Introduction and Aim of Work

Neonatal jaundice remains the most common and, perhaps, the most vexing problem in full-term infants during the immediate postnatal period. Despite the numerous articles published about this subject, many aspects of neonatal hyperbilirubinemia remain unexplained. Changes in the presentation and course of neonatal jaundice associated with breastfeeding have been recognized for some time, and have been the subject of scientific studies for the past twenty years *(Maisels, 2000).*

Though the data still tend to be conflicting, a reasonable summary of current knowledge suggests that breastfeeding is associated with an increased incidence of neonatal jaundice compared with formula feeding, jaundice in breast-fed infants tends to be more severe and that the duration of measurable hyperbilirubinaemia may extend for weeks or even months in some cases *(Zetterstro¨m, 1999).* A fairly typical infant could be the one who at 2 wk of age still has a serum bilirubin that hovers around 300–350 mmol/L, but who, beyond his obvious jaundice, appears perfectly healthy and has a satisfactory weight curve.

This phenomenon, as observed in our practice, requested an increased number of lab tests as well as repeated visits for infants who might need neither. To test or not to test, to release from further follow-up as healthy or to schedule a new appointment because you are not one hundred percent certain that the infant's serum bilirubin might not be >400 mmol/L in the next couple of days and whether you should be concerned because there is evidence suggesting that prolonged exposure to high serum bilirubin levels is associated with the risk of developmental sequelae or you should breath a sigh of relief because bilirubin as an antioxidant is probably good for the little baby are questions related to breastfeeding-associated jaundice that have become a common occurrence in the well baby nursery as well as in the follow-up of healthy infants born in our hospitals. (*Hammermann et al., 1998*).

In fact, our answers to such highly relevant clinical questions are still based more on suppositions than on solid clinical scientific proofs. There is accumulating evidence that kernicterus, the much feared sequel of neonatal jaundice, now occurs more frequently than used to be the case a decade ago ***(Ebbesen,2000 & Hansen, 2000).***

Some believe that this is caused by a combination of early release from maternity hospitals and lessened awareness of the potential danger of severe hyperbilirubinaemia ***(Ebbesen, 2000).***

While these are probable contributory factors, there are also data suggesting that increased postnatal weight loss, a phenomenon associated with breastfeeding, is seen in a number of infants with extreme neonatal jaundice ***(Hansen, 1997).***

So, is neonatal jaundice associated with breastfeeding totally innocuous, or there is a cause for concern? With this commentary, I hope I have made a case for the urgent need for increased scientifically based knowledge about breastfeeding-associated jaundice in the neonates. Is there more than one syndrome of jaundice associated with breastfeeding and breast milk? This question was recently reviewed by ***Maisels (2000)*** who concluded that the evidence to support the presence of two distinct syndromes is meager. He was referring to a suggested terminology whereby jaundice associated with breastfeeding in the first 2–4 days of life was called "the breastfeeding jaundice syndrome", while that which appears at 4–7 days of life was called "the breast-milk jaundice syndrome".

Inadequate breastfeeding, particularly in the first days of life, can as be associated with elevated levels of bilirubin ***(Gartner,2001).*** This manifestation is known as breast-nonfeeding jaundice and is the neonatal manifestation of the adult disorder, starvation jaundice ***(Whitmer & Gollan, 1983).*** In this condition, marked by inadequate milk and caloric intake, but not necessarily by dehydration, there may be a delay in

bilirubin clearance resulting from low stool output *(De Carvalho, Robertson, & Klaus, 1985)* with an increase in the intestinal absorption of bilirubin.

Exaggerated jaundice due to poor breastfeeding should not be considered physiologic. It has been shown that there is neither a difference in the percentage of weight loss nor a difference in the percentage of neonates with elevated levels of bilirubin during the first days of life between those who were adequately breastfed on demand and those who were bottle-fed *(Rubaltelli, 1993)*.

Despite the knowledge of an association between exaggeration of neonatal jaundice and breastfeeding, it will be a mistake to assume, without careful consideration, that because a neonate is breastfed and is jaundiced, breastfeeding is the sole or main cause of jaundice. It will be also a mistake to believe that if the jaundice is associated with brestfeeding, it can never be harmful *(Riordan, 2004)*.

The mode of delivery also influences neonatal jaundice. There is a probable association between delivery by cesarean section and the method of feeding. Women subjected to cesarean section breastfeed infrequently during the first 48 hours after delivery *(Giovanna, 2001)*.

After all, breast milk is the undisputed natural food for the newborn. The fact that this form of alimentation is frequently associated with limited food availability (and thus intake) in the first days of life is something for which the full term newborn is well prepared. It is interesting that the transition from the use of breast-milk substitutes at various periods during the 20th century to the current emphasis on breastfeeding is forcing us to reconsider some of our knowledge regarding the normal physiology of neonatal jaundice *(Gartner , 2001)*.

Hintz et al., (2001) stated that for centuries, neonatal jaundice has caused medical practitioners to reflect and speculate as well as to offer

therapeutic advices. As we embark upon the 21st century, we must continue our quest for improved understanding of the biological mechanisms underlying the variable course and expression of neonatal jaundice. We have therapeutic modalities that have been proven safe and effective, but the important question of when to treat and when not to treat) is still awaiting a more refined answer. The extent to which measurement of bilirubin production through end-tidal carbon monoxide sampling will add useful details to that answer, remains to be seen. ***(Johnson, 1991).***

Many nurseries in Egypt lack a neonatal jaundice protocol, a neonatal jaundice tracking system and a parents' education program. Furthermore, newborns discharged in the first 48 hours of age are often not scheduled to be seen by health care providers within 2-3 days despite the recommendations of many pediatric health care authorities (***Habeeb, 1994).***

The lack of unified protocols for infant feeding practices in the postnatal period with early discharge of newborns from hospitals has made keen to revise and evaluate the effects of the current infant feeding and perinatal practices on the development of significant neonatal hyperbilirubinemia.