

## Effect of Educational Intervention on the Knowledge and Practice among Parents of Newborns with Jaundice

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### Abstract

**Background:** Raising awareness of mothers has an important role to preventing neonatal severe hyperbilirubinemia. We aimed to investigate the role of educational intervention on the knowledge and practice of the mothers with icteric newborns. **Materials and Methods:** This study was interventional study with interventional and control group. Study population consisted of 384 consecutive parents of newborns with jaundice, who were admitted to Mahdieh and Mofid hospitals in Tehran- Iran, during 2013 to 2014. The participants were randomly assigned to the trained group (n = 192), who receiving educational programs in three sessions that each sessions was about 45 minutes and the control group (n = 192), without any educational intervention Two months after completing the educational program, the level of knowledge and practice of women in both groups was assessed by using the same questionnaire. The data were analyzed by using SPSS software. **Results:** The mean score for the level of knowledge toward neonatal jaundice was higher in educational group compared to the control group ( $7.5 \pm 2.5$ , ranged 2 to 15 versus  $4.7 \pm 1.3$  ranged 1 to 7,  $P < 0.001$ ). The level of knowledge toward neonatal jaundice reached 72% in educational group that remained 39% in control mothers. The mean score for practice of mothers to neonatal jaundice was significantly higher in trained mothers than in untrained ones ( $13.7 \pm 3.8$  ranged 7 to 19 versus  $5.9 \pm 2.1$  ranged 3 to 7,  $P < 0.001$ ). Also, high score for practice in trained and untrained women was 84% and 67%, respectively that was significantly higher in former group ( $P < 0.05$ ).

**Conclusion:** Despite low level of knowledge and practice of mothers with jaundiced neonates, training programs in our experience led to significantly improving the level of knowledge and practice in this population.

**Key Words:** Educational intervention, Knowledge, Practice, Neonatal Jaundice.

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## 1- INTRODUCTION

Bilirubin-induced neurologic dysfunction and kernicterus as its serious consequence is frequently preventable by early treatment and prevention of severe hyperbilirubinemia. Kernicterus is the pathological finding of bilirubin-related toxicity in the brain characterized by bilirubin deposition and ultimately neuronal necrosis and gliosis in all parts of the brain, especially the basal ganglia of brain stem (1). In addition to the deposition of bilirubin in the brain, autopsies carried out have been revealed extra-neuronal lesions in the renal tubules (renal tubular necrosis), in the pancreas and in the gastrointestinal system (GI bleeding) (2). There are no accurate estimates of the prevalence of kernicterus, but in a study in Tehran, about 3.5% of patients with cerebral palsy had a history of severe hyperbilirubinemia (3).

The American Academy of Pediatrics (AAP) has emphasized the following preventable causes for kernicterus (4,5): early discharge from the hospital (under 48 hours) with no early follow-up, failure to recognize the risk factors of severe jaundice, no testing of bilirubin in infants with jaundice in the first 24 hours of birth, failure to properly estimate the severity of jaundice by clinical observation, no fear of jaundice in newborns, delays in the measurement of bilirubin, delay in starting treatment, and lack of attention to the concerns of parents about jaundice and poor feeding. Several strategies have been studied to reduce kernicterus that one of the most important approaches is to increase the level of public knowledge towards jaundice (6). In some studies, the most common causes of kernicterus have been the lack of identifying high-risk infants and difficulty with initiating treatment for jaundice (7). In others, the high incidence of complications of jaundice in infants has been attributed to parental neglect, self-treatment, and lack

of proper understanding of jaundice (8). In addition, a significant correlation has been found between knowledge and practice in parents of newborns with jaundice (9). Considering all the above points, raising awareness in the community has an important role in preventing serious complications of jaundice. The present study aimed to investigate the role of public education on the knowledge and practice of parents of newborns with jaundice.

## 2- MATERIALS AND METHODS

### 2-1. Study Design and Population

The study population consisted of 384 consecutive parents of newborns with jaundice who were admitted to Mahdieh and Mofid hospitals in Tehran- Iran, during 2013 to 2014. All included babies had gestational age at birth greater than 35 weeks. In this study, the participants were randomly assigned to the intervention group (n = 192), who received educational programs and the control group (n = 192), without any educational intervention.

### 2-2. Methods

This study was interventional study with case and control groups. The educational section was done by face to face method when the pregnant mother (after age 35 weeks of pregnancy) referred to health centers and Mahdieh and Mofid hospitals of Shahid Beheshti University of Medical Sciences. For matching of some variable like literacy and level of family income of sample, two groups selected from similar socio- economic part of the Tehran city and statistic test showed that there was not significant deferent between two groups before the educational intervention.

In the case group, women who attended healthcare centers for routine assessment were trained face-to-face by obstetricians and midwives using educational pamphlets about hyperbilirubinemia. The educational intervention for case group was

accomplished in three sessions that each session was about 45 minutes. During the 4 months study period, educational intervention was aired in several newspapers and through educational advertising on radio and television. Two month after completing the educational program, the level of knowledge and practice of women in both groups was assessed using the same questionnaire.

### 2-3. Measuring tools

The study tool was researcher made questionnaire that the validity and reliability of the questionnaire was approved by study team. This questionnaire consisting of 19 questions about knowledge towards neonatal jaundice as well as 7 questions about the practices of mothers relating to neonatal jaundice. The level of knowledge scored as 0 to 5 (undesirable level of knowledge), 6 to 11 (partially desirable), and 12 to 19 (completely desirable) and the level of practice was also, scored as 0 to 3 (undesirable level of practice), 4 to 5 (partially desirable), and 6 to 7 (completely desirable).

Some of the headlines saying in this educational intervention were: the onset age of icteric, the main cause of icteric, the signs of icteric, the consequence of delay in treatment, misunderstanding and false belief about icteric and some advice for prevention of traditional treatment like usage formula milk, cupping and stopping the breast feeding and Start formula or sugar water, which is very common in society.

### 2-4. Inclusion criteria

Inclusion criteria were: mothers with infants with gestational age of 35 weeks and more that just because jaundice infants were referred to Mofid and Mahdih hospital of Tehran.

### 2-5. Exclusion criteria

The exclusion criteria were: unwillingness to participate in the study.

### 2-6. Ethical considerations

This study approved by Shahid Beheshty University of Medical Sciences ethical research committee.

### 2-7. Data analyses

Results were presented as mean  $\pm$  standard deviation (SD) for quantitative variables and were summarized by absolute frequencies and percentages for categorical variables. Categorical variables were compared using Chi-square test or Fisher's exact test when more than 20% of cells with expected count of less than 5 were observed. Quantitative variables were also, compared with Mann- Whitney U test. Statistical significance was determined as a P- value of  $\leq 0.05$ . All statistical analysis was performed using SPSS software (version 19.0, SPSS Inc., Chicago, Illinois).

## 3- RESULTS

### 3-1. Baseline characteristics

As summarized in **Table.1**, no significant difference was revealed between the interventional group and the control group for gender distribution of neonates, mean gestational age, mean age of onset of jaundice, mean birth weight, and mean level of serum hemoglobin. However, the serum level of neonatal total bilirubin was significantly higher in control group.

There was also, no difference between the intervention and control groups in terms of blood group, the frequency of blood transfusion, and prevalence of Glucose-6-phosphate dehydrogenase (G6PD) deficiency, however neonates in control group received more intensive phototherapy, than compared to intervention group. No difference was also, observed in mean age of fathers and mothers between the two study groups,

while the number of infant with parity was significantly lower in control group. Moreover, fathers and also mothers in interventional and control groups did not differ in educational level and occupational status. There was no difference between trained and untrained women in history of jaundice in previous children (20.8% vs. 17.7%,  $P = 0.518$ ), history of jaundice complications (1.6% vs. 1.6%,  $P = 1.000$ ), and history of blood transfusion or intensive phototherapy (10.4% vs. 8.4%,  $P = 0.600$ ). Family relationship between parents were observed in 30.4% in trained group and 21.6% in untrained group ( $P = 0.074$ ). In intervention group, 88.0% were supervised by gynecologist and 12.0% by midwife, whereas in control group, 87.5% were supervised by gynecologist and 12.5% by midwife ( $P = 0.875$ ). Regarding the number of visits before the current admission, in trained group, 24.5% of neonates were visited one time, 51.6% were visited two times, and 23.9% were visited three times that one, two, and three times of visits was shown in 58.8%, 24.0%, and 9.9%, respectively with a significant difference ( $P < 0.001$ ).

### 3-2. Level of knowledge and practice

The results of the study showed that the mean score for the level of knowledge toward neonatal jaundice was significantly higher in trained group compared to untrained group ( $7.5 \pm 2.5$ , ranged: 2 to 15 versus  $4.7 \pm 1.3$  ranged: 1 to 7,  $P < 0.001$ ). The level of knowledge toward neonatal

jaundice reached 72% in trained group that remained 39% in untrained mothers. In this regard, the trained group were more likely to answer correctly to different items including manifestation of onset of jaundice with yellowing of the skin or eyes, the timing of deteriorating jaundice, need to visit a doctor or other health personnel to detect jaundice, dangerousness of jaundice, the etiology of jaundice, complications of severe neonatal jaundice, appropriate treatment of jaundice, and immediate referring jaundiced neonates to physician. These results are shown in **Table.2**.

The mean score for practice of mothers with respect to neonatal jaundice was significantly higher in trained mothers than in untrained ones ( $13.7 \pm 3.8$  ranged: 7 to 19 vs.  $5.9 \pm 2.1$  ranged: 3 to 7,  $P < 0.001$ ). Also, high score for practice in trained and untrained women was 84% and 67%, respectively, that was significantly higher in former group ( $P < 0.05$ ). More corrected answered were expressed by trained group to the items of practice towards neonatal jaundice including how to diagnose neonatal jaundice, how to identify deterioration of jaundice in newborns, first step after detection of jaundice in newborns, considering doctor's advice to control the jaundice status through blood tests, considering doctor's advice to hospitalize suffered neonate, the time to wait for hospitalizing neonate, and considering doctor's advice to readmit neonate.

**Table-1:** The caparison between interventional and control groups in some variable in infants with jaundice

Variables	Interventional group	Control group	P -value
	Mean $\pm$ SD	Mean $\pm$ SD	
Gestational age	37.3 $\pm$ 1	37.2 $\pm$ 0.7	0.169
Refer age babies (days)	6 $\pm$ 3.1	6.7 $\pm$ 3.6	0.165
Age of onset of jaundice (days)	3.4 $\pm$ 1.6	3.3 $\pm$ 1.5	0.484
Birth weight (g)	3056 $\pm$ 525	3093 $\pm$ 340	0.416
Total bilirubin (mg / dL)	17.8 $\pm$ 3.7	18.6 $\pm$ 2.9	0.01
hemoglobin	15.9 $\pm$ 2.1	16.3 $\pm$ 2	0.068

**Table-2:** The comparison between case and control groups in distribution of variables in infants with jaundice hospitalized in Mofid and Mahdih hospital

Variables	Intervention group	Control group	P -value
	Number (%)	Number (%)	
Rh	11(5.8)	14(7.3)	0.68
G6PD deficiency	17(8.9)	11(5.8)	0.257
Coombs	8(4.3)	0(0)	0.003
Normal	46(24)	28(14.6)	0.027
Intensive	146(76)	164(85.4)	0.674
Blood transfusions	8(4.2)	5(2.6)	0.574

#### 4- DISCUSSION

According to our observation, the level of knowledge toward neonatal jaundice reached 72% in trained group in comparison with only 39% in untrained mothers. Also, high score for practice in trained and untrained women were 84% and 67%, respectively that was significantly higher in former group. In this regard, mean scores for knowledge and behavior in trained women was significantly higher in trained group. The scores for both knowledge and practice was mainly affected by different items particularly early referring to physicians and thus by early referring neonates to medical health centers, it can be managed neonatal jaundice more appropriately. As shown in previous studies, the level of knowledge and behavior in mothers of jaundiced neonates is directly associated with the level of mothers' education. In fact, higher educational level can be main explain for higher level of knowledge toward neonatal jaundice. On the other hand, higher educational level may help achieving higher level of knowledge and behavior toward neonatal jaundice.

In the present study, proper knowledge to neonatal jaundice in total population ranged 39% in untrained group to 72% in trained group. Also, acceptable behavior to neonatal jaundice in our subjects ranged 67% in untrained group to 84% in trained

group. In fact, although the level of knowledge and practice in our population improved by training, it was not acceptable at baseline. In a study by Boo et al.(10), higher level of baseline knowledge achieved in mothers that 93.8% of them knew about neonatal jaundice; however one-third of mothers were aware that jaundice appearing during the first 36 hours of life was abnormal and less than 20% knew about glucose-6-phosphate dehydrogenase deficiency and that fetal-maternal blood group differences could cause jaundice. Also, only 38.4% of them were aware that severe jaundice could result in hearing impairment and only 27.1% of them were aware that putting jaundiced infants under the direct sun could result in dehydration and worsening of jaundice. In another study by Egube et al. (11), 85.9% of participants were aware of the condition, 77.4% knew how to recognize the symptoms of neonatal jaundice, and 67% knew its complications. In their study, the knowledge of neonatal jaundice was significantly influenced by their level of education. Amirshaghghi et al. (12) in another sample of Iranian population showed that about 77% of the mothers had moderate-to-high level of knowledge of neonatal jaundice.

In a study by Ogunlesi and Abdul (13), 57.1% of participants had good knowledge on newborn jaundice. Moreover, in a study by Sutcuoglu et al and Dizaji et al. (14,

15), the rate of insufficiently informed mothers was 53.6% and low education level was found to increase the probability of the mothers' knowledge level to be insufficient. In total, it seems that the level of knowledge and behavior to neonatal jaundice, its complications and the best way for its management is considerably low in our population and also, in most developing nations emphasizing implementation of various training programs to improve understanding of these mothers to neonatal jaundice.

Our study results could confirm the beneficial effects of training by different resources including pamphlets, public newsletters and even advertising on radio and television on increasing level of both knowledge and practice towards neonatal jaundice. It seems that by improving knowledge of mothers to jaundice their neonates, raising their practice can be also, achieved appropriately. In this regard, families with lower educational levels and/or those with unemployment status are at high risk for neonatal jaundice and its related complications and thus, longer hospitalization with high healthcare costs is expected.

Education to parents can lead to early diagnosis and management of jaundice in their neonates. It emphasizes that training at the public level through planning of the Ministry of Health and Medical Education and by physicians and healthcare providers is necessary to achieve early diagnosis and management of affected neonates as well as to reduce delay of referring the parents to healthcare centers. In this context, the following points can be strongly recommended: planning to raise broader public awareness about the issue of diagnosis, causes, treatment, complications and danger signs of jaundice through mass media, planning to increase the awareness of parents about jaundice during pregnancy by holding training courses in health centers and hospitals, encouraging

gynecologists and midwives to provide training of pregnant women with neonatal jaundice during pregnancy visits, planning to provide practical training to mothers diagnosed with neonatal jaundice after birth by nurses trained or pediatric specialists in maternities, and paying special attention to the education of high risk groups for inadequate performance or consideration of screening programs for these people.

#### **4. Limitations of the study**

Unwilling to participate in the study because of parents' problem related to Jaundice of infants.

#### **5. CONCLUSION**

Despite low level of knowledge and behavior of mothers with jaundiced neonates, training programs in our experience led to significantly improving the level of knowledge and practice in this population. So it seems having routine education in the hospital about neonatal Jaundice can help to control of Jaundice of infant.

**6- CONFLICT OF INTEREST:** None.

#### **7. ACKNOWLEDGEMENT**

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