

Mothers' Knowledge and Attitude Regarding Neonatal Hyperbilirubinemia

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Abstract

Background: Hyperbilirubinemia is the most common problem in the newborn period that requiring hospitalization and medical attention. Approximately 60% of all newborns develop some degree of jaundice in the first week of life. **Aim of the study:** To assess mothers' knowledge and attitude regarding neonatal hyperbilirubinemia. **Research design:** A descriptive exploratory research design was used to achieve the aim of this study. **Sample:** A convenient sample of 375 mothers admitted to postpartum unit at Minia University Hospital for Obstetrics and Pediatrics. **Tool:** Structured interview questionnaire were developed by the researchers that include Part I: Personal data of the mothers including age, place of residence, level of education, occupation ...etc. Part II: assessment of mothers' knowledge regarding neonatal hyperbilirubinemia. Part III: assessment of mothers' attitude regarding hyperbilirubinemia by using five levels Likert scale. **Results:** the results of the current study revealed that more than half of mothers had unsatisfactory level of knowledge regarding hyperbilirubinemia and the vast majority of them had an agree attitude toward hyperbilirubinemia. There was a fair a correlation between occupation and educational level of mothers and their total knowledge scores. More than half of mothers with past history of babies with hyperbilirubinemia have a satisfactory knowledge and there was no statistically a significance difference between mothers who have previous experience with hyperbilirubinemia and their attitudes to hyperbilirubinemia. **Conclusion:** More than half of mothers have an unsatisfactory knowledge regarding hyperbilirubinemia and the most of mothers have an agree attitude regarding hyperbilirubinemia. **Recommendation:** further health education program should be conducted to increase awareness of mother to how to deal and manage their newborn with hyperbilirubinemia.

Keywords: Hyperbilirubinemia, Newborn infant, Mothers' knowledge, Mothers' attitude

postnatal week. Because of the potential for bilirubin toxicity, newborns require assessment to identify those at risk for severe hyperbilirubinemia or, in rare cases, bilirubin encephalopathy or kernicterus (Kamath et al., 2011). Hyperbilirubinemia leads to neurotoxicity by a number of mechanisms that include; cellular death by interfering with DNA synthesis, disruption of protein synthesis and phosphorylation, impairment of nerve conduction (particularly the auditory nerve), and by inhibition of ion exchange and water transport in renal cells leading to neural swelling (Khalifa, 2015).

Nurses play an integral role in the routine physical assessment includes observing for evidence of jaundice at regular intervals. Jaundice is most reliably assessed by observing the infant's skin color from head to toe and the color of the sclera and mucous membranes. Applying direct pressure to the skin, especially over bony prominences such as the tip of the nose or the sternum, causes blanching and allows the yellow stain to be more pronounced (Hockenberry et al., 2016).

In Egypt, several other factors predispose to severe hyperbilirubinemia and kernicterus. These include inappropriate maternal knowledge about the possible risks of severe neonatal jaundice, delay in seeking medical advice, home therapy for jaundice using neon lamps that do not provide the required wavelength, and difficulty in finding adequate medical care especially in remote areas when required (Iskander et al., 2012). It is suggested that the mother, as the primary caretaker, should have a clear understanding of how to recognize NNJ and how to respond appropriately, as early recognition and prompt treatment decrease the likelihood of development of the potentially permanent complication. Therefore, mothers should be adequately educated about the care of jaundiced baby and early identification of danger signs and also its complications. It helps in effective treatment and also in the prevention of jaundice complications (Allahony et al., 2016)

Introduction

Hyperbilirubinemia is an abnormally elevated serum bilirubin level characterized by yellowing of the skin and other tissues of a newborn infant. It is the most common condition that requires medical attention in newborns (Hockenberry and Wilson, 2013). The most prevalent and easily identified symptom of both types of hyperbilirubinemia is jaundice, in neonates, clinical jaundice diagnosed if the total serum bilirubin is ≥ 7 mg/dl. It affects 60% of term and 80% of preterm infants in the first week of life (Allahony et al., 2016).

Physiological jaundice is an elevated serum bilirubin in a newborn by third or fourth day of life, due to immaturity of the liver's capacity to handle a substantial amount of bilirubin leading to jaundice and reduced life span of red blood cells 45-90 days. It usually takes the newborn's liver a week or two to mature enough to handle the build-up of bilirubin in the blood, while preterm or late preterm newborn at 5th day of life will have a peak bilirubin level of 15 mg/d (Vandborg et al., 2012).

Pathological Jaundice is an elevated serum bilirubin level in a newborn, defined as an elevated bilirubin level >5 mg/dL within the first twenty-four hours of life, an increase in the bilirubin level of more than 0.5 mg/dL /hour, and this due to hemolytic diseases as RH incompatibilities, ABO incompatibilities (Maisels et al., 2012).

The most obvious sign of hyperbilirubinemia is jaundice, the yellowish discoloration primarily of the sclera, nails, or skin. The intensity of the jaundice not always related to the degree of hyperbilirubinemia; therefore, transcutaneous screening or serum bilirubin levels are necessary. The associated signs include poor at sucking or feeding, sleepy, and have a high-pitched cry (Hockenberry et al., 2016).

Most jaundice is benign and resolves within 7 to 10 days in term newborns. However, severe hyperbilirubinemia may develop in 8% to 9% of all newborns during the first

Sample:

A convenient sample of 375 mothers that admitted to postpartum unit at Minia University Hospital for Obstetrics and Pediatrics. The determination of the sample size is based upon the confidence level 95%, margin of error 5%, and population size 14600 mothers' (total number of women was delivered in Minia University Hospital for obstetrics and pediatrics at 2014).

Inclusion criteria:

- Primipara and multipara mothers admitted in postpartum unit.
- Mothers who were willing to participate in the research

Exclusion criteria:

- Mothers have a newborn baby with multi congenital anomalies
- Mothers with chronic diseases and unable to participate in the study

Data collection Tool:

Structured interview questionnaire: It was developed by the researcher in Arabic language after reviewing related literature. It covered the following parts:

Part I: Personal data sheet: Personal data covered 5 items including mother's age, place of residence, occupation, education level of mothers and father.

Part II: level of mother's knowledge regarding neonatal hyperbilirubinemia: It covered 32 questions such as "definition, risk factors, causes, early signs and symptoms, prevention...etc.

Part III: Attitude of mothers regarding hyperbilirubinemia by using Likert scale that involved 15 elements includes five points as completely agree, agrees, not identified, disagree, and completely disagree. Their attitude as worry for appearance of jaundice on their child, go with baby that has neonatal hyperbilirubinemia to physician, worry about blood sample aspiration for their infant because it causes anemia etc.

Scoring system:

Scoring system for mother's knowledge regarding neonatal hyperbilirubinemia, each correct response took two scores, incorrect response took one score. It contained 32 questions, so score of general mother's knowledge regarding neonatal hyperbilirubinemia was 64 score. The total score of mother's knowledge less than 60% was considered as unsatisfactory knowledge, while score more than 60% was considered as satisfactory knowledge. As regards mother's attitude regarding neonatal hyperbilirubinemia, it include 15 questions and score 5 (strongly agree), score 4 (agree), score 3 (don't identified), score 2 (disagree), and score 1 (strongly disagree).

Procedure:

An official permission was obtained from the director of the Minia University Hospital for Obstetrics and Pediatrics, and permission from the head of department after explaining the aim and nature of the study. Mothers' was interviewed on individual bases to explain the nature and purpose of the study. Measures were taken to protect mothers' ethical rights. Mothers' knowledge and attitude regarding neonatal hyperbilirubinemia was assessed using

Significance of the study

Newborns are discharged early from hospitals, therefore mothers play an important role to recognize jaundice and control it properly. Mothers had moderate knowledge on neonatal jaundice, especially very low knowledge over complications and types of neonatal jaundice, which has to be improved through adequate education from antenatal period itself. Positive attitude to be improved in breastfeeding the child during neonatal jaundice as it is essential to prevent the complications (Rabiyeepoor et al., 2014).

In Egypt, severe hyperbilirubinemia and bilirubin encephalopathy are still being reported in numbers that cannot be ignored. Pre-discharge screening for neonatal jaundice or for risk factors for severe hyperbilirubinemia is not routinely performed except in private practice. To date, all available data are hospital based and not representing the general population (Basheer et al., 2017).

Fewer studies could be located that has assessed the mothers' knowledge and attitude regarding neonatal hyperbilirubinemia. Hence, the current study is under taken to explore the knowledge and attitude of the mothers concerning hyperbilirubinemia among newborn infants. Results of the current study may help in evaluation of the mother's knowledge and attitude as well as providing guidance, evidences and recommendations that should be reflected in neonatal nursing education and practice. Hopefully, the results of the current study could help clinical neonatal nurses design appropriate discharge education programs for mothers of newborn infants having hyperbilirubinemia.

Aim of the study

The aim of the current study was to assess mothers' knowledge and attitude regarding neonatal hyperbilirubinemia.

Research Questions

- What are the mothers knowledge regarding neonatal hyperbilirubinemia and its management?
- What are mother's attitudes toward neonatal hyperbilirubinemia?
- Is there a difference between mothers having babies with hyperbilirubinemia and mothers without having babies with hyperbilirubinemia before?

Subject and Method

Research design:

A descriptive exploratory research design was utilized for the current study.

The primary objective of descriptive exploratory research is to explore a problem to provide insights into and comprehension for more precise investigation. It focuses on the discovery of ideas and thoughts. The exploratory research design is suitable for studies which are flexible enough to provide an opportunity for considering all the aspects of the problem.

Setting:

The study was conducted in postpartum unit at Minia University Hospital for Obstetrics and Pediatrics.

according to the panel judgment on the clarity of sentences, appropriateness of content and sequences of items. Reliability of tools was performed to confirm its consistency by Cronbach's Alpha reliability was 0.834 and 0.75 respectively

Ethical considerations:

A primary approval was obtained from the research ethics committee, Faculty of Nursing, Minia University. Oral Informed consent was obtained from mothers before data collection, after full explanation purpose of the study, benefits, rights for privacy, confidentiality and rights to withdraw at any time.

Statistical design

The collected data were coded and entered into the Statistical Package for the Social Science (SPSS 20.0). Data were presented using appropriate descriptive and inferential statistical tests in the form of frequencies and percentages for categorical variables. Statistical significant was considered at p -value ≤ 0.05 .

Result:

Table1: The percentage distribution of mothers according to their personal data (n=375)

Personal data	No.	%
Mothers' / years		
18-	161	42.9
27-	161	42.9
36 – 42	53	14.2
Mean \pm SD	28.1 \pm 6.3 years	
Residence		
Urban	218	58.1
Rural	157	41.9
Occupation		
Housewife	257	68.5
Employee	87	23.2
Private employee	31	8.3
Education level of mother		
Illiterate	142	37.9
Read and write	42	11.2
Primary school	83	22.1
Diploma	67	17.9
University	41	10.9
Education level of father		
Illiterate	123	32.8
Read and write	29	7.7
Primary school	46	12.3
Diploma	113	30.1
University	64	17.1
Total	375	100

the structured interview questionnaire. The interview took place in the inpatient rooms of postpartum unit at Minia University Hospital for Obstetrics and Pediatrics. The researcher asked mothers questions in questionnaire and marked their response in structured interview questionnaire. The time taken to conduct the structured interview questionnaire for each mother was ranged from 20 to 30 minutes and at rate of 10 to 12 mothers/ week. Data collection was conducted over a six months period extending from May 2016 till November 2016.

Pilot study

A pilot study was done on 10 % of total sample (38 mothers) to test the content validity and feasibility of designed tools and estimate the time required for filling the tool. Modifications were done accordingly.

Tool Validity and Reliability

The tools were given to a panel of three experts in the field of neonatology and pediatric nursing to examine the content validity. Modifications of the content were done

Table 1: shows the percentage distribution of mothers according to their personal data. It was found that mother's age from 18-and less than 27 years equal to mother is age from 27- and less than 42 years were 42.9% respectively of each one and the mean age of mother was 28.1 ± 6.3 years. More two thirds of mothers (68.5%) were housewives and 41.9% came from rural area. The one third of mothers (37.9%) and fathers (32.8%) were illiterate.

Table 2: the percentage distribution of mothers according to their past experience related to hyperbilirubinemia (n=375)

Past experience related to hyperbilirubinemia	No.	%
Had child with hyperbilirubinemia		
Yes	146	38.9
No	229	61.1
If yes, how many number of child affected		
One	76	52.1
Two	42	28.8
Three	28	19.2
Are you had child died (n=146)		
No	146	100
From your past experience, how did child treated with hyperbilirubinemia (n=146)		
Go to hospital	91	62.3
Drugs	38	26
Natural light	11	7.5
Traditional medicine	2	1.4
Nothing	4	2.7
Are your child need for hospitalization (n=146)		
Yes	45	30.8
No	101	69.2
If yes, what was the treatment given to the child at hospital (n=45)		
Phototherapy	24	53.3
Blood exchange	12	26.7
Don't remember	9	20
What was the outcome of your baby from the hospital (n=45)		
Complete recovery and discharge	38	84.4
Discharge and has medical problem	7	15.6
Are you received guide about hyperbilirubinemia		
No	146	100
What is the first thing that you do for your newborn infant when developing jaundice (n=146)		
Go to hospital for investigation	102	69.9
Worry	33	22.6
Give the child herbs	9	6.2
Don't know	2	1.4

Table (2): presents the percentage distribution of mothers according to their past experience related to hyperbilirubinemia. It was noticed that more than one third (38.9%) of had previous experience of hyperbilirubinemia and more than half (52.1%) out of them had one child affected with hyperbilirubinemia before, and more than two thirds of affected newborn (69.2%) not treated at hospital. It was found that 53.3% of hospitalized child treated with phototherapy and 84.4% of neonates discharged from hospital with complete recovery and 69.9% go to hospital for investigation firstly if jaundice developed.

Table 3A: Percentage distribution of mother's regarding to general knowledge about hyperbilirubinemia (n=375)

Knowledge	No.	%
Heard about hyperbilirubinemia before		
Yes	327	87.2
No	48	12.8
Source of mother's information		
Health team members	175	46.6
Neighbor and friends	113	30.1
family	87	23.2
Hyperbilirubinemia is		

Knowledge	No.	%
Decrease affect neonates as consanguinity between mother and father associated with flushed face and hyperthermia	38	10.1
Decrease affect neonate due to elevated bilirubin level associated with yellow color in body and eye	49	13.1
Disease affect neonate due to hereditary factors and associated with pale face	57	15.2
Don't know	231	61.6
First sites appear in it		
Chest	28	7.5
Abdomen	29	7.7
Face	217	57.9
Sclera	24	6.4
Extremities	34	9.1
Don't know	43	11.5
Time of appearance		
Every day in the first two weeks	212	56.6
Every day in the first four weeks	38	10.1
Don't know	125	33.3
Time of physician consultation		
Immediately when observe hyperbilirubinemia	208	55.5
Depend on nurse family visitor	15	4
Wait for more observation of hyperbilirubinemia	109	29.1
Don't seek medical advice	4	1.1
Don't know	39	10.4

Table 3A: shows the percentage distribution of mother's regarding to general knowledge about hyperbilirubinemia. It presented that 87.2% heard about hyperbilirubinemia and main source of information was health team members 46.6% while the neighbor and friends play an important role in information of mothers which represented 30.1% from mothers. It was found that 61.6% of mothers do not know the definition. More than half of mothers (56.6%) checked for jaundice every day for the first two weeks of life and 10.1% checked every day in the first four weeks while 31.7% did not know the time of checking. It was noticed that 57.9% of mothers mentioned that face was the first site of appearance and 56.5% of them response that appearance occurred at every day of the first two weeks of life, while 59.2% of them replied that appearance of hyperbilirubinemia occur in the eye. It was observed that 55.5%-visited physician immediately when observe hyperbilirubinemia.

Table 3B: Percentage distribution of mother's regarding to general knowledge about hyperbilirubinemia (n=375)

Knowledge	No.	%
Early signs		
Loss of ability for suck and feed	66	17.6
High pitched cry	98	26.1
Convulsion	35	9.3
Inappropriate positioning	10	2.7
Changes of conscious level of child	31	8.3
Don't know	135	36
Causes		
Inappropriate matching between blood of mother and fetus	49	13.1
Infection	24	6.4
Premature labor	88	23.5
Breast milk	8	2.0
Drugs	25	6.7
All the above	33	8.8
Don't know	148	39.5
Types		
Physiological	76	20.3
Breast milk	7	1.9
Indirect pathological	17	4.5
Rh incompatibility	12	3.2
ABO incompatibility	9	2.4
All the above	26	6.9
Don't know	228	60.8
Treatment		
Phototherapy	130	34.7
Blood exchange	16	4.3
Albumin	13	3.5

Knowledge	No.	%
Drugs	60	16
All the above	32	8.5
Don't know	124	33
Investigations		
Urine analysis	34	9
Blood analysis	103	27.5
Body appearance	28	7.5
Don't know	210	56
Complications		
Acute bilirubin encephalopathy	40	10.7
Increase bilirubin in brain tissue	32	8.5
Mental retardation	52	13.9
All the above	66	17.6
Don't know	185	49.3

Table 3B: presents the Percentage distribution of mother's regarding to general knowledge about hyperbilirubinemia continue. It summarized that more than one third (36%) of mothers do not know the early signs, while 17.6% of them said change in infant suck and feed were the early signs and 26.1% said that high pitched cry are the early signs. It was found that 39.5% of mothers do not know the causes and 23.5% of them mentioned premature labor was one of the causes. It was observed 60.8% of mothers do not know the types, while physiological hyperbilirubinemia was reported by 20.3% of mothers. It illustrated that 34.7% of mothers said that phototherapy was the treatment, and 49.3% of them do not know the complications, while acute bilirubin encephalopathy as a complication was answered by 13.9% of mothers.

Table 4: The Percentage distribution of mother's regarding to their attitude toward hyperbilirubinemia (n=375)

Attitude	Strongly agree	Agree	Not identify	Disagree	Strongly disagree	% of agreement
I will worry for appearance of jaundice on my child	283 (75.5%)	69 (18.4%)	10 (2.7%)	8 (2.1%)	5 (1.3%)	94
I go with baby that has neonatal hyperbilirubinemia to physician	213 56.8	121 32.3	28 7.5	11 2.9	2 .5	89
I'm worry about blood sample aspiration for my child because it causes anemia	190 50.7%	136 36.3%	10 (2.7%)	30 (8%)	9 (2.4%)	87
when jaundice appeared I will use traditional treatment because it not dangerous disease	52 (13.9%)	53 (14.1%)	62 (16.5%)	153 (40.8%)	55 (14.7%)	28
If jaundice develops, since I am afraid of hospitalizing my infant, I won't consult a physician	64 17.1	65 17.3	23 6.1	122 32.5	101 26.9	34
Neonatal hyperbilirubinemia is a serious disease	137 36.5	117 31.2	35 9.3	58 15.5	28 7.5	68
hyperbilirubinemia is easily treated when early diagnosed and taken suitable treatment	203 54.1	107 28.5	23 6.1	36 9.6	6 1.6	83
hyperbilirubinemia is an infectious disease	64 17.1	42 11.2	104 27.7	82 21.9	83 22.1	28
Breast feeding is given for baby with neonatal hyperbilirubinemia	164 43.7	114 30.4	73 19.5	14 3.7	10 2.7	74
Proper antenatal care helps in preventing the incidence of hyperbilirubinemia	129 34.4	111 29.6	109 29.1	23 6.1	3 .8	64
Hyperbilirubinemia in early life have a dangerous effect on the neonates	134 35.7	147 39.2	64 17.1	24 6.4	6 1.6	75
Hyperbilirubinemia in early life is easily treated at hospital	162 43.2	138 36.8	30 8	26 6.9	19 5.1	80
Hyperbilirubinemia is caused by evil events	4 1.1	2 .5	17 4.5	31 8.3	321 85.6	2
Exposure of neonates to sun light help in treatments of hyperbilirubinemia	33 8.8	45 12	156 41.6	94 25.1	47 12.5	21
Premature labor help in incidence of neonatal hyperbilirubinemia	60 16	107 28.5	147 39.2	51 13.6	10 2.7	45

Table 4: presents the percentage distribution of mother’s regarding to their attitude toward hyperbilirubinemia. It was revealed that, the majority (94%) of mothers’ worry for appearance of jaundice, followed by them go with their babies to physician (89%). It was observed that 87% of mothers worry about sample aspiration of their babies, and 83% of them have agreement that jaundice it can be easily treated when it early diagnosed and taken suitable treatment. It was reported that 80% of mothers have an agreement that jaundice in early life easily treated at hospital and 45% of them agree that prematurity increase the incidence of jaundice. It was reflected that small numbers of mothers 21% agree that sun light exposure help in treatment of jaundice.

Figure 1: The Percentage distribution of mother’s regarding to total knowledge score

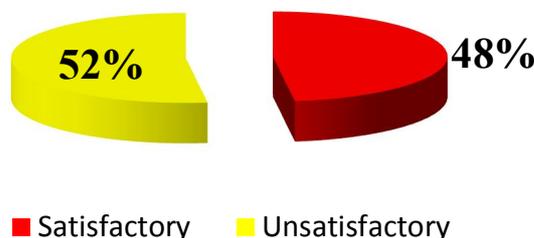


Figure 1: illustrates the percentage distribution of mother’s regarding to total knowledge scores. It was found that more than half of mothers 52% have unsatisfactory knowledge about hyperbilirubinemia and 48% of them have satisfactory knowledge, which Mean ± SD was 34.4 ± 3.1.

Figure 2: The Percentage distribution of mother’s regarding to attitude score

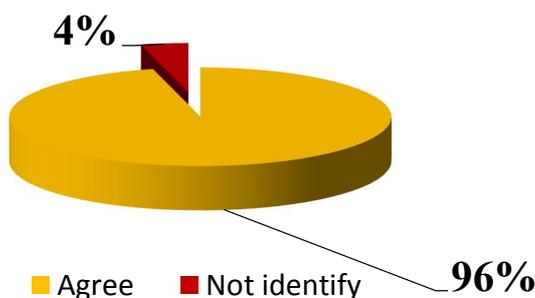


Figure 2: presents the Percentage distribution of mother’s regarding to total attitude scores. It was illustrated that majority of mothers (96%) had agreed attitudes which Mean ± SD 52.9 ± 4.9

Table 5 correlation between total knowledge, attitude scores and personal data of the mothers

Personal data	Total knowledge scores		Total attitude scores	
	r	P – value	r	P – value
Age	.139**	.007	.133**	.010
Residence	-.140**	.007	.067	.198
Occupation	.293**	.0001	.003	.960
Education level for mother	.272**	.0001	.030	.566
Education level for father	.208	.06	.095	.065

**statistical significance at level ≤ 0.01

Table 5: illustrates correlation between total knowledge, attitude scores and personal data. It was represented that a fair association between occupation and educational level of mothers and their total knowledge score with highly statistically significant difference. However, there were a weak association between their total attitude score and their age.

Table 6 relation between total knowledge scores and previous experience with hyperbilirubinemia

Have previous experience	Satisfactory knowledge		Unsatisfactory knowledge		t = test	P - value
	No	%	No	%		
Yes	97	53.9	49	25.1	32.57	.000**
No	83	46.1	146	74.9		

**highly statistical significance at level ≤ 0.01

Table 6: illustrates relation between total knowledge scores and previous experience with hyperbilirubinemia. It was presented that 146 of mothers have previous experience with hyperbilirubinemia and more than half of them (53.9%) of them have satisfactory knowledge with statistically significance difference which p ≤ 0.000.

41.9% came from rural area and 10.9% of them have a university degree as observed in table1. Which indicates that illiteracy rate among Egyptian females in Upper Egypt is high. So the efforts of governmental and non-governmental

Discussion:

Regarding personal characteristics of the current study revealed that mean age of mothers was 28.1 ± 6.3 years, 37.9% were illiterate, 68.5% were housewives, and

mentioned that waiting more for observation of jaundice as shown in table 3A. Similarly, (Ng and Chong, 2014) demonstrated that 83.3% of participants go to health workers when observing jaundice but 11.2% of mothers put the baby on sun when observing jaundice. Conversely (Onyearugha et al., 2016) reported that 14% of participants take baby immediately to hospital while 56% of them put the baby under sunlight when observing

The present study reported that 36% of mothers do not know the early signs, while 17.6% of them mentioned that change in infant suck and feed were the early signs as detected in table 3B. On the same line (Alfouwais et al., 2018) reported that 44.3% don't know the warning signs, 26.6% reported refusal to feed, and 31.3% demonstrated high pitched cry are a warning sign of neonatal jaundice.

Regarding the causes of neonatal hyperbilirubinemia, this study demonstrated that 39.5% of mothers do not know the cause, 8.8% know all possible causes while 23.5% said premature labor as shown in table 3B. Similarly, reported by (Egube et al., 2013), who demonstrated that 45.5% of participants don't know the causes of jaundice, while 16.2% of mothers mentioned that jaundice caused by premature labor. On the opposite side the study conducted by (Onyearugha et al., 2016) who demonstrated that 81.3% don't know the causes, 14% know one causes and 4.7% know two possible causes. The present study revealed that 57.9% of participants checked the face as it is the first site of appearance of jaundice as shown in table 3B. Conversely, (Ng and Chong, 2014) cited that 95.4% checked the skin for presence of jaundice.

Regards mothers' knowledge about complication, our study stated that 49.3% of participants do not know the complication, while 17.6% mentioned all complication which includes acute bilirubin encephalopathy, increase bilirubin in brain tissue, and mental retardation, this could have an influence on perceived severity of jaundice and consequently on the steps taken as shown in table 3B. On the same line (Allahony et al., 2016) cited that only 21.5% of mothers were aware that severe NNJ can cause brain damage, which is the main complication of NNJ, and only 1.5% knew that hearing loss is a common sequel.

Regards treatment of neonatal jaundice, the result of this study revealed that 33% of participants do not know the treatment while 34.7% of mothers mentioned that phototherapy used for treatment of jaundice as shown table 3B. On the same line the study conducted by (Vaez, 2016), he found that there a false answer about treatment which reported that 77.5% of the mothers answered that they had given their babies some sort of antibiotics, remedies, or herbs and 2.04% answered don't know the treatment of jaundice. On the opposite side (Egube et al., 2013) found that a large proportion of the expectant mothers 96.1% agreed that they would accept phototherapy for treatment of NNJ, if their babies had the condition.

We have found that 56% of mothers don't know the investigation required for diagnosis of neonatal jaundice, 27.5% of them mentioned blood analysis, while 7.5% of them mentioned that diagnosis of jaundice depends on body appearance as observed in table 3B. This result may be due many physician dependents on observational assessment due to increase costs of laboratory investigations. In contrary (Ogunfowora et al., 2006), reported that 56.6% of the participants knew that checking a baby for the presence of jaundice involved examination of the eyes, skin, palm of the hands and sole of the feet, while 36% of them stated that

organizations should focus on female' education in Upper Egypt because low levels of literacy, and education in general affect the mother's response to disease. On the same line, (Rodrigo and Cooray, 2011) stated that 73.2% were housewives, 69% from rural area but 46.5% of mother have a university degree. On the opposite side (Egube et al., 2013) reported that the mean age of their study was 30.5 years with high literacy level which showed that 60.7% of participants have a tertiary educational level.

As regards to mother's previous experience of hyperbilirubinemia, the current study revealed that 39.9% had previous experience of hyperbilirubinemia and 52.1% out of them had one child affected with hyperbilirubinemia before, and 69.9% of them followed the advice of physician when observe jaundice in their babies as shown in table 2. These results are in agreement with (Boo et al., 2011) who reported that 282 women who already had children, 54.6% of them had a past history of their children developing neonatal jaundice. A majority (91.6%) of this latter group of mothers followed the advice of their doctors in the management of their jaundiced infants. On the opposite side (Ogunfowora et al., 2006) who reported that Only (5.3%) of respondents had previous experience with NNJ. Half of them managed the condition with drugs on their own at home while the other half did not give any treatment.

As shown in table 3A in the current study represented that 87.2% heard about neonatal hyperbilirubinemia before and 46.6% of mothers heard about it from health care teams, while 30.1% of them heard about it from neighbor and friends, and 23.2% of them aware about jaundice from family members. This finding may be due the increased incidence of hyperbilirubinemia in newborn, so almost homes have a child affected with hyperbilirubinemia. On the same line (Shukla and Agarwal, 2016), who found that 80% of mothers heard about jaundice 69.5% of them heard about it from community health worker. On the contrary the result of the current study were inconstant with (Goodman et al., 2015), who found that 73.2% of respondents had never heard about jaundice occurring in neonates. Majority of those aware of the disease got such information through friends and family members 63 (59.4% and 35 (33.0%) respectively.

The current study found that 61.6% of mothers do not know the definition of hyperbilirubinemia while 13.1% reported that hyperbilirubinemia is a disease affect neonate due to elevated bilirubin level associated with yellow color in body and eye as shown in table 3A. This result may be due more than more than one third of mothers were illiterate and lack of antenatal care and absence of guidance from health team members before mother discharged from hospital. On the opposite side (Rabiyeepoor et al., 2014) who reported that 90% of participant in the study describe hyperbilirubinemia as a condition characterized by the yellow discoloration of the skin of newborns.

This study revealed that 56.5% of mothers checked for jaundice every day for the first two weeks of life and 10.1% checked every day in the first four weeks and 33.3% of them don't know the time of jaundice that appear as observed in table 3A. This finding was in agreement with (Boo et al., 2011) who explained that 74% of participants noticed jaundice in the first two weeks, while 9.1% noticed it in the first four weeks of life.

It was observed from the current study that more than half of mothers 55.5% consult physician immediately when observe hyperbilirubinemia while 29.1% of them

- Pediatric nurses should educate mothers about dangerous signs of hyperbilirubinemia, ways of prevention and the importance of early medical seeking of disease.
- Health education sessions and awareness campaigns about hyperbilirubinemia and how mothers can deal and manage their children with hyperbilirubinemia especially in rural remote areas are mandatory.
- Further study also can be conducted to have greater view regarding the knowledge on neonatal jaundice care among mothers.

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using the color of the stool or urine of the baby to detect NNJ.

The present study reflects a negative attitude of mothers toward sun exposure of their babies that have NNJ, which shows that 20.8% of mothers agree of sunning babies affected with jaundice as shown in table 4. On the same line (Allahony et al., 2016) documented that 52.8% of mothers deemed that it was harmful for babies; a belief induced 54% of participants to keep infants in a dark room. On the opposite side this finding disagree with (Boo et al., 2011), who revealed that placing a jaundiced infant, either naked or fully dressed, directly under the sun was a common practice among Malaysian mothers which was 79.1% from total participants of the study.

Regarding attitude of mothers about action taken when observing jaundice, the current study documented a negative attitude of mothers toward traditional treatment and herbs in babies with jaundice which reflect that small numbers of mothers 28% only agree toward that. On the same line (Khalessi and Rakhshani, 2008) reported that 36.1% agree to use home medicinal herbs when observing jaundice in their baby.

It was revealed from our study that there was a weak association between the age and residence of mothers and level of their knowledge with highly statistically significant difference as observed in table 5. This finding contradicts with (Hussein and Aziz, 2016), who revealed that there were a high significant association between the mother's knowledge and their age, level of education and socioeconomic status at p-value < 0.05

The current study cited that mothers with previous history of jaundice have a satisfactory knowledge about hyperbilirubinemia which have 53.9% total knowledge score as illustrated in table 6. This finding may be due to increased awareness of mothers from first contact with the disease, hence future contact with same disease become easy to deal with it. These result were in agreement with (Egube et al., 2013) which demonstrated that the level of education of the respondents, and also the number of their previous babies who had NNJ, had a significant influence on their knowledge of the condition.

Conclusion:

It was concluded from the current study results that the total knowledge score of mothers regarding hyperbilirubinemia was unsatisfactory. Most of mothers had an agree attitude toward hyperbilirubinemia. More than half of mothers had a misconception that neon lamb aid in treatment of hyperbilirubinemia. Mothers with Previous history of hyperbilirubinemia have a satisfactory knowledge than mothers without past history of jaundice.

There were a fair association between occupation and educational level of mothers and their total knowledge score with highly statistically significant difference and there was a weak association between their total attitude score and age of mothers. It was concluded that no statistically significance difference between mothers who have previous experience with hyperbilirubinemia and their attitudes to the disease.

Recommendations:

- Awareness program should be conducted among the mothers attending gynecological inpatient and outpatient department.

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