FACTORS AFFECTING SEVERITY OF NEONATAL JAUNDICE IN PATIENTS PRESENTING FROM HOME

Pang Mei Foong, Ling Shih Gan[1]

Department of Paediatrics, University of Malaya Medical Centre, 50603 Kuala Lumpur, [1]International Medical University, Seremban, Negeri Sembilan, Malaysia

ABSTRACT: A descriptive study of full- term neonates with jaundice was carried out to determine factors affecting severity of neonatal jaundice for those infants presenting to the hospital from their homes. Severe jaundice (serum bilirubin ≥250 μmol/l) was significantly more likely in infants whose mothers consumed traditional herbs during the postpartum period ($p<0.001$) and if the jaundice was first detected by the parents or relatives rather than by medical personnel ($p<0.05$). In addition, the interval between detection of jaundice and presentation to hospital was significantly longer in jaundice that was first detected by parents compared to those detected by medical personnel. In conclusion, factors affecting severity of neonatal jaundice for infants who present from home could be influenced by the socio-cultural practices of maternal postpartum use of herbs, the ability of parents to detect jaundice and the urgency of the parents in seeking medical treatment once the jaundice was detected. Further studies need to be done to explore the association of these factors with neonatal jaundice more specifically. *(JUMMEC 2000; 1: 24-27)*

KEYWORDS: Hyperbilirubinaemia, socio-cultural practices, herbs.

Introduction

Neonatal jaundice is a very commonly encountered problem, which may affect up to 60% of newborn infants (1). Causes of neonatal jaundice include Rhesus and ABO incompatibility, erythrocytic Glucose-6-Phosphate Dehydrognase (G6PD) deficiency, prematurity and sepsis (2). Recent studies have demonstrated several other factors associated with neonatal jaundice. These include breast- feeding, weight loss after birth, oriental race, male sex and low gestational age (3). However, up to 55-68% of infants with jaundice have no apparent cause found (3, 4).

With the common practice of early postpartum discharge from hospital, very much is dependent on the ability of the parents to detect jaundice at home. Furthermore, socio- cultural practices by nature of the different ethnic groups may also contribute to the severity of neonatal jaundice at presentation to hospital.

An understanding of these factors would assist doctors in determining which infants are at risk of presenting with more severe jaundice if discharged during the early postpartum period and thus provide closer supervision and education to the parents of these at-risk infants.

This study therefore sets out to determine whether socio- cultural factors and the ability of parents to detect jaundice at home have any influence on the severity of neonatal jaundice at presentation.

Materials and methods

This study was conducted in the Paediatric Institute, Kuala Lumpur Hospital, Malaysia, a tertiary referral centre for paediatric patients in the country. The hospital however, also caters for the general health needs of the middle and lower income groups in the city. The community is made up of three main ethnic groups, namely the Malays, Chinese and Indians.

Newborn infants that were admitted to the ward for clinical neonatal jaundice were identified by daily ward review over a one- month period. Babies who were found to have clinical jaundice in the out- patient department were generally admitted to the ward and started empirically on phototherapy while awaiting the serum bilirubin level results. Thus, the majority of infants who presented with neonatal jaundice to the hospital were seen in the ward.

Information on the birth, nutrition, socio-cultural

Corresponding address:
M F Pang
c/o Department of Paediatrics,
University of Malaya Medical Centre
50603 Kuala Lumpur, Malaysia

practices and the detection of jaundice was obtained from direct interview of the parents. The information was also supplemented by data in the patients' medical records as well as from the baby's growth and development card given to the parents following birth.

G6PD deficiency screening is routinely performed in all infants at birth and is normally recorded in the child development card. With regard to the detection of jaundice, parents were asked about the person who first detected the jaundice in their child. The detection of jaundice could be made by the parents themselves, relatives or medical personnel. In our health system, newborn babies who were discharged from the hospital were normally followed up with home visits by the public health nurse or midwife. Jaundice might be first detected by the nurses during such home visits or coincidentally by doctors when parents brought the infant to the doctor for other medical complaints.

These neonates were included in the study if they have been born at home or have been earlier discharged home from the maternity ward. Only infants with unconjugated jaundice and without any defined cause to account for the jaundice were selected. Infants were excluded from the study if an apparent cause of the jaundice was found. These causes included Rhesus and ABO incompatibility, G6PD deficiency, sepsis or suspected sepsis, prematurity (gestation< 37 weeks) or low birth weight (weight< 2.5 kg), polycythaemia and cephalohaematoma. Infants who developed jaundice while still in the maternity ward were also excluded from the study. Informed verbal parental consent was obtained for each of these selected infants before the investigator conducted the interview or extracted information from the patient's medical records.

Data from a total of 98 patients with neonatal jaundice were collected. From these patients, 16 patients were born premature or of low birth weight, 12 were diagnosed as having sepsis or suspected sepsis, 5 had G6PD deficiency, one had ABO incompatibility while another one was an infant of diabetic mother with polycythaemia and suspected sepsis. These 35 patients had a cause to account for the jaundice and were excluded, while the remaining 63 patients formed the study population.

A total serum bilirubin (SB) level on admission of 250 µmol/l (15 mg/dl) or more is regarded as significant (5), and forms the threshold level where phototherapy would be required (1, 6).

The patients were divided into the high bilirubin group (SB>=250µmol/l) and the low bilirubin group (SB<250µmol/l). The analysis of data was then done using the chi- square test and the Fisher's exact test for qualitative data and the student- t test for quantitative data to determine factors contributing to the high bilirubin level, with significance level at 0.05.

Table 1. Characteristics of infants with neonatal jaundice (n=63).

Age, days	
Mean ± S.D.	5.7 ± 3.1
Range	2 – 17
Gender (Male/ Female)	34/29
Birth Weight, kg	
Mean ± SD.	3.2 ± 0.4
Range	2.6 – 4.2
Ethnic Group (%)	
Malay	44 (69.8)
Chinese	13 (20.6)
Indian	5 (6.4)
Others	1 (1.3)
Feeding (%)	
Fully breast-fed	46 (73.0)
Mixed breast/ bottle	15 (23.8)
Fully bottle-fed	2 (3.2)
Total serum bilirubin, µmol/l	
Mean ± SD.	250 ± 56
Range	124 – 401

Results

The characteristics of the 63 infants included in the study are as outlined in Table 1. Out of the 63 patients, 32 (50.8%) of them had a SB level of 250 µmol/l or more while the remaining 31 infants had a SB level of less than 250 µmol/l.

On analysis of qualitative data, factors significantly associated with high SB levels were consumption of traditional herbs in the immediate postpartum period ($p<0.001$) and the initial detection of jaundice by parents or relatives rather than by medical personnel ($p<0.05$). No significant association was found to relate high SB levels with gender and ethnic group, neither was there any association with whether the infant was fully breast-fed or not (Table 2).

There was significantly longer lag time from detection of jaundice to admission in the group where the jaundice was first detected by parents/relatives compared to the group whose jaundice was first detected by medical personnel. However, no significant difference in this interval was found when comparing the group where there was maternal consumption of traditional herbs with the group where there was not. (Table 3).

On analysis of quantitative data, factors such as the interval from the detection of jaundice to admission, age on admission, maternal age, parity and birth weight have not been found to be significantly associated with high SB levels. This is shown in Table 4.

Table 2. Analysis of Qualitative Data For Factors Associated with Severe Jaundice (Bilirubin level ≥ 250 μmol/l).

Factors	Total number Of patients	Number with severe jaundice	Rate ratio (95% CI)	p value
Feeding				
Fully breast-fed	46	21	0.7(0.4-1.1)	NS
Mixed/ Bottle-fed	17	11		
Gender				
Male	34	15	0.8(0.5-1.2)	NS
Female	29	17		
Ethnic group				
Malay	44	20		
Chinese	13	9	-	NS
Indian	5	3		
Maternal postpartum consumption of herbs				
Yes	22	18	2.4(1.4-3.8)	<0.001
No	41	14		
First person to detect jaundice*				
Parents/ Relatives	33	21	1.7(1.1-2.5)	0.04
Medical personnel	29	11		

* Data missing from one patient
NS = Not significant

Discussion

Previous studies on factors contributing to neonatal jaundice have mainly focused on antenatal, birth and feeding factors, as well as factors associated with the infant (3, 7, 8, 9). Furthermore, in these studies, all the infants stayed in the ward throughout the duration of the study. However, the variables that may affect severity of jaundice at presentation can become much more complicated in situations where the infant was brought in for jaundice from home, having had early postpartum discharge from the hospital or having been born at home.

Besides the contributory factors enumerated above, the severity of neonatal jaundice on admission in such situations might also be determined by several other factors. These factors included firstly, the socio-cultural practices in the homes, secondly, the ability of the parents or health personnel in detecting jaundice in the infant, and thirdly, the response of the parents in seeking medical help once the jaundice was detected.

This study has demonstrated that the socio-cultural practice of consuming traditional herbs amongst mothers in the postpartum period had significant association with more severe neonatal jaundice. This association can be interpreted from different angles. The association could mean that the practice of using traditional herbs might be more prevalent among those who would try traditional remedies initially in treating neonatal jaundice and thus present late to the hospital.

Table 3. Analysis of variables associated with prolonged interval between detection of jaundice and presentation to hospital.

Variables	Interval, days ± S.D.	p value
Postpartum maternal consumption of herbs		
Yes (n=22)	1.7 ± 1.5	NS
No (n=41)	2.0 ± 3.7	
First person to detect jaundice *		
Parent /relative (n=33)	2.8 ± 3.3	0.03
Medical personnel (n=29)	1.0 ± 2.8	

* Data missing from one patient
NS = not significant

Table 4. Analysis of Quantitative Data of Factors Associated with Severe Jaundice (Serum Bilirubin, SB level ≥ 250 μmol/l).

Variables	SB<250 μmol/l (n=31)	SB≥250 μmol/l (n=32)	p value
Interval, days*	1.5±2.9	2.3±3.3	NS
Parity	2.5±1.7	2.7±1.5	NS
Maternal Age, years	27.6±4.8	28.7±5.3	NS
Birth weight, kg	3.1±0.4	3.2±0.3	NS
Age of infant, days	5.1±2.9	6.3±3.1	NS

* Interval between detection of jaundice and presentation to hospital
NS = Not significant

However, this had not been shown to be the case in this study as the interval between detection of jaundice and admission did not differ between those who used herbs compared to those who did not.

Another more plausible explanation would be the direct effects of the herbs in causing severe jaundice in infants. As almost all infants in our study were still being breast-fed (either fully or partially) on admission, the herbs consumed by the mother might had been excreted via breast milk and transmitted to the infant. Literature had shown that some Chinese herbal medicines could displace the bilirubin molecule from their serum protein binding sites and increase the risk of neonatal jaundice (10, 11). Traditional herbs from the Malays and Indians might also have similar effects. In the light of the findings in this study, the contribution of traditional herbs in causing severe neonatal jaundice would warrant deeper analysis and review.

The ability of the parents in detecting neonatal jaundice has also been demonstrated in this study to be an important factor in determining the severity of neonatal jaundice at presentation to hospital. A higher proportion of jaundice that were detected by parents or relatives presented with higher bilirubin levels compared to jaundice that were detected by medical personnel. With the practice of early postpartum discharge of mother and infant, the responsibility to detect jaundice would fall on the parents. It would therefore be important to train parents to accurately detect and assess progression of jaundice in their infant. Parents who were trained had been shown in one study to be able to detect and estimate the degree of jaundice with high correlation with actual bilirubin levels (12).

In this study, it has been shown that there was a shorter interval between the time of detection and admission if the jaundice was detected by medical personnel. This might imply that parents tend to respond more promptly in bringing their infant to hospital if the jaundice was first detected by medical personnel, compared to jaundice that was detected by the parents themselves. Parents might experience indecision whether to bring the infant in for further assessment if they themselves detected the jaundice. On the other hand, parents might be more inclined to promptly follow the instructions of the medical personnel who first detected the jaundice, as the medical personnel might be perceived by the parents to be more experienced in jaundice detection.

In conclusion, the severity of neonatal jaundice for infants that were brought from home to hospital could be related to socio- cultural practices in the homes, particularly with regard to postpartum maternal consumption of traditional herbs, the ability of the parents to detect jaundice and the response of the parents once the jaundice was detected. Larger, detailed studies would be required to confirm these findings and explore each of the three factors more specifically.

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