AJPMHS GLOBAL RESEARCH NETWORK

AMERICAN Journal of Pediatric Medicine and Health Sciences
Volume 02, Issue 4, 2024 ISSN (E): 2993-2149

Neonatal Jaundice Prevalence and Risk Factors at a District al Hindiya Hospital in Karbala

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Abstract: Background: Some newborns have jaundice as a result of hyperbilirubinemia; nevertheless, complications can arise in a tiny percentage of instances, leading to potentially fatal outcomes. Infections and hemolysis are among the several potential causes. Finding out how often jaundice is in infants and what causes it is the main goal of this research.

Materials and Methods: A Review Among newborns hospitalized to al Hindiya Hospital in Karbala, Iraq, from October 2022 to April 2023, the prevalence of neonatal jaundice was evaluated in this study. This research presents the results of a cross-sectional study of 892 neonatal inpatients.

Results In all, 498 (or 54.8%) of the infants admitted were female, while 394 (or 44.4%) were male. Jaundice was seen in 664 infants (74% of the total). The majority of cases were caused by premature birth.

Conclusions: Prematurity, illness (especially septicemia), blood type incompatibility, and breastfeeding were the most prevalent causes of newborn jaundice. Because breast milk jaundice is a major contributor to chronic jaundice.

Key words: : jaundice, prevalance , newborns.

Introduction

ABBREVIATIONS.
TSB, total serum bilirubin
NNJ, neonatal jaundice
Rh, rhesus;

ABO, blood group
G6PD, glucose-6-phosphate dehydrogenase
UTI, urinary tract infection

THE AIM

This essay set out to do two things: first, find out how common neonatal jaundice is, and second, look at what causes it in newborns.

INTRODUCTION

Bilirubin deposits cause a yellowing of the skin, sclera, and mucous membranes, a condition known as jaundice. One of the most prevalent reasons why newborns require medical treatment is neonatal jaundice. Jaundice affects over 60% of full-term and 80% of premature infants within the first week of life, and even after a month of breastfeeding, around 10% of babies still have jaundice (1,2). The onset of jaundice often occurs in the first few days of a baby's life, however this might vary by cause. As serum levels rise, jaundice typically appears in a cephalocaudal pattern, beginning on the face and moving down the body to the feet. The anatomic evolution of jaundice can be shown by dermal pressure (about 5 mg/dL on the face, approximately 15 mg/dL in the mid-abdomen, and approximately 20 mg/dL on the soles), but blood levels cannot be estimated from clinical examination (3). Bilirubin, a byproduct of hemoglobin catabolism, is an unconjugated lipid soluble reagent that operates indirectly in the van den Bergh test. Unconjugated, indirect-acting bilirubin is insoluble in water and has a toxic effect on the central nervous system, which limits its excretion (4). The van den Bergh test produces a direct response when conjugated bilirubin is used. The majority of conjugated bilirubin is passed out in the stool after being expelled through the bile into the small intestine. Enterohepatic recirculation is the process by which some bilirubin is hydrolyzed back to its unconjugated portion by intestine glucuronidase (3,4). Factors that increase the likelihood of neonatal jaundice caused by indirect hyperbilirubinemia include: the presence of visible jaundice within the first 24 hours of life, a gestational age below 38 weeks, a history of neonatal jaundice in a sibling requiring phototherapy, a decision by the mother to exclusively breastfeed, a mother with diabetes, a low birth weight, being male, certain drugs (such as vitamin K and trimethoprim), polycythemia, cephalhematoma, Down syndrome, the use of oxytocin during delivery, and a history of delayed meconium passing (5-8). Factors contributing to the development of unconjugated hyperbilirubinemia include 1-Rhesus, ABO incompatibility, and other uncommon forms of antibody incompatibility. 2- a lack of G6PD and, less frequently, pyruvate kinase. Three, abnormalities in the red blood cell membrane, including spherocytosis and ovalocytosis. hemoglobinopathies, including alphathalassemia is one example. 5-infections or sepsis, such as pneumonia or a UTI. six, internal bleeding, cephalhematoma, and severe bruising. Babies born to mothers with diabetes can experience complications such as polycythemia and premature birth. 8-liver enzyme problems with improper maturation; they can manifest in a variety of medical disorders, including Crigler-Najjar and Gilbert syndromes, pyloric stenosis, congenital hypothyroidism, and others. 9-physiological jaundice and breast milk (3, 4, 9, 10). For newborns with jaundice brought on by indirect hyperbilirubinemia, phototherapy is now the gold standard treatment because of its effectiveness in reducing TSB and slowing its rate of increase. For neonates whose phototherapy treatments have failed or who come with dangerously high TSB concentrations, exchange transfusion is the only way to bring the levels down to a safe level. The treatment of hyperbilirubinemia may also involve the use of intravenous immunoglobulin (IVIG) and phenobarbital therapy (11).

METHOD AND PATIENTS

892 infants were the subjects of a retrospective cross-sectional investigation. The research included 892 infants hospitalized to the neonatal care units at Al Hindiya teaching Hospital in Karbala City, Iraq, between October 1, 2022, and April 1, 2023. This research encompassed all 664 infants that required medical attention and examination for neonatal jaundice that was clinically severe and caused by unconjugated hyperbilirubinemia. Phototherapy, blood transfusions, or both were among the medical procedures. This study did not include newborns with neonatal jaundice who did not need medical care or those whose direct blood bilirubin level was more than 20% of their total serum bilirubin level. The mothers were asked to provide a detailed history, which included the following details: sex, age at admission, age at which jaundice first appeared, birth weight, gestational age, feeding method, and any history of neonatal jaundice in the family. Patients are sent for a variety of tests based on their symptoms, including total and differential hematocrit (TSB), maternal and child blood groups, reticulocyte counts, blood cultures, complete blood counts, blood films, general urine examinations, CXRs, and thyroid function tests. Rh. and ABO incompatibility was diagnosed by analyzing the mother's and child's blood types, reticulocyte counts, comb tests, and other clinical and historical data. Laboratory data of white blood cell count and blood culture were used to confirm the diagnosis of septicemia based on clinical evaluation of the patients. A diagnosis of a urinary tract infection (UTI) is based on the patient's symptoms, as well as the findings of a general urine test and a urine culture. The clinical picture and results of the chest X-ray confirmed the diagnosis of pneumonia. Based on the clinical findings and the elimination of alternative causes of newborn jaundice, the diagnosis of physiological jaundice and breast milk jaundice was made. Patients who did not meet the criteria for the aforementioned diagnoses were classified as undiagnosed, and this group included individuals with either direct or indirect hyperbilirubinemia.

The results

There were 664 patients with neonatal jaundice due to indirect hyperbilirubinemia were included in this study Apart from 892 of total admission making a 74.4% (table.1), from whom there were 288 males and 376 females with male to female ratio of 1:1.3(table. 2). The jaundiced male patients were 73% of the total admissions while the jaundiced female patients were 75.5% of the total admissions as shown in the (table. 2) with clear female gender predominance.

Table 1: Prevalence of Neonatal Jaundice.

Status of jaundice	Number	Percentage (%)
jaundice	664	74.43%
No jaundice	228	25.56%
total	892	100%

Clear female gender predominance among total admission with male to female ratio 1:1.2 and jaundiced patients 1:1.3 (table. 2).

Table 2: Distribution of the patients according to gender

gender	Total admission	Jaundiced patients	%
Male	394	288	73%
female	498	376	75.5%
total	892	664	74.4%

The distribution of the total admissions according to the gender and gestational age as shown in(table. 3), show that the males were 304 full term and 90 preterm while the females were 338 full

term and 160 preterm. There is a premature female predominance among the total admission (table. 3).

Table 3: distribution of the total admission according to gender and gestational age.

Term	Male	Female	Total patients	%
Full-term	304	338	642	71.97%
Preterm	90	160	250	28.02%
Total	394	498	892	100%

There is premature female gender predominance among jaundiced patients (table. 4).

Table 4: distribution of the jaundiced patients according to gender and gestational age.

Term	Male	Female	jaundiced patients
Full-term	204	226	430
Preterm	84	150	234
Total	288	376	664

Table 5: distribution of the jaundiced patients according to the gender.

Gender	Jaundiced patients	%
Male	288	43.3%
female	376	56.4%
Total	664	100%

The patients were classified according to the gestational age and jaundice; the results show that 430 jaundiced patients were full term and 234 were preterm as shown in (table. 6) which shows their percentage of total admission and their gestational age.

Table 6: distribution of the total admitted patients according to gestational age.

GA	Total admission	Jaundiced patients	%
Full-term	642	430	66.9%
Preterm	250	234	93.6%
Total	892	664	74.4%

The patient also classified according to their gender and family history of neonatal jaundice the results show that 145 of male patients and 170 of female patients give positive family history of neonatal jaundice as shown in (table. 7).

Table 7: distribution of the patients according to gender and family history of neonatal jaundice.

Family history of neonatal jaundice	Male	Female	Total	%
Positive	145	170	315	47.44%
Negative	143	206	349	52.65%
Total	288	376	664	100%

Table 8: show that the distribution of the jaundiced patients according to the type of feeding and it shows that 369 (55.57%) of them were breast fed and 180 (27.1%) were artificially fed while 115 (17.3 %) of them were mixed feeding.

Table 8: distribution of the patients according to the type of feeding and neonatal jaundice.

Type of feeding	Jaundiced patients	%
Breast feeding	369	55.57%
Artificial feeding	180	27.1%
Mixed feeding	115	17.31%
Total	664	100%

The patients finally classified according to their gender and the cause of the neonatal jaundice and the results shows that 20 of them (7 males and 13 females) due to Rh incompatibility& 34 patients (12 males & 22 females) due to ABO incompatibility. Septicemia was the diagnosis in 48 patients (27 males and 21 females). The diagnosis of breast milk jaundice was done in 10 patients (4 males & 6 females) while urinary tract infections were the cause of neonatal jaundice in 6 patients (4 males and 2 females). Thirty patients (18 males and 12 females) were diagnosed as cases of pneumonia as a cause of neonatal jaundice. Hypothyroidism was the diagnosis which was done in 20 patients (8 males and 12 females). The physiological jaundice was the cause behind neonatal jaundice in 162 patients (74 males and 88 females). The remainders of the patients who constitute more than 50% of the cases (157 males and 177 females) were labeled as undiagnosed because they were not fitting the criteria of the diagnosis and may need more investigations to reach the diagnosis which were not available in our hospital

Table 9: distribution of the patients according to the etiology of neonatal jaundice and the gender.

Cause of jaundice	male	Female	Total	%
Physiological	74	88	162	24.39%
Septicemia	27	21	48	7.22%
ABO incompatibility	12	22	34	5.12%
Pneumonia	18	12	30	4.51%
Rh incompatibility	7	13	20	3%
Hypothyroidism	8	12	20	3%
Breast milk jaundice	4	6	10	1.5%
UTI	4	2	6	0.9%
Undiagnosed	157	177	334	50.31%

Discussion

The NNJ is a frequent issue that we encountered throughout the newborn era; it's intriguing since its severity has clinical relevance, and in order to handle it effectively, we need to understand its origins and risk factors. A total of 892 newborns were hospitalized to the neonatal intensive care unit (NICU) throughout the research period. A high prevalence of neonatal jaundice was observed in 74.43% of these infants (Tab.1) .Regarding gender, there are studies that suggest that being male is a risk factor (3, 12, 13). However, our study found that there were more females than males in both the full-term and premature groups (table 2, 3). The male-to-female ratio was 1:1.3, which is

similar to a study in Kirkuk (14) but different from a study in Nigeria that found that 67.4% of newborn males had jaundice (15). in contrast to the 1.6:1(16), 1.3:1(17), and 1.3:1(18) male:female ratios found in numerous studies. The variation in the incidence and associated factors of ethnic and geographic alteration from one area to another could explain these differences (19). In our study, we found that there were more premature females than premature males, and that overall, premature neonates were more likely to experience NNJ compared to full-term infants (table 6).

There is a clear inverse relationship between the gestational age of the neonate and the incidence of significant NNJ, which is explained by the remarkable effect of neonate maturity on this incidence. Impaired conjugation ability and inadequate enteral intake leading to an increase in the enterohepatic circulation load from decreased oral intake may explain why 93.5% of premature babies had jaundice, compared to 67% of admitted full-term neonates. In this respect, our findings were consistent with those of the majority of research on the topic (14). Nearly all premature babies have NNJ, with 93% having it at term (16)Example: 73.3% of preterm babies reach puberty at a young age (20). The presence of a sibling with the same illness is another feature of NNJ that we investigate. There was a positive correlation between NNJ and family history in 47% of individuals, whereas 53% did not (19). The existence of G6PD, a significant cause of newborn jaundice in our community, may explain why the proportion is higher in males (50%) compared to females (45%). Similar ABO and Rh blood types, as well as minor incompatibilities, are only a few of the hereditary variables that may explain such a discovery. Factors that contributed to neonatal jaundice were examined, including neonatal infection, insufficient breastfeeding, and breast milk jaundice, all of which are significant in the development of NNJ. Based on the kind of postnatal feeding, we observed that newborns who were exclusively breastfed had a greater percentage of jaundice (35.5%), compared to those who were fed artificially (27.17%), or were fed a mixed diet (115.3%). Result was comparable to most of research as study of Baghdad(21) which revealed the ratio of (35% breast, 7% mixed, and 5% formula 52% supplemental). Breast feeding jaundice is a well-known cause of neonatal jaundice in first few days of life (decrease intake of milk will lead to dehydration and increase enterohepatic circulation) but breast milk jaundice is the cause of jaundice in most cases in the 2nd weak jaundice claimed to the presence of competitive inhibitor for the transferase enzyme as well as it contains enzyme promote enterohepatic circulation increasing the level of TSB.

Reveled that poor breast feeding (breast feeding jaundice) is the biggest factor for infant jaundice followed by and neonatal infection. We tried to discover the causal reason that generate considerable NNJ in our admitted patient by the accessible investigation in our hospital. Ultimately we could define about 50% of them and other 50% of patient have jaundice of unknown origin and need other more difficult examination that is not found in our facility to be determine. Result in (table 9) showed RH incompatibly 3%, ABO incompatibility 5.12%. In study of Mosul (18)5% and 25% and study of Najaf 10% and 20% respectively. jaundice owing to infection (pneumonia, UTI and sepsis is discovered in 12.65% of patients compared to 10.5% in research of Kirkuk(14),UTI regarded one of the most common causes of long-term jaundice(22) . Hypothyroidism was the sole cause in 3% of cases and breast milk jaundice in 1.5%. Finally, in a study conducted in Mosul (18 cases) and Kirkuk (14.2 cases), physiological jaundice—defined as jaundice without known causes based on history, examination, and laboratory data —was implicated in 24.4% of cases. A higher ratio of 94.12% is shown. One possible factor is ethnic diversity. Out of 334 cases of neonatal jaundice, 50.3% had causes that have not been identified.

Conclusions

More female infants than male were hospitalized due to neonatal jaundice, and the study found that NNJ was very common. There were mainly three types of risk factors: demographic, maternal, and neonatal. Neonatal jaundice was most often caused by incompatibilities between blood types, complications during delivery, and reduced breastfeeding.

Recommendation

If a mother is Rh negative, she should be educated to receive anti-D within three days after giving birth in the event that her baby is Rh positive, and she should undergo blood group and Rh typing screenings before getting married or during prenatal care. Tests for blood type and Combs' tests are administered to infants delivered to mothers with type O blood. Prior to the infants' release, it is important to make the necessary arrangements for follow-up care, such as repeat serum bilirubin testing, if required. The predictive hour-specific serum bilirubin normograms used for infant discharge should form the basis for repeat serum bilirubin testing.

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