KNOWLEDGE AND ATTITUDE OF NURSES ABOUT NEONATAL HYPERBILIRUBINEMIA IN DUHOK GOVERNORATE: CROSS SECTIONAL STUDY

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ABSTRACT
Background and objectives: Neonatal hyperbilirubinemia is the most common medical condition in the neonates. About 60% of term and 80% of preterm infants develop jaundice during 1st week of life. The objectives of the study were to assess knowledge and attitude of nurses toward hyperbilirubinemia, and to find out whether there were any relationships between nurses knowledge and attitude with sociodemographic data.

Subjects and methods: A descriptive, cross sectional study was done all nurses (n=166) working in the neonatal intensive care units and different departments in governmental hospitals in Duhok governorate has been recruited to the study during the period started from 1st May to 1st August 2019.

Results: The study revealed that the majority of nurses had fair knowledge about concepts, definition of phototherapy 98 (59%), causes 78 (47%), Intervention of bilirubin level and steps of management 125 (75.3%), side effects 106 (63.9). While 98.8% of nurses had good knowledge regarding clinical manifestations 164 (98.8%), Investigations 137 (82.5%), complications 78 (47.0%) and Nursing care 159 (95.8%). It also found that there was a significant relationship between demographic data and nurses' knowledge. Moreover, 145 (87.3%) of nurses held neutral attitude toward neonatal hyperbilirubinemia. Finally, the study found a significant relationship between attitude and demographic factors.

Conclusions: The study concludes that nurses working in Neonatal intensive care unit (NICU) and pediatric wards had fair knowledge regarding concepts, causes, steps of management, side effects of phototherapy and good knowledge regarding clinical manifestations, investigations, complications and nursing care. Furthermore, nurses held neutral attitude towards neonatal hyperbilirubinemia.

KEY WORDS: Knowledge, Attitude, Nurses, Neonatal hyperbilirubinemia

Abbreviations:
TSB: Total serum bilirubin
G6PD: Glucose 6-phosphate dehydrogenase deficiency
NICU: Neonatal Intensive Care Unit
Hrs: Hours
BIND: Bilirubin-induced neurologic dysfunction

INTRODUCTION
Hyperbilirubinemia clinically apparent as jaundice, it is a common clinical manifestation that can be Life threatening ((Duan et al., 2006) and is a reason for emergency department visits for neonates (Wolff et al., 2012). It is a commonly encountered problem especially in the first week of life (Begum & Afroze, 2018). It occurs in almost all neonates (Bhutani et al., 2008). Based on the present evidence, 80% of premature can have clinical symptoms of hyperbilirubinemia (Mojtahedi et al., 2018).

The neonatal period is defined as the time from birth to 28th day of life and is the most critical survival time for children (Pathirana et al., 2016). Around 60% of full term and 80% of preterm neonates in the first week of their lives suffered from hyperbilirubinemia that may need medical attention (Hussein & Aziz, 2016).
When the total serum bilirubin (TSB) reaches above the 95th percentile for age (high risk zone) in the first week of life, it is considered as hyperbilirubinemia (Burke et al., 2009).

Physiological jaundice is the one occurs on the 2nd and 3rd day of life. It is usually harmless and self-limiting so that it usually improves with no need for treatment after reaching the normal bilirubin level (Mojtahedi et al., 2018).

The life span of the erythrocytes is relatively shorter and the capacity for elimination of bilirubin is lower in neonates than in adults (Christensen & Yaish, 2015).

In case of pathological jaundice, bilirubin level rises in the first 24 hours and there is an urgent need for attention to find its cause (Mojtahedi et al., 2018). It can be either due to conjugated or unconjugated hyperbilirubinemia. However, unconjugated hyperbilirubinemia is much more frequent and can lead to brain damage (kernicterus) in severe conditions (Shaked & Peña, 2012).

The main risk factors for pathological jaundice are ABO blood group incompatibilities (Bhutani et al., 2013), glucose-6-phosphate-dehydrogenase deficiency (G6PD) (Watchko, 2009), infections (Field et al., 2008), prematurity, male gender, ethnicity, breastfeeding and early hospital discharge (Watchko, 2009; Bhutani et al., 2013).

Nurses need to be vigilant when caring for neonates with jaundice by monitoring the levels of bilirubin, identifying those who are at risk for developing severe hyperbilirubinemia and effectively implementing the treatment when indicated (Watson, 2009).

Therefore, by having adequate knowledge and attitude, nurses can prevent complications and decrease hospitalization needed for neonatal hyperbilirubinemia (Adebami, 2015).

In order to successfully manage hyperbilirubinemia, the nurses need to have adequate knowledge on the early detection. Total serum bilirubin level and early interventions. Nurses should assess accurately the presence and severity of hyperbilirubinemia and help parents how to assess jaundice to prevent complications related to the hyperbilirubinemia such as hearing loss, mortality, harms of hospitalizations, treatment failure, length of stay in hospital (Fayoumi, 2018).

New members nursing staff who provide care for neonates with jaundice in neonatal nurseries should be well-oriented with standardized protocols of nursing care to ensure competent nursing care (Karale et al., 2018).

**Aim of the study:**

This study aims to assess nurses’ knowledge and attitude about neonatal hyperbilirubinemia in Duhok governorate.

**SUBJECTS AND METHODS**

It is a descriptive, cross-sectional study design because it assesses and describes the knowledge and attitudes of nurses toward neonatal hyperbilirubinemia. Cross-sectional because data were collected at the same time. The study was accomplished in Governmental Hospitals in Duhok area of Kurdistan region (Hevi pediatric teaching hospital, Duhok maternity hospital while caring the patients, Zakho general Hospital, Zakho maternity hospital, Akre general hospital, Akre emergency hospital and Amadiyah general hospital). It is a non-probability sampling method used a convenience sample where the sample is taken from target population of this study was all nurses have a contact with phototherapy who were working in (NICU) and pediatric wards in Duhok governorate hospitals at the time of data collection. The total number of nurses overall hospitals were (188) Nurses. The number of nurses participated in the study were (166) nurses. However, the number of nurses who disagreed to participate in the study were (15) nurses and the number of nurses did not attended due to vacation or unknown reasons were (7) nurses.

**Inclusion criteria:** Nurses who were working in neonate and pediatric wards at the time of data collection. Nurses who accepted to participate and were available during data collection on visit were included while the study excluded nurses who refused to participate in the study and who were not available at the time of data collection. The time of data collection was done within a period of three months from 1st May to 1st August 2019 by the researcher himself (12 hour per day, 4hrs at morning, 4hrs at afternoon and 4hrs at night) in order to cover large number of nurses. The total period of the study was (From 6th March to 6th January). The approval has been obtained from the Ethical committee at Directorate of Health of Duhok. After that a written request of agreement was sent to all
hospitals in order to facilitate researcher work. After that, purpose of the study was explained for nurses working in NICU and paediatric wards, oral verbal consent was obtained from nurses who participated; The nurses or participants has right to withdraw or stop the interview. They were assured that all data would be confidential. Also the cover page cleared that all the participation in this study was voluntary and they can withdraw at any time. After getting the permission from General Directorate of Health and the selected hospital administrations in Duhok governorate, the researcher distributed self-construction questionnaire by himself. The participants who agreed to participate and were available during data collection filled in the questionnaire sheet. The filling of the questionnaire took around 30 minutes; the researcher told them that all data will kept for confidentiality and anonymity Since there was no previously designed questionnaire regarding knowledge and attitude of Nurses about Neonatal hyperbilirubinemia, the researcher formulated a questionnaire that addressed all the study’s variables that examined the knowledge and attitude of Nurses working in NICU and paediatric wards. A questionnaire was designed for the present study into three parts: part one is for assessing the socio-demographical characteristics, part two is for assessing the nurses knowldge regarding neonatal hyperbilirubinemia. It divided in to poor/fair/good. The highest score was 30 and lowest was 3, and part three is for finding the attitude of nurses.it used a likert scale. It consisted into positive/Neutral/Negative. So the highest score was 75 and the lowest was 15. The levels of knowledge and attitude were rated according to the cut of point.

| Items                              | Poor knowledge | Fair knowledge | Good knowledge |
|------------------------------------|----------------|----------------|----------------|
| Concepts & definition of phototherapy | 10-16          | 17-23          | 24-30          |
| Causes                             | 7-11           | 12-16          | 17-21          |
| Clinical manifestations             | 3-4            | 5-6            | 7-9            |
| Investigations                     | 4-6            | 7-9            | 10-12          |
| Intervention & steps of management | 6-9            | 10-13          | 14-18          |
| Complications                      | 6-9            | 10-13          | 14-18          |
| Side effects                        | 7-11           | 12-16          | 17-21          |
| Nursing care                        | 10-16          | 17-23          | 24-30          |

Cut of point of attitude

| Items | Negative | Neutral | Positive |
|-------|----------|---------|----------|
| Attitude | 15-34 | 35-54 | 55-75 |

Validation of the instrument progressed panel of expert, who provided some comments on the tool. The researcher presented the questionnaire to (6) experts who were specialized in nursing and paediatric. Their comments were considered by the researcher and modified the questionnaire accordingly. The reliability was tested using Guttman split-half coefficients to ascertain the reliability and consistency of the survey. Guttman split-half for the survey instrument was 0.89 respectively, indicating an acceptable level of reliability and consistency. The data were analysed using Statistical Package for Social Sciences (SPSS) software version 23; the purpose of this analysis was to answer the research questions. Descriptive statistics has been conducted to answer all questions. Frequency and Percentage of good/ fair/ poor
were computed, and Inferential was utilized Pearson correlation to answer the questions related to the relationship between knowledge/attitude score of Neonatal hyperbilirubinemia and selected demographic data in Duhok governorate.

RESULTS
The table (1) showed that the respondents consisted of 166 Nurses’ working in the governmental hospitals in Duhok city. The Majority of nurses 75 (45.2%) were working in Hevi paediatric teaching hospital. The Majority of the participants were between 20-29 years 108 (65.1%) and more than half 84 (50.6%) were single and 108 (65.1%) were had no children. Most of the participants 105 (63.3%) held institution degree and 13.9% were university nurses. According to the total experience of respondents in the NICU and other departments, the results revealed that 94 (56.6%) of nurses did not have previous experiences in NICU and only 31.3% were <1-3 years of experience, and 39.8% were <1-3 years of experiences in other department. Up to 115 (69.3%) of participants had no previous training about how to deal with Neonatal hyperbilirubinemia and most of them 116 (69.9%) lived in the city.

Table (1): Distribution of socio-demographic data of Participants

| Socio-demographic data | Frequency | Percent |
|------------------------|-----------|---------|
| Age 20-29              | 108       | 65.1    |
| Age 30-39              | 36        | 21.7    |
| Age 40-More            | 22        | 13.3    |
| Residence Urban        | 116       | 69.9    |
| Residence Rural        | 50        | 30.1    |
| Educational level      |           |         |
| High school            | 38        | 22.9    |
| Institution            | 105       | 63.3    |
| University             | 23        | 13.9    |
| Years of experience in NICU No experience | 94 | 56.6 |
| Years of experience in NICU <1-3 Years | 52 | 31.3 |
| Years of experience in NICU >3-6 Years | 11 | 6.6 |
| Years of experience in NICU >6-9 Years | 2 | 1.2 |
| Years of experience in NICU >9-More | 7 | 4.2 |
| Years of experience in other department No experience | 23 | 13.9 |
| Years of experience in other department <1-3 Years | 66 | 39.8 |
| Years of experience in other department >3-6 Years | 37 | 22.3 |
| Years of experience in other department >6-9 Years | 16 | 9.6 |
| Years of experience in other department >9-More | 24 | 14.5 |
| Training course        |           |         |
| No                     | 115       | 69.3    |
| Yes                    | 51        | 30.7    |
| Marital status         |           |         |
| Single                 | 84        | 50.6    |
| Married                | 82        | 49.4    |
| If married and have a children No | 108 | 65.1 |
| If married and have a children Yes | 58 | 34.9 |

Table (2): Mean and standard deviation of socio-demographic data

| Socio-demographic data | Mean | Std. Deviation |
|------------------------|------|----------------|
| Age of Nurses’         | 29.11| 7.345 |
| Years of experience in NICU | 1.4012 | 3.46452 |
| Years of experience in other department | 5.1127 | 6.47816 |
Table (3): Knowledge related to Concepts of hyperbilirubinemia and definition of phototherapy

| Knowledge Level          | Frequency | Percent |
|-------------------------|-----------|---------|
| Poor Knowledge          | 3         | 1.8     |
| Fair Knowledge          | 98        | 59.0    |
| Good Knowledge          | 65        | 39.2    |
| Total                   | 166       | 100.0   |

Table (4): Knowledge related to Causes of hyperbilirubinemia

| Knowledge Level          | Frequency | Percent |
|-------------------------|-----------|---------|
| Poor Knowledge          | 27        | 16.3    |
| Fair Knowledge          | 78        | 47.0    |
| Good Knowledge          | 61        | 36.7    |
| Total                   | 166       | 100.0   |

Table (5): Knowledge regarding clinical manifestations of hyperbilirubinemia

| Knowledge Level          | Frequency | Percent |
|-------------------------|-----------|---------|
| Poor Knowledge          | 1         | .6      |
| Fair Knowledge          | 1         | .6      |
| Good Knowledge          | 164       | 98.8    |
| Total                   | 166       | 100.0   |

Table (6): Knowledge related Investigations of hyperbilirubinemia

| Knowledge Level          | Frequency | Percent |
|-------------------------|-----------|---------|
| Poor Knowledge          | 2         | 1.2     |
| Fair Knowledge          | 27        | 16.3    |
| Good Knowledge          | 137       | 82.5    |
| Total                   | 166       | 100.0   |

Table (7): Knowledge related to Intervention of Bilirubin level (phototherapy) and Steps of management

| Knowledge Level          | Frequency | Percent |
|-------------------------|-----------|---------|
| Poor Knowledge          | 4         | 2.4     |
| Fair Knowledge          | 125       | 75.3    |
| Good Knowledge          | 37        | 22.3    |
| Total                   | 166       | 100.0   |

Table (8): Knowledge related to complications of hyperbilirubinemia

| Knowledge Level          | Frequency | Percent |
|-------------------------|-----------|---------|
| Poor Knowledge          | 21        | 12.7    |
| Fair Knowledge          | 67        | 40.4    |
| Good Knowledge          | 78        | 47.0    |
| Total                   | 166       | 100.0   |
Table (9): Knowledge of Nurses related to side effects of phototherapy

|               | Frequency | Percent |
|---------------|-----------|---------|
| Poor Knowledge| 6         | 3.6     |
| Fair Knowledge| 106       | 63.9    |
| Good Knowledge| 54        | 32.5    |
| **Total**     | **166**   | **100.0**|

Table (10): Knowledge related to nursing care for neonate receiving phototherapy

|               | Frequency | Percent |
|---------------|-----------|---------|
| Fair Knowledge| 7         | 4.2     |
| Good Knowledge| 159       | 95.8    |
| **Total**     | **166**   | **100.0**|

Table (11): Total attitude of nurses’ toward Jaundice

|               | Frequency | Percent |
|---------------|-----------|---------|
| Negative attitude| 0         | 0       |
| Neutral attitude   | 145       | 87.3    |
| Positive attitude  | 21        | 12.7    |
| **Total**         | **166**   | **100.0**|

Table (12): Mean score and SD of Knowledge and attitude

| Items                                                                 | Mean  | Standard deviation |
|-----------------------------------------------------------------------|-------|--------------------|
| Concepts of hyperbilirubinemia and definition of phototherapy        | 22.78 | 2.706              |
| Causes of hyperbilirubinemia                                         | 15.11 | 3.038              |
| Clinical manifestations of hyperbilirubinemia                        | 8.79  | .695               |
| Investigations required for diagnosis of hyperbilirubinemia          | 10.64 | 1.592              |
| Intervention of Bilirubin level and steps of management              | 12.11 | 1.566              |
| Complications of hyperbilirubinemia                                  | 12.89 | 2.535              |
| Side effects of phototherapy                                         | 15.34 | 1.971              |
| Nursing care for neonate receiving phototherapy                      | 28.51 | 1.990              |
| Attitude level towards neonatal hyperbilirubinemia                  | 48.58 | 5.047              |

Table (13): The relationship between knowledge and socio-demographic data

| Concept & Definition          | Causes | Clinical Manifestations | Investigations | Interventions & Steps |
|------------------------------|--------|-------------------------|----------------|-----------------------|
| Age of Nurses’               |        |                         |                |                       |
| Pearson Correlation          | .253   | .029                    | -.014          | .180                  | .095                  |
| Sig. (2-tailed)              | .001   | .708                    | .855           | .015                  | .225                  |
| Residence                   |        |                         |                |                       |
| Pearson Correlation          | -.118  | .049                    | .029           | .031                  | .002                  |
| Sig. (2-tailed)              | .131   | .532                    | .708           | .690                  | .976                  |
| Location of hospital         |        |                         |                |                       |
| Pearson Correlation          | -.030  | .112                    | .024           | -.121                 | .066                  |
| Sig. (2-tailed)              | .701   | .151                    | .759           | .119                  | .396                  |
| Educational level            |        |                         |                |                       |
| Pearson Correlation          | -.150  | .029                    | -.002          | -.091                 | -.060                 |
| Sig. (2-tailed)              | .054   | .711                    | .976           | .245                  | .445                  |
DISCUSSION

bases on the present study, most of the participants’ ages were between 20-29 years old with mean 29.11±7.345 years. The results were in the same line with (Issa et al., 2018) who stated that; most of the study participants reported having age ranged from 20-29 years. The current study finding disagreed with (Aleem et al., 2011) who mentioned that; more than half 47(52.7%) of the nurses were 25 to 34 years old. In the present study most of them live in the city and more than half were single and did not have children. The current study finding disagreed with (Ahmed & Hani, 2017) who stated that most of them live in the rural and more than third (75.6%) were married and had children.

As regard years of experience, more than half had short experiences in the neonatal intensive care unit with a mean duration 1.4±3.4 years and 39.8% had experienced less than 1-3 years in other department. The current study finding disagreed with (Fayoumi, 2018) who mentioned that in relation to their years of experience in

| Years of experience in NICU | Pearson Correlation | Sig. (2-tailed) |
|-----------------------------|---------------------|-----------------|
| Years of experience in other department | .251 | .160 |

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)
neonatal intensive care unit and another department the result reveals that the most of nurses had between 1-5 years of experiences.

In the current study, the highest percentage of the nurses held diploma degree in nursing which disagrees with (Khudhair, 2018) who observed that 48 (48%) of nurses had high school degree and with (Fayoumi, 2018) who stated that high percentage of nurses in the study held bachelor degree in nursing. Furthermore, the study argued that a high percentage of participants did not have previous training course regarding neonatal hyperbilirubinemia. This finding is consistent with (Ashor et al., 2016) who mentioned that more than ninety percent did not have previous attending course but disagrees with (Ahmed & Hani, 2017) who said that high percent of nurses had previous training course related to neonatal hyperbilirubinemia and (Fayoumi, 2018) who observed more than half had previous training course regarding neonatal hyperbilirubinemia.

The present study shows that nurses’ knowledge about concepts of hyperbilirubinemia the majority of nurses had fair knowledge about hyperbilirubinemia, for example increased level of bilirubin in the blood. This finding is different from that of Ahmed & Hani (2017) who illustrated that 97.6% define hyperbilirubinemia as increase bilirubin level in the blood; likewise, half of the studied nurses gave correct responses when assessing their level of knowledge. Majority of nurses had good knowledge about definitions of hyperbilirubinemia.

There is also a significant relationship between knowledge and educational level. Most nurses held an institution degree 105 (63.3%). Consequently, it was expected that their knowledge level has to be better compared to those who had high school degree. This may indicate that level of education is another factor that affected nurses’ knowledge. Conversely, the results of Fayoumi( 2018) stated that educational level did not have any relationship with nurses knowledge.

What is more, the relation between socio-demographic data and nurses’ attitude regarding neonatal hyperbilirubinemia reveals that only location of hospital and training course have statistically significant relationships with attitude. This finding is contradicted with Fayoumi (2018) who showed that there was no significant relation between demographic data and nurses’ attitude.

The current study showed that, nurses’ knowledge about neonatal hyperbilirubinemia generally was fair to good. And also neutral attitude regarding neonatal jaundice.

CONCLUSIONS

According to the results of the study the researcher concluded that most of the nurses have fair level of knowledge toward concepts, causes, and side effects of phototherapy, intervention of bilirubin level (phototherapy) and steps of management. So most nurses have good knowledge regarding clinical manifestations, complications, Investigations required for diagnosis of hyperbilirubinemia, and nursing care for neonate receiving phototherapy. Moreover, demographic factors significantly affect the knowledge and attitude of nurses, and most nurses held neutral attitude toward neonatal hyperbilirubinemia.

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الخلاصة

الخلفية والأهداف: إن فرط بيليروبين الدم عند المولود هو الحالة الطبية الأكثر شيوعًا عند الأطفال حديثي الولادة. يُصاب حوالي 60% من الأطفال الناضجين و 80% من الخذاب باليرقان خلال الأسبوع الأول من العمر.

تهدف الدراسة إلى تقييم المعرفة وموقف الممرضات من فرط بيليروبين الدم. وذلك للاستفادة ما إذا كانت هناك علاقة بين معرفة الممرضات وموقفهن من البيانات الاجتماعية والديموغرافية والمللية والطرق: أجريت دراسة وصفية مستعرضة باستخدام عينة ملائمة لجمع الممرضات (ن = 166) من العاملات اللاتي يعملن في وحدات العناية المركزة لحديثي الولادة والاقسام الأخرى في سبعة مستشفيات حكومية في محافظة دهوك في فترة ثلاثة أشهر ابتداءً من 1 مايس حتى 1 آب 2019.

النتائج: كشفت الدراسة أن غالبية الممرضات لديهن معرفة مقبولة حول مفاهيم وتعريف العلاج بالضوء (98% (59%)), والأسباب (78% (47%)), والتدخيل في مستوى البيليروبين وخطوات العلاج (125 (39.7%)), والآثار الجانبية (117 (36.7%)). على تبين أن معظم الممرضات كان لديهم معرفة جيدة فيما يتعلق بالظاهرة السريرية (14 (3.9%)), والفحوصات (123 (37.8%)), والمضاعفات (127 (37%))، والرعاية المنقولة (169 (50.8%)). كما وجد أن هناك علاقة كبيرة بين البيانات الديموغرافية ومعرفة الممرضات. كما وجد أن هناك علاقة كبيرة بين البيانات الديموغرافية ومعرفة الممرضات. علاوة على ذلك، فإن (145 (87.3%)) من الممرضات وفق موقفًا محليًا تجاه فرط بيليروبين الدم عند الأطفال حديثي الولادة. وأخيرًا، وجدت الدراسة وجود علاقة كبيرة بين موقف الممرضات والعناوين الدموغرافية.

الاستنتاجات: خلصت الدراسة إلى أن الممرضات لديهن معرفة كافية فيما يتعلق بالفماهم والأسباب وخطوات العلاج والآثار الجانبية للعلاج الضوئي ومعرفة جيدة فيما يتعلق بالظاهرة السريرية والتحقيقات والمضاعفات والرعاية المنقولة. علاوة على ذلك، اظهرت الممرضات موقفًا محليًا تجاه فرط بيليروبين الدم عند المولود.