

Hyperbilirubinemia in Neonatal Intensive Care Unit: Incidence And Etiology at Fayoum University Hospital.

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ABSTRACT

Although most of newborns develop some degree of jaundice, bilirubin levels high enough to put a newborn at risk of bilirubin encephalopathy and kernicterus are rare but still occur in Egypt.

The aim of current study was to assess the magnitude of neonatal jaundice and detect possible etiologies. This study included prospective analysis of the data of all jaundiced cases admitted to NICU of Fayoum University Hospital during the period from the first of July 2017 to the end of June 2018 (one year) .

In the study period, among 366 patients admitted to the NICU, there were 167 patients having neonatal jaundice who were admitted to neonatal intensive care unit with a mean age of 5.96 ± 3.88 days and a mean weight of 2940 ± 390 grams. They represented 45.6 % of all cases admitted in the period of study.

The mean total bilirubin level at day of presentation was 19.89 ± 4.85 mg/dl. It was found that ABO incompatibility, Rh incompatibility and G6PD deficiency (29.9%, 8.4% and 1.8% respectively) are the main causes of indirect hyperbilirubinaemia. In 56.3% of cases the cause was exaggerated physiological.

Phototherapy was the only therapy in 56.3% of cases while 32.9% required Intensive photo (Bilisphere) and 10.8 % required exchange transfusion.

KEY WORDS: Neonatal jaundice, hyperbilirubinemia, kernicterus, neonates.

INTRODUCTION

One of the most prevalent clinical conditions in neonates is hyperbilirubinemia (**Olusanya et al., 2015**). Neonatal hyperbilirubinemia is a common clinical problem encountered during the neonatal period, especially in the first week of life (**Bhutani et al., 2013**).

Nearly 8% to 11% of neonates develop hyperbilirubinemia. When the total serum bilirubin (TSB) rises above the 95th percentile for age (high-risk zone) during the first week

of life, it will be considered as hyperbilirubinemia (**Burke et al., 2009**).

Between 60%–80% of healthy infants are expected to present with idiopathic neonatal jaundice . Neonatal jaundice is the discoloration of skin and sclera color to yellowish in a newborn (**Ogunfowora et al., 2006**).

Several types of hyperbilirubinemia have been reported in neonates including physiological jaundice, pathological jaundice,

jaundice due to breastfeeding or breast milk and hemolytic jaundice including three subtypes due to Rh factor incompatibility, ABO blood group incompatibility and Jaundice associated with Glucose-6-phosphate dehydrogenase (G6PD) deficiency (Mishra et al., 2008).

The most common causes of early neonatal jaundice (Onset less than 24 h) are

SUBJECTS AND METHODS

Subjects:

One hundred sixty seven (167) was the total number of neonatal jaundice cases who were included in the study. All of them had total serum bilirubin level above 6 mg/dl and were admitted in the Neonatal Intensive Care Unit (NICU) of Fayoum University Hospital during the period from the first of July 2017 to the end of June 2018 (one year). Their mean age of 5.96 ± 3.88 days and a mean weight of 2940 ± 390 grams. They represented 45.6 % of all cases admitted in the period of study. The mean total bilirubin level at day of presentation was 19.89 ± 4.85 mg/dl.

Methods:

Prospective data of all neonatal jaundice cases admitted in NICU of Fayoum University Hospital was collected and descriptive analysis of these data was done.

1-Full history with focusing on : date of birth, gender, onset of jaundice and if there are any problems associated with jaundice as respiratory distress or sepsis, gestational age with perinatal and past history for maternal

RESULTS

Incidence of jaundice among neonates attending NICU at Fayoum University

Haemolytic disease: eg, haemolytic disease of the newborn (rhesus), ABO incompatibility, glucose-6-phosphate dehydrogenase deficiency, spherocytosis. Infection: congenital (eg, toxoplasmosis, rubella, cytomegalovirus (CMV), herpes simplex, syphilis) or postnatal infection (Stevenson et al., 2011).

illness, history of drug intake , birth trauma or previous sibling with neonatal jaundice.

2- Examination of the newborn: including weight, temperature and overall inspection for general appearance, alertness and skin to assess extent of jaundice and detect pallor. Neurological examination including muscle tone and reflexes and also signs suggestive of kernicterus.

3- Laboratory investigations:

- Total and direct bilirubin level.
- Complete blood count and reticulocytic count.
- C-reactive protein.
- Maternal, infant blood groups ABO and Rh and Coombs' test to suspected cases with hemolytic jaundice.
- G6PD activity assay in suspected cases.

4- Therapy :

Most of cases received phototherapy and some cases received intensive phototherapy (Bilisphere) while exchange transfusion was done to indicated cases only.

Hospital in the period between July 2017 to June 2018: (No =366)

Table (1): Incidence of Neonatal Jaundice:

	No	% (95 % confidence interval CI)
Having jaundice	167	45.6 (40.5- 50.7)
Having other conditions	199	54.4
Total	366	100.0

Regarding gender , 90 (53.9 %) of neonates with jaundice in our study were

males and 77 (46.1 %) were females as shown in **figure (1)** .

Figure (1): Prevalence of Neonatal Jaundice According to Gender

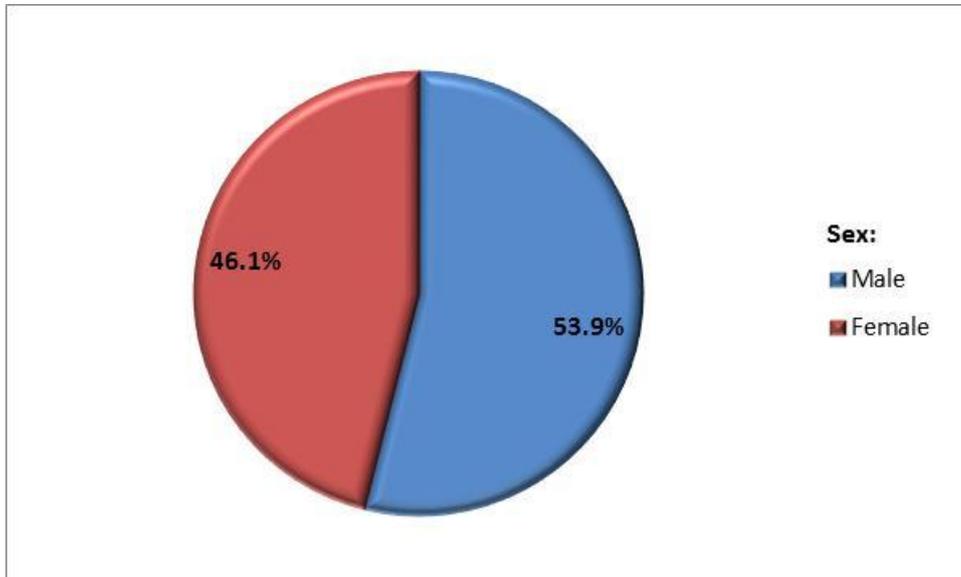


Figure (2) showed the relationship between jaundice prevalence and mode of delivery. The prevalence of jaundice in

neonates delivered by NVD was 28.1 % and 71.9 % in neonates delivered by CS.

Figure (2): Relation of Jaundice Prevalence to Mode of delivery

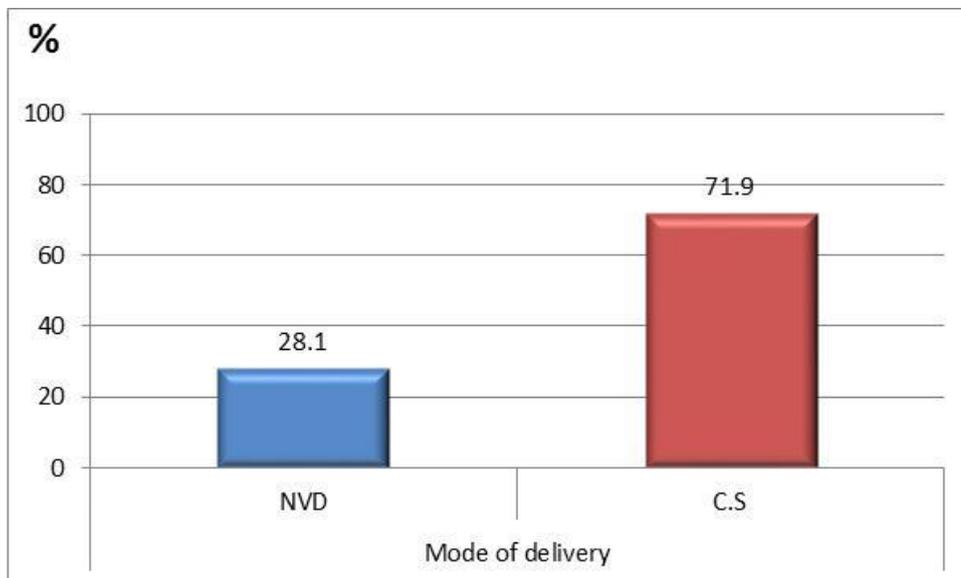


Table (2): Most of neonates with jaundice 94/167 (56.3%) were diagnosed as exaggerated physiological jaundice, then 50/167 (29.2%) as ABO incompatibility,

14/167 (8.4%) as RH incompatibility, 3/167 (1.8%) ABO & RH incompatibility, 3/167 (1.8%) as G6PD deficiency and 3/167 (1.8%) as sepsis.

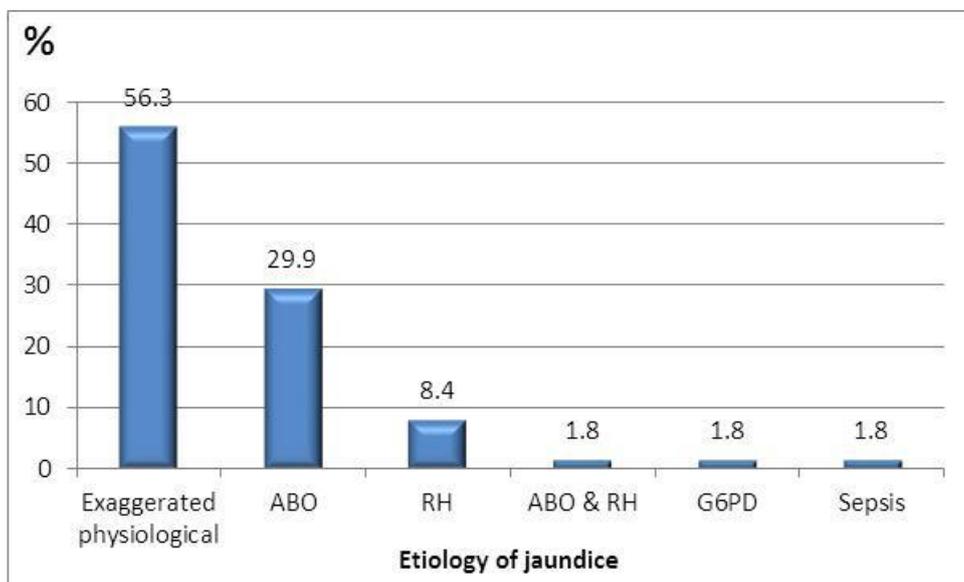
Variable	No	%
Etiology:		
Exaggerated physiological	94	56.3
ABO incompatibility	50	29.9
RH incompatibility	14	8.4
ABO & RH incompatibility	3	1.8
G6PD deficiency	3	1.8
Sepsis	3	1.8

Table (2): Etiology of Neonatal Jaundice

Figure (3) : Most of neonates with jaundice 94/167 (56.3%) were diagnosed as exaggerated physiological jaundice, then 50/167 (29.2%) as ABO incompatibility,

14/167 (8.4%) as RH incompatibility, 3/167 (1.8%) ABO & RH incompatibility, 3/167 (1.8%) as G6PD deficiency and 3/167 (1.8%) as sepsis.

Figure (3): Etiology of Neonatal Jaundice



Regarding mode of treatment in our study, we found that the incidence of hyperbilirubinemic neonates received phototherapy was 56.3 % (94/167) , and the incidence of neonates who received intensive photo (Bilisphere) was 32.9

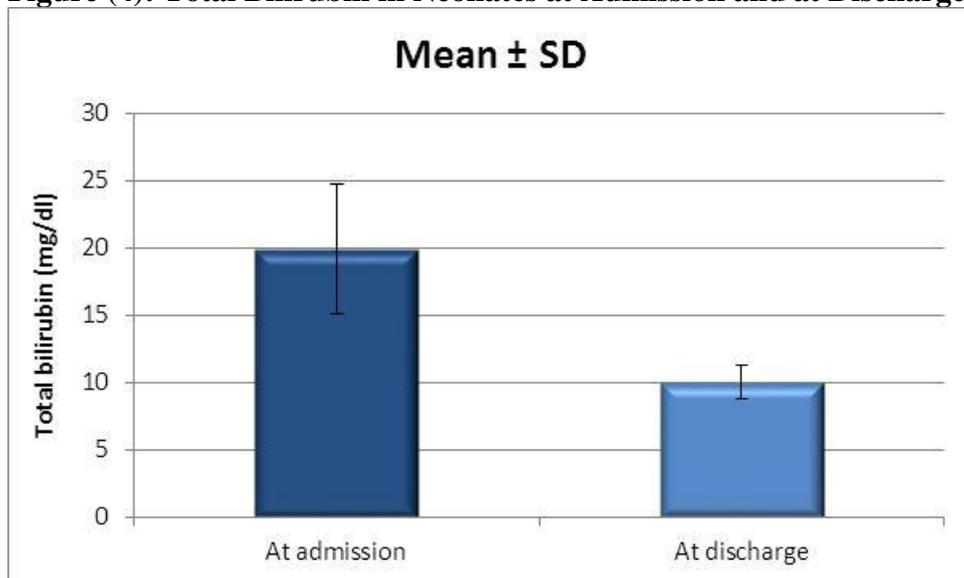
% (55/167) , and the incidence of neonates who received exchange transfusion and photo was 10.8 % (18/167) as shown in **table (3)** .

Table (3): Types of Treatment of Neonatal Jaundice Cases

By comparing total bilirubin level between admission and discharge, there was a reduction in serum total bilirubin from at-admission

compared to at-discharge (19.89 ± 4.85 vs. 9.99 ± 1.25), which was statistically significant ($p < 0.0001$) **figure (4)**.

Figure (4): Total Bilirubin in Neonates at Admission and at Discharge



DISCUSSION

Among 366 patients admitted to the NICU during the period from the first of July 2017 to the end of June 2018, the incidence of neonatal jaundice in our study was 45.6%. The study included 167 neonates with clinical jaundice who had serum bilirubin level above 6 mg/dl.

In a study in **Jawahar Lal Nehru Medical College and Hospital**, Bhagalpur, Bihar, India during the period from June 2016 to July 2017, out of 280 newborns, 136 (48.57%) newborns developed clinical jaundice (**Pawan et al., 2018**).

In another study that was conducted in neonatal unit, Department of Pediatrics, Saidu group of Teaching Hospital, Swat, **Pakistan**, from 1 July 2016 to 31 December 2016, Out of 550 newborns admitted to neonatal unit, 201(36.54%) patients had jaundice (**IhsanulHaq et al., 2017**).

In Iran, Neonatal hyperbilirubinaemia, defined as a total serum bilirubin level above 5 mg/dl, accounts for up to 75% of hospital readmissions in the first week of life (**Koosha and Rafizadeh, 2007**).

In our study the age of patients on admission ranged between 1 and 20 days with mean age of 5.96 ± 3.88 days compared to study by **Seoud et al in 2007** which showed that admission ranged from 6-24 days with a mean of 10.8 ± 3.69 days.

There was a higher incidence of males (58.7%) compared to females (41.3%) in our study. The same male predominance was reported by **Tiker et al in 2006** in a study in Baskent University, Turkey and **Hassan et al in 2000** in a study in Children's Hospital – Cairo University.

A study was conducted in Neonatal Intensive Care Unit, Gauhati Medical College and Hospital, India, over a period of one year (February 2015 to January 2016), out of 520 jaundiced neonates 302 (58.08%) were males and 218 (41.92%) females (**Dulal et al., 2016**).

Regarding the cause of jaundice in our study, we found that 56.3% of cases had exaggerated physiological jaundice and 43.7% had pathological jaundice.

ABO incompatibility and Rh incompatibility accounts for 29.9% and 8.4% of jaundiced cases respectively.

Close results were reported by **Seoud et al in 2007**, 23% and 10.9% had ABO and Rh incompatibility respectively.

In our study, phototherapy was used for 56.3 % (94/167) , and intensive photo (Bilisphere) was used for 32.9 % (55/167). Cases that didn't respond to phototherapy or had markedly elevated TSB at presentation were managed by exchange transfusion and were placed on phototherapy while exchange transfusion was prepared and 10.8 % (18/167) of our cases required exchange transfusion.

In a study in Pakistan, all jaundiced patient received phototherapy, exchange blood transfusion was done in 37patients (18.40%), double exchange transfusion was done in 3 patients (1.49%) (**IhsanulHaq et al., 2017**).

Conclusions and Recommendations

- Neonatal Jaundice is a major problem in the NICU of Fayoum University Hospital and the incidence seems to be increasing.

- The frequent causes of unconjugated hyperbilirubinemia in our population are ABO incompatibility, Rh incompatibility and sepsis. Exaggerated physiological jaundice is present in a big number of cases.
- Early management with phototherapy alone or with exchange transfusion in indicated cases significantly decline the total serum bilirubin levels on follow up of cases and improve the outcome.
- Improving the antenatal care services and obstetric practices for the prevention and early control of neonatal hyperbilirubinemia.
- Screening all newborns before discharge from maternity hospital and check level on hour specific normogram to detect risk of severe hyperbilirubinemia and give them appointment to follow up.
- Encouragement of early breast feeding and lactation support.
- Parental education about jaundice and proper timely follow up is essential.

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