Assessement of risk factors of hyperbilirubinemia in neonatal in Erbil city

A Research Project

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CERTIFICATE

This research project has been written under my supervision and has been submitted for the award of the **BSc.** degree in **Biology** with my approval as a supervisor.

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DEDICATION

I dedicate this work to:

➢ My dear parent who always prayed for me and supported me in everything, and my sisters and brothers who are beside me.

➢ My supervisor Dr. Noor Ali Gheni

➢ Best friend who helped me.

Rayan Kaify Omer **Shibas Sherzad Hussien**

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ABSTRACT

Neonatal jaundice (NNJ) is one of the most common diseases globally. It is believed that delays in detection and improper treatment of neonatal jaundice can be responsible for neonatal morbidity and mortality. Jaundice is observed during the first week after birth in approximately 60% of term infants and 80% of preterm infants. Early identification of neonates at great risk of Neonatal Hyperbilirubinemia is of paramount importance in preventing brain damage. A survey study was conducted on 70 neonates attending Raperin, Sardam and Lala Hospitals. The study aimed to determine the associated risk factors for hyperbilirubinemia in Erbil city, throughout December 2022 to the end of March 2023. The study revealed that (50%) of the neonates developed jaundice within the first 5 days of life. Male neonates were (57.1%), while (42.8%) were female. Neonates were exclusively bottle fed were (48.5). The neonates were in the normal body weight (70%) and (74.2%) with hyperbilirubinemia. Hyperbilirubinemia is one of the most common problems encountered by the neonatal infants in Erbil city, the male gender showed more effected than female for the development of hyperbilirubinemia, positive family history of jaundice in sibling had higher risk for hyperbilirubinemia than those with negative history, breast feeding are more effected by hyperbilirubinemia than jaundiced neonates with bottle feeding.

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LIST OF ABBREVIATIONS

(NNJ) : neonatal jaundice

(TSB) :Technical Service Bulletin

(AAP) : accountability to affected people

(NANN) : no", "none" or "not one";

(G6PD) : Glucose-6-phosphate dehydrogenase

(HFHS) : Henry Ford Health System

(NVD) : National Vulnerability Database

(IVIg) : Intravenous immune globulin

(IV) : Into or within a vein

1. INTRODUCTION

Hyperbilirubinemia is one of the most common problems encountered by neonatal infants. It is the most common condition requiring medical attention in newborns (Akobeng, 2005). Jaundice is the clinical manifestation of hyperbilirubinemia, it is relatively common in newborns, where some degree of hyperbilirubinemia is virtually universal. The appearance of jaundice beyond the immediate neonatal delivery is virtually always a manifestation of pathology(Baker et al., 1999). The incidence of severe hyperbilirubinemia and kernicterus is also higher among newborn Asian infants. These findings suggest that genetic factors may be involved in the development of severe neonatal hyperbilirubinemia, approximately 60% of term newborns develop jaundice, 2% reach TSB level > 20 mg/dl(Barrington et al., 2007). The word jaundice comes from the French word jaune, which means yellow. Neonatal jaundice is a condition marked by high levels of bilirubin in the blood. The increased bilirubin causes the infant's skin and whiteness of the eyes (sclera) to looks yellow(Moerschel et al., 2008).Neonatal jaundice affects 60% of full-term infants and 80% of preterm infants in the first week after birth. Neonatal hyperbilirubinemia is the most common reason for hospital readmission in the first two weeks of life; prolonged neonatal jaundice (after 14 days of age) may be an indication of an underlying liver disorder(Shortland et al., 2008). The American Academy of Pediatrics (AAP) Practice Guidelines for management of hyperbilirubinemia in the healthy newborn provides guidelines for identifying risk in newborns and treatment strategies, and recommends evaluating the bilirubin level in newborns according to hour-specific bilirubin nomograms, recommends examining the TSB level in every newborn infant every 8–12 hours, and follow-up for all newborns within 48 hrs after discharge by a nurse(Hyperbilirubinemia, 2004). The National Association of Neonatal Nurses (NANN) believes that neonatal nurses must be proactive in the assessment and

management of hyperbilirubinemia in the newborn, and that parents should be educated about the risks of untreated hyperbilirubinemia, need for close follow-up of their infants after discharge, and further believes that neonatal nurses must take steps to increase awareness and identify strategies within their institutions and practice to enhance the processes of diagnosis and management of hyperbilirubinemia(Johnson et al., 2002).

Aim of study:

1. To identify an incidence of hyperbilirubinemia in neonatal in Erbil city
2. To determine the risk factors which may associated with hyperbilirubinemia.

2. METHODOLOGY AND RESEARCH DESIGN

Research design: Questionnaire design and data collection.

Sample size estimation: (70) participants were included in this study.

Data collection: Data were collected during the period between December 2022 to March 2023 from Raperin, Sardam and Lala Hospitals.

3. RESULTS

As shown in (table 1); 35 (50%) of the neonates developed jaundice within the first 5 days of life. 40 (57.1%) of the sample were males. 34 (48.5%) of the neonate were exclusively breast fed. 56 (80%) of the sample were products of term delivery. 45 (64.2%) of the neonate with previous siblings with jaundice. 52 (74.2%) of the sample were normally delivered. 49 (70%) of the neonates were in the normal body weight range (2500-3500gm). Total serum bilirubin level between 13 to 25 in 74.2% of neonatal cases.

Table 1: Distribution of the samples characteristics

	age	Frequency	Percentage
Newborn age in day	Less than 1 day	2	2.8 %
	1-5 days	35	50 %
	5-10 days	26	37.1 %
	More than 10 days	7	10 %
Newborn gender	Male	40	57.1 %
	Female	30	42.8 %
Newborn feeding	Breast feeding	34	48.5 %
	Bottle feeding	28	40 %
	Mixed feeding	8	11.4 %
Pregnancy duration	Term	56	80 %
	Pre term	14	20 %
Previous siblings with jaundice	Yes	45	64.2 %
	No	25	35.7 %
Type of delivery	Normal Vaginal delivery	52	74.2 %
	Caesarean section delivery	18	25.7 %
Newborn Weight	Less than 1500 g	2	2.8 %
	1500-2500g	13	18.5 %
	2500-3500g	49	70 %
	More than 3500g	6	8.5 %

Total serum bilirubin (TSB) level mg/dl	Range 1-12	18	25.7 %
	Range 13-25	52	74.2 %

4. DISSCUSION

Little is known about the incidence of neonatal hyperbilirubinemia in Iraq, however in comparison to other studies. Our results shows that jaundiced neonates with appearance of jaundice in the first five days of life had higher than after fifth day of life. Jaundice in 1st five days of life was more likely to be pathological (e.g. hemolytic diseases more likely to be presented in first five days of life and even intrauterine) , so that jaundice that is visible during the first 24 hours of life is likely to be nonphysiologic (Dennery et al., 2001). The incidence of hyperbilirubinemia among our study was 74.2%. In our results is higher than the study that carried out in Iran by Kavehmanesh et al, (2008) in which the prevalence of hyperbilirubinemia was 12.6%. These differences may be attributed to ethnic and geographic variations in different populations(Maisels and Kring, 1998).

The results show high percentage Jaundiced male neonates were 40 neonates 57.1% of all positive neonates, Jaundiced female neonates were 30 neonates 42.8% of all positive neonates. This study reported male sex in (57.1%) of cases, similar to Donal study in UK and Ireland, which showed (60.4%) of cases with severe jaundice were males, This fact may be related to that G6PD deficiency is more common and more severe in male(Manning et al., 2007).

Approximatly 48.5 % of the jaundiced neonate were exclusively breast fed. Exclusive breastfeeding has historically been an important predictor for jaundice, the mechanism behind the association is not well understood (Scrafford et al., 2013). This result is in agreement with a study from Nigeria which had shown that (90.4%) of the jaundiced neonates were exclusively breastfed(Onyearugha et al., 2011). What it is in breast milk that causes excessive jaundice is not known but unsaturated fatty acids or a lipase which inhibits glucuronyl transferase have been suspected(Sadeq et al., 2019). The Taiwanese study had shown that the most

common etiology was exclusive breast feeding (38.5%) out of 413(Cheng et al., 2012).

The study shows that term neonates with hyperbilirubimemia had higher percentage (80%) than preterm (20%) of neonates. Henry Ford Health System (HFHS) , which reported that severe jaundice was associated with younger gestational age which had a higher significant risk in term jaundiced neonates which could be explained by most of jaundiced neonates in this study(Chou et al., 2003). In our study positive family history of jaundice in sibling had a higher risk for hyperbilirubinemia than those with negative history That could be explained by: Hemolytic diseases had inherited pattern G6PD deficiency . Incidence is also higher in infants with mutations in the gene that causes Gilbert syndrome, infants with homozygous or heterozygous G-6-PD deficiency and other hereditary hemolytic anemia(Yahya and Alajeely, 2013).

In our study the percentage of normal vaginal delivery (NVD) was (74.2%) and (25.7%) for cesarean section, a study from Iran had reported the same results (BOSKABADI and NAVAEI, 2011).This study had shown that there was a positive correlation between Age of neonate in days and total serum bilirubin, which means when neonatal age increases in days; the bilirubin level will also increase. The results had shown that (45%) of the neonates were exclusively breast fed and continued to be fed during their hospital stay, a possible explanation for the correlation between neonatal age and bilirubin level could be related to undernourished neonates that led to breastfeeding jaundice which is seen in breastfed babies during the first week of life and it is more likely to occur when babies do not nurse well or the mother's milk is slow to come in Hospital routines may also limits breastfeeding and in turns leads to undernourished neonates (Sadeq et al., 2019).

The study shows that the percentage is high in normal birth weight of neonates (70%), while it was (18.5%) with low birth at weight. This result is in agreement with a study of (Bhat and Rao, 2008).

5. CONCLUSIONS AND RECOMMENDATIONS

1. Hyperbilirubinemia is one of the most common problems encountered by the neonatal infants in Erbil city.
2. The male gender showed more effected than female for the development of hyperbilirubinemia.
3. Neonatal infants with risk factors (positive family history, breast feeding, male gender, and poor feeding) are more exposed to hyperbilirubinemia.

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پوختە

زەردوویی تازەلەدایکبووان **(NNJ)** یەکێکە لە نەخۆشییە باوەکان لەسەر ئاستی جیهان. پێدەچێت دواکەوتنی دۆزینەوە و چارەسەری نادروستی زەردوویی تازەلەدایکبووان دەتوانێت بەرپرسیار بێت لە نەخۆشی و مردنی تازەلەدایکبووان. زەردوویی لە ماوەی هەفتەی یەکەمی دوای لەدایکبوون لە نزیکەی 60%ی کۆرپەی تەمەن و 80%ی کۆرپەی پێشوەختەدا بەدی دەکرێت. ناسینەوەی پێشوەختەی تازەلەدایکبووەکان کە مەترسی زۆریان لەسەرە بۆ زیادبوونی بیلیروبینی خوێنی تازەلەدایکبوو گرنگییەکی سەرەکی هەیە لە ڕێگریکردن لە تێکچوونی مێشک. توێژینەوەیەکی ڕاپرسی لەسەر ٧٠ منداڵی تازەلەدایکبوو ئەنجامدراوە کە لە نەخۆشخانەکانی ڕاپەڕین و سەردەم و لالە دەچن. ئامانجی توێژینەوەکە دیاریکردنی هۆکارە مەترسیدارەکانی پەیوەست بە زیادبوونی بیلیروبینی خوێن بووە لە شاری هەولێر، بە درێژایی مانگی کانوونی دووەمی ٢٠٢٢ تا کۆتایی مانگی ئازاری ٢٠٢٣. توێژینەوەکە دەرکەوتووە کە (٥٠%)ی منداڵە تازەلەدایکبووەکان لە ماوەی ٥ ڕۆژی یەکەمی تەمەنیان تووشی زەردوویی بوون. تازەلەدایکبووی نێر (57.1%) بووە، لەکاتێکدا (42.8%) لە مێ بووە. ئەو منداڵە تازەلەدایکبووانەی کە بە تایبەتی بە شووشە خۆراکیان پێدرابوو بریتی بوون لە (48.5). تازەلەدایکبووەکان لە کێشی جەستەی ئاساییدا بوون (70%) و (74.2%) لەگەڵ زیادبوونی بیلیروبین لە خوێندا. زیادبوونی بیلیروبین لە خوێندا یەکێکە لەو گرفتانەی کە کۆرپە تازەلەدایکبووەکان ڕووبەڕووی دەبنەوە لە شاری هەولێر، ڕەگەزی نێر کاریگەری زیاتری لە مێ دەرخستووە بۆ گەشەکردنی زیادبوونی بیلیروبین لە خوێندا، مێژووی خێزانی پۆزەتیڤی زەردوویی لە خوشک و برادا مەترسی زیاتری هەبووە بۆ زیادبوونی بیلیروبین لە خوێندا لە چاو ئەوانەی پێشینەی نەرێنییان هەبووە، مەمک خۆراکدان زیاتر کاریگەری زیادبوونی بیلیروبینی خوێنیان لەسەرە لە چاو تازەلەدایکبووانی زەردوویی کە خۆراکدانی قوتوویان پێدەدرێت.

هەڵسەنگاندنی

هۆکارەمەترسیدارەکانی(hyperbilirubinemia)

لەمنداڵی ساوا لە شاری هەولێر

پرۆژەی دەرچوونە

پێشکەش بە بەشی بایۆلۆژی کراوە، وەک بەشێک لە پێداویستیەکانی بەدەستهێنانی بروانامەی بەکالۆریۆس لە زانستی بایۆلۆژی

ئامادەکراوە لەلایەن:

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