# The Impact Of Neonatal Hyperbilirubinemia Management On Neonatal Intensive care Unit Outcome In Zagazig University Hospital

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بسم الله الرحمن الرحيم

﴿وَعَلَّمَكَ مَا لَمْ تَكُنْ تَعْلَمُ وَكَانَ فَضْلُ اللهِ عَلَيْكَ عَظِيمًا﴾

صدق الله العظيم

سورة النساء آية (١١٣)

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# List of Abbreviations

| Abb. | Full term |
|---|---|
| *AABR* | *Automated auditory brainstem response* |
| *AAP* | *American Academy of Pediatrics* |
| *ABE* | *Acute bilirubin encephalopathy* |
| *ATNA* | *Amiel-Tison Neurological Assessment* |
| *ATP* | *Adenosine triphosphate* |
| *BA* | *Biliary atresia* |
| *BAER* | *Brainstem auditory evoked response* |
| *BBS* | *Bronze baby syndrome* |
| *Bf* | *free bilirubin* |
| *BIND* | *Bilirubin-induced neurologic dysfunction* |
| *BR* | *Bilirubin* |
| *BV* | *Biliverdin* |
| *C/S* | *cesarean section* |
| *CBC* | *Complete blood picture* |
| *CBE* | *chronic bilirubin encephalopathy* |
| *CC* | *Choledochal cyst* |
| *cMOAT* | *Canalicular multispecific organic anion transporter* |
| *CN-I* | *Crigler-Najjar syndrome type I* |
| *CN-II* | *Crigler-Najjar syndrome type II* |
| *CO* | *Carbon monoxide* |
| *CPT* | *Conventional phototherapy* |
| *CPT* | *Conventional phototherapy* |
| *CRP* | *C-reactive protein* |
| *CRP* | *C-reactive protein* |
| *DAT* | *Direct Antiglobulin Test* |
| *DCT* | *Direct Coombs Test* |
| *ET* | *Exchange transfusion* |
| *FV* | *Femoral vein* |
| *G6PD* | *Glucose 6-phosphate dehydrogenase* |
| *GS* | *Gilbert's syndrome* |
| *GSTs* | *Glutathione S-transferases* |
| *Hb* | *Hemoglobin* |

# List of Abbreviations Cont...

| Abb. | Full term |
|---|---|
| *HB* | *hyperbilirubinemia* |
| *Hct* | *Hematocrit* |
| *HD* | *Hemolytic disease* |
| *HIDA* | *Hepatobiliary iminodiacetic acid* |
| *IEM* | *Inborn errors of metabolism* |
| *IgG* | *Immunoglobulin G* |
| *IL* | *Interleukin* |
| *ILCOR- CoSTR* | *International Liaison Committee On Resuscitation- Consensus on Science with Treatment Recommendations* |
| *IQ* | *intellectual impairment* |
| *IVIG* | *Intravenous immune globulin* |
| *LEDs* | *Light-emitting diodes* |
| *LMICs* | *Low- and middle-income countries* |
| *MN* | *Melanocytic naevus* |
| *MRP2* | *Multi-drug resistance protein 2* |
| *NBLP* | *Neonatal blue-light phototherapy influences* |
| *NDD* | *Neurodevelopmental delay* |
| *NEC* | *Necrotising enterocolitis* |
| *NICE* | *National Institute for Health and Clinical Excellence* |
| *NICU* | *Neonatal intensive care unit* |
| *NNPT* | *Neonatal phototherapy* |
| *NNT* | *Number needed to treat* |
| *OATP* | *Organic-anion transporting polypeptides* |
| *PDA* | *Patent ductus arteriosus* |
| *PFIC* | *progressive familial intrahepatic cholestasis* |
| *PT* | *Phototherapy* |
| *Rh _ve* | *Rhesus negative* |
| *Rh+ve* | *Rhesus positive* |
| *RhD* | *Rhesus D* |
| *rh-EPO* | *Recombinant human erythropoietin* |
| *ROP* | *retinopathy of prematurity* |

# List of Abbreviations Cont...

| Abb. | Full term |
|---|---|
| *SPSS* | *Statistical Package for the Social Science* |
| *TcB* | *Transcutaneous bilirubinometry* |
| *TNF* | *Tumor necrosis factor* |
| *TSB* | *Total serum bilirubin* |
| *UCB* | *unconjugated bilirubin* |
| *UDP* | *Uridine diphosphate* |
| *UGT* | *Uridine diphospho glucuronosyltransferase* |
| *UHWI* | *University Hospital of the West Indies* |
| *UV* | *Umbilical vein* |
| *UVC* | *Umbilical venous catheter* |

# ABSTRACT

**Background:** Neonatal hyperbilirubinemia, with consequent encephalopathy, remains a common cause of morbidity in developing countries so the challenge is early detection and treatment of neonatal hyperbilirubinemia to prevent adverse neurologic outcome.

**Objective:** The aim of this study was to assess the protocol of management of neonatal jaundice of Zagazig University hospital (according to Amercian Academy of Pediatrics guidelines) in comparison to the protocol Royal College University in UK according to outcome and feedback.

**Patients and Methods:** This is a prospective study including 213 neonates suffering from indirect hyperbilirubinemia admitted to the NICU of the Pediatric Hospital of Zagazig University Hospital between July 2013 and July 2014, However, parents of 8 newborns did not want to participate in the study, 5 newborns were excluded as they had exclusion criteria, and a total of 200 newborns with significant hyperbilirubinemia were finally included in the study during the study period.

**Results:** The comparison between ATNA upon admission, at 3M and 6 M old among all studied neonates. It shows that ATNA was significantly lower (optimal) at 3m compared to upon admission which means improvement in neurological performance, however non significant difference was detected between ATNA at 3m & 6m old in both groups. Higher statistically significant positive correlations was detected between bilirubin level upon admission and follow up versus ATNA score (intial, 3M and 6M) in both groups.

**Conclusion:** Neurodevelopmental assessment allows the detection of mild and moderate brain abnormalities and developmental delay.



**Keywords:** Neonatal hyperbilirubinemia, necrotising enterocolitis, intellectual impairment

# INTRODUCTION

Neonatal jaundice is the yellow discoloration of the skin and eyes due to elevated bilirubin levels in the bloodstream of a newborn. Bilirubin is produced by the breakdown of red blood cells. Jaundiced infants are unable to process bilirubin at a normal rate or they have an abnormally high amount of bilirubin in their bloodstream, resulting in a buildup of the yellow colored bilirubin. That build up is called hyperbilirubinemia and is the cause of jaundice ***(Hansen and Thor, 2016).***

Physiologic jaundice is also known as transient jaundice because it is the more common of the two types and is much less harmful. When infants are born, their livers are not fully developed. That immaturity makes it difficult for the liver to filter all of the bilirubin, the yellow-colored byproduct of red blood cell breakdown, from the bloodstream, resulting in infants with yellow tinged skin. Physiologic jaundice is the obstruction of the pathway for normal red blood cell breakdown ***(Bradley and Arianna, 2017).***

Bilirubin levels with a deviation from the normal range and requiring intervention would be described as pathological jaundice. Appearance of jaundice within 24 h due to increase in serum bilirubin beyond 5 mg/dl/day, peak levels higher than the expected normal range, presence of clinical jaundice more than 2 weeks and conjugated bilirubin (dark urine staining the clothes) would be categorized under this type of jaundice ***(Sana et al., 2016).***