extravasated blood. It may also result from liver cell membrane defects such as Gilbert's disease, defective conjugation and other conditions such as prematurity, Down's syndrome and infants of diabetic mothers.[1]

The aim of this study was to determine Neonatal jaundice sociodemographic study in bint alhuda teaching hospital.

Chapter Two: Patients and methods :

Study Design:

This is a descriptive study conducted in bint alhuda teaching hospital Dhi-Qar ,Iraq , from pediatric population based on a restrictive survey over a period of three months (1st January to 29th March 2022). The data was collected from 100 samples including 39 female and 61 male.

Questionnaire development

The development of questionnaire was based on the information needed for the study. The questionnaire included these items: (Age in day, Gender, Level of TSB, Neonatal age of presentation, Mode of delivery, Blood group of mothers, Blood group of babies, Gestational age, Treatment). And family history domain include five items.

Statistical analysis

We encoded the participants' responses and analyzed the data using Statistical Package for Social Sciences (SPSS statistics for windows, version26.0, IBM Corp., Armonk, NY, USA). We adopted descriptive analysis to calculate the response proportion of each group of respondents for each item in the questionnaire. We also used the Chi-square test to ascertain the association between the dependent variables and other independent selected variables considering the level of $p< 0.05$ as the cut-off value of significance.

Descriptive data analysis and Inferential data analysis:

This approach was performed through the determination of:

a. Frequency (f).

b. Percentages:

c.

$$\% \equiv \frac{Frequencies}{sample\ \ size} x100$$

d. $$\overline{X} = \frac{\sum_{i=1}^{k} mifi}{\sum_{i=1}^{k} fi}$$

Chi-square (x^2) test:

$$X^2 = \sum \frac{(O_i - E_i)}{E_i}$$

Chapter three: Results

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Table 1: Clinical and demographic data (N=100)

Clinical and demographic data	N(%) or M (±SD)
Age in day	7.30 (±3.87)
Gender ○ Male ○ Female	 61 (61.0%) 39 (39.0%)
Level of TSB	12.54 (±4.59)
Neonatal age of presentation	3.44 (±1.54)
Mode of delivery ○ C/A ○ NVD	 65(65.0%) 35(35.0%)
Blood group of mothers ○ O- ○ O+ ○ A+ ○ B+ ○ AB+	 5 (5.0%) 35 (34.7) 28 (27.7%) 6 (5.9%) 12 (11.9%)
Blood group of babies ○ O- ○ O+ ○ A- ○ A+ ○ B- ○ B+ ○ AB- ○ AB+	 4 (4.0%) 26 (25.7%) ? 2 (2.0%) 38 (37.6%) 2 (2.0%) 10 (9.9%) 2 (2.0%) 2 (2.0%)

Gestational age ○ Preterm ○ Full term	 24 (24.0%) 76 (76.0%)
Hemolytic disease ○ YES ○ NO	 0 (0.0%) 100 (100.0%) ?
Treatment ○ Phototherapy ○ Exchange transfusion ○ Both	 91 (90.1%) 1 (1.0%) 8 (7.9%)

One hundred neonates were included in the study of which 61 (61.0%) were males and 39 (39.0%) were females with mean age 7.30 (±3.87). The mean level of TSB was 12.54 (±4.59). Majority of the individuals 76 (76.0%) were full term gestational age while 24 (24.0%) were preterm. About 91 (90.1%) of neonate were treated by phototherapy. Higher percent of blood group of mothers was O+ and A+, 35 (34.7), 28 (27.7%) respectively. The same result observed in baby 26 (25.7%), and 38 (37.6%).

Table 2: Family history (N=100)

Family history	**N(%)**
Family history of neonatal jaundice ○ YES ○ NO	 40 (40.0%) 60 (60.0%
Family history of exchange transfusion ○ YES ○ NO	 2 (2.0%) 98 (98.0%)
Maternal disease during pregnancy ○ HTN ○ DM ○ NO	 6 (5.9%) 1 (1.0%) 93 (92.1%)
History of blood disease Hb pathology . ○ YES ○ NO	 1 (1.0%) 99 (98.0%)
Family history of neonatal	

death or abortion ○ YES ○ NO	8 (7.9%) 92 (91.1%)

Table 2 describes the family history of the study individuals, Majority of them were not have family history of neonatal jaundice 40 (40.0%). Most of mothers not have disease during pregnancy 93 (92.1%), about 6 (5.9%) have hypertension. Only 8 (7.9%) have family history of neonatal death or abortion and 1 (1.0%) have history of blood disease Hb pathology.

Table 3: comparison between male and female (Gestational age, Treatment, and Mode of delivery)

Variable	Male	Female	*P* value
Gestational age			
○ Preterm	18	6	0.11
○ Full term	43	33	
Treatment			
○ Phototherapy	56	35	0.59
○ Exchange transfusion	1	0	
○ Both	4	4	
Mode of delivery			
○ **C/A**	40	25	0.88
○ **NVD**	21	14	

Table 3 describe some of comparison between male and female (Gestational age, Treatment, and Mode of delivery). In term preterm gestational age 18 male and 6 female, also, full term age in 43 male and 33 female, and there is no statistically significant difference between both

genders. 56 and 35 male and female respectively were treated by phototherapy. The number of males that delivered by C/A higher than female and no statistical difference among them.

Chapter Four: Discussion

Chapter Four: Discussion

Similar sociodemographic characteristics were observed in this study's participants by other researchers (Slusher, Angyo et al. 2004). The majority of participants in this sample were men. Males have higher bilirubin levels than females, as demonstrated by previous research (Maisels, Gifford et al. 1988) so it is not surprising that they are overrepresented in the cohort of infants readmitted to the hospital for evaluation and management of NNJ. Consistent with findings in populations where G-6-PD deficiency is prevalent due to its sex-linked mode of inheritance, males have a higher risk (Owa and Ogunlesi 2009). These results suggest that male neonates are more susceptible to developing severe jaundice and bilirubin-induced injury. The majority of participants in this study were between 37 and 39 weeks pregnant. This result was consistent with the findings of other researchers (Burgos, Schmitt et al. 2008) who found that term neonates born between 37 and 38 weeks of gestation had a higher incidence of NNJ than those born between 39 and 40 weeks. Before being discharged, it may be imperative that term neonates with a low gestational age and low birth weight are appropriately screened for jaundice.

In this study, newborns developed jaundice between days 5 and 10 of life. In another study, the majority of neonates (54 percent) developed jaundice within 1–3 days of birth, while 10 percent were born with it. Birth weight and prolonged duration of labor were associated with neonatal jaundice; mothers' knowledge of neonatal jaundice was insufficient (Abbas, Nafea et al. 2021).

Research indicates that NNJ is a common reason for hospital readmission after early discharge for healthy newborns (Mercier, Barry et al. 2007). Visual estimation of serum bilirubin in newborns of mixed or diverse racial or ethnic backgrounds is insufficiently precise (Petersen, Okorodudu et al. 2005). Thus, early discharge has been associated with an increase in NNJ-related readmissions. After implementing TcB measurements, Petersen et al. observed a significant decrease in hospital readmissions for clinically significant NNJ and a significant increase in the monthly incidence of phototherapy treatment before discharge. Before being discharged from the hospital, it may be appropriate to screen neonates, especially those of early gestational age, for NNJ with TcB.

A study is conducted on mothers of term newborn infants with neonatal hyperbilirubinemia requiring phototherapy and/or exchange transfusion who are combatable or have maternal-fetal ABO incompatibility in order to evaluate maternal contributing factors associated with the development of hyperbilirubinemia in newborns. Higher serum bilirubin levels (31.32 2.30 mg/dL) were found in 28 percent of neonates whose mothers were younger than 30 years old, according to this study. There was no significant difference between parity and serum bilirubin levels (primi or multi). There was an association between the neonatal serum bilirubin level and maternal ABO blood groups, with the highest mean of neonatal serum bilirubin reported in neonates whose mothers carried blood group

A and B, respectively (17.92 10.32) and (17.28 6.90). The association between neonatal serum bilirubin level and maternal Rh reuses factor revealed no statistically significant differences (P>0.05) (Abbas, Nafea et al. 2021)

The higher percentage of mothers with blood group O+ and A+ was 35 (34.7) and 28 (27.7 percent) respectively. The same outcome was observed in babies 26 (25.7%) and 38. (37.6 percent). ABO incompatibility has been found to be significantly associated with neonatal hyperbilirubinemia in another study. Our 18 percent ABO blood group incompatibility among neonates with jaundice is higher than the 5.9 percent reported by Najib et al. in an Iranian prospective longitudinal study, but lower than the 35.5 percent recorded by Menon and Amanullah in an Indian case-control study (Adoba, Ephraim et al. 2018).

About 21.3 percent of the study participants had an ABO incompatibility setting, 24.7 percent had probable neonatal sepsis, and 11.3 percent had a rhesus incompatibility setting. This was consistent with the findings of other authors (Slusher, Angyo et al. 2004) who observed that ABO incompatibility, rhesus incompatibility, and sepsis, in combination with exposure to various household chemicals, were associated with NNJ in Nigeria, leading to high mortality and long-term morbidity. Anti-D globulin is administered to all Rh-negative mothers during pregnancy and to those who have delivered a Rh-positive infant postnatally to prevent Rhesus isoimmunization, which was once a common cause of severe hemolysis. Therefore, direct Coombs' positive ABO blood group incompatibility is the most frequently encountered immune cause of haemolysis. Thus, characteristics of the mother and perinatal/neonatal factors can provide insights into an infant's susceptibility to severe hyperbilirubinemia (Maisels and Kring 1998). During prenatal care,

screening for ABO and Rh (D) blood types and counseling against the use of these harmful substances could reduce the incidence of NNJ and its associated complications.

The current research findings suggest that neonates born via vaginal delivery are more likely to have jaundice than those born via cesarean section. There was a positive correlation between jaundice severity and mode of delivery. In actuality, severe jaundice was more prevalent in newborns born naturally than in those born via cesarean section. Consistent with the present findings, Chang et al. (2011) found that bilirubin levels were higher in neonates delivered vaginally than in those delivered via cesarean section. Cheo and Karen suggested nearly 25 years ago that vacuum-assisted vaginal delivery, cephalohematoma, and oxytocin induction are risk factors for hyperbilirubinemia. In fact, oxytocin may affect bilirubin metabolism directly (Chang, Lin et al. 2011). Additionally, neonates born by cesarean section are more likely to receive supplements, resulting in a reduction in jaundice severity (Farr, Jamieson et al. 2007). found no correlation between delivery mode and jaundice (ESMAEILPOUR, SAFAVI et al. 2008). Similarly, Sharifizade et al. (2012) found no correlation between jaundice severity and mode of delivery (ESMAEILPOUR, SAFAVI et al. 2008). Similarly, Sharifizade et al. (2012) found no significant association between the severity of jaundice and mode of delivery (Sharifizad, Khodakaram et al. 2012). Temoke et al. (2004) discovered a statistically significant correlation between jaundice severity and mode of delivery (Tamook, Salehzadeh et al. 2005). The contradictory results regarding the relationship between mode of delivery and hyperbilirubinemia may be influenced by differences in the selected variables, study conditions, and sample size. In the present study, it appears that the use of oxytocin during vaginal

delivery may modify the positive association between jaundice severity and oxytocin use for labor induction or reinforcement.

Chapter Five:

Conclusions and recommendation

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The present study concluded that mean age of study samples 7.30 (±3.87), majority of them had full term gestational age, Majority of them were not have family history of neonatal jaundice. There is statistical relation in comparison between male and female (Gestational age, Treatment, and Mode of delivery). Further studies recommended for more number of samples with wide nation region and increase questionnaire items to get more accurate results.

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