

## Assessment for Nurses Working in Rural Health Units at Ashmoun, Menuofia Governorate about Newborn Heel Stick.

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**Abstract: Background:** Newborn heel stick is to detect potentially fatal or disabling conditions in newborns as early as possible. Many of the conditions detectable in newborn screening, if left untreated, have serious symptoms and effects, such as lifelong nervous system damage; intellectual, developmental, and physical disabilities; and even death.

**Aim of the study:** this study aims to assessment for nurses working in Rural Health Units at Ashmoun, Menuofia Governorate about newborn heel stick.

**Sample :** A purposive sample of 150 nurses was recruited for the study

**Design:** descriptive design was used.

**Setting:** The study was carried out in 22 rural health units at Ashmoun, Menuofia, Governorate.

**Tools:** two tools: tool I, it covered the characteristics of the nurses, nurses knowledge about newborn heel stick test, congenital hypothyroidism and phenylketonuria, tool II, Observation checklist to assess nurses practice.

**Findings:** findings of the present study, showed that, nurses' total correct knowledge score about newborn heel stick, congenital hypothyroidism and phenylketonuria, it was found that before program implementation 55% of nurses had poor knowledge score. on the other hand 90% of nurses had good knowledge score at post health education program and 80% of nurses had good knowledge score at follow-up newborn heel stick health education program and statistical significant improvement in nurses done practices regarding newborn heel stick test at the post-test of newborn heel stick program, than that of pre and follow-up test in all items.

**Conclusion:** there were an improvement in nurse's knowledge score and practice score regarding newborn heel stick in the rural health units at the post and follow up, than pre-test with statistical significant.

**Recommendations:** continuous training program for nurses of the rural health units about newborn heel stick.

**Keywords:** Newborn heel stick, Nurses, Health education program.

Date of Submission: 03-08-2019

Date of Acceptance: 19-08-2019

### I. Introduction

Newborn Screening Program (Heel Stick) are, to ensure that all newborns are screened with results processed within five days of birth, to ensure that all affected newborn receive appropriate confirmatory testing, counseling, and initiation of treatment as soon as possible, to provide physician consultation with other healthcare providers regarding treatment options and recommendations, and to provide an educational information program for the various healthcare providers that Serve families. **Washington State Department of Health DOH, (2016).**

**Deluca and et al (2015)** cited that nurse collects blood spots from the newborn's heel at 3-7 days of age, fill in the details of the newborn on the card before collecting the blood, aseptic technique and adhere to standard aseptic technique principles for this procedure, fill 4 circles with a large drop of blood from the back of the screening card ensuring sufficient blood has soaked through both sides, air dry the card without the use of heat and place in hospital envelope, not a plastic specimen bag, the staff reports the date of blood spot collection for screening on the newborn's paper health record and Provider informing parents of the results, If results are positive and the designated provider(s) do not include subspecialists, then referral to subspecialists with expertise in follow-up.

#### Significant of the study:

Approximately 5.6% in Egypt suffer from hypothyroidism in addition approximately 7.6% in Egypt suffer from phenylketonuria. **Health grades, (2014).**

The significant upgrade of Egypt's national newborn screening system will provide critical early insights into the health of newborns with advanced testing and ultimately, opportunities for earlier intervention when necessary. test results will also be stored in a central database, providing Egyptian healthcare professionals with timely information and improved newborn health. **Hannon, (2013).**

The goal of the continuing newborn health education program about newborn heel stick is improve nurse's practices and knowledge. **Holaday, (2016),** Some samples are considered unsatisfactory due to the quality of sample collection or handling caused by the nurse. These samples are tested for extreme values but another sample must be obtained to complete the screening tests. The need to obtain a repeat sample could delay diagnosis and treatment of an affected newborn. **Schleicher and Schuell, (2012).**

### **Aim of the study**

This study aims to assessment for nurses working in rural health units at Ashmoun, Menuofia Governorate about newborn heel stick. Through the following objectives  
1-Assess nursing knowledge and practice about newborn heel tick.

### **Research Hypothesis:**

Health educational program will improve staff nurses knowledge and practice regarding heel stick test.

### **Subjects And Methods**

**The methodology for this study was presented under the following four designs :**

- I. Technical design
- II. operational design
- III. Administration design
- IV. Statistical design

#### **I. Technical Design**

The technical design included the research design, study setting, the study subjects and tools for data collection.

##### **a-Research Design:**

Descriptive design was used in this study.

##### **b- Research Setting:**

The study was carried out in 22 rural health unit it equal (50% from the total units) was selected randomly from 44 rural health units at Ashmoun, Menuofia, Governorate. Randomization was done by using complete generated tables in closed envelop, this units are: Shanshoor rural health unit, Tahawey rural health unit, Smadon rural health unit, Shama rural health unit, Sobkalahid rural health unit, Talia rural health unit, Halawas rural health unit, Dalhamo rural health unit, Ramlet Len Jib rural health unit, ManalDeweab rural health unit, MahletSobk rural health unit , Mounsa rural health unit, Shoshai rural health unit, Migriarural health unit, Kaferabo Mahmoud rural health unit, Ouras rural health unit, Grees rural health unit, EzbetTa'imah rural health unit, Aboauali rural health unit, Len Jib rural health unit, Abo Rakaba rural health unit, Manal-aros rural health unit .

##### **c- Sample:**

A purposive sample of 150 nurse who responsible for collect newborn heel stick sample at the rural health units in the above mentioned setting was included in the study sample .

##### **Sample size:**

Total number of nurses working in the studied rural health units were 207 nurse. (The investigator select 150 staff nurse responsible about collect newborn heel stick sample to conduct in the study sample.

##### **d- Tools for data collection:**

A structured interviewing questionnaire sheet was developed by investigator after reviewing the national and international related literature and observation checklist.

##### **Tool I :Structure interview questionnaire composed of two parts:-**

**Part I:** It covered the general characteristics of the nurses such as e.g. age, sex, level of education, years of experience and training program in newborn heel stick.

**Part II:** Nurses knowledge about newborn heel stick test. It contain three parts:

*1<sup>st</sup> part: Nurses knowledge about newborn heel stick:*

cover 13 closed ended question about heel stick test such as , meaning of newborn heel stick test, right place for take the heel stick sample, the suitable time to take the first sample, the suitable time to take the repeated sample, reasons for taking the sample in the central labs in Cairo, reasons for taking the sample, transportation line for the heel stick sample, causes for repeat the invalid heel stick sample, translation the samples from units to the district, action taking toward the positive samples, storing the filter paper in the unit before taking the

sampling, time of stenting sample to the district (from 1 o'clock to 3 o'clock )and monthly report of the activity of early detection.

**2<sup>nd</sup> part:** *Nurses knowledge about congenital hypothyroidism:*

which includes ,four closed ended question such as, meaning of the congenital hypothyroidism, thyroid gland are formation in the body, site of the thyroid gland and causes of the congenital hypothyroidism.

**3<sup>rd</sup> part :** *Nurses knowledge about phenylketonuria:*

it contain three closed ended question, such as meaning of the phenylketonuria, deal with the suspect phenyl ketone urea sample and deal with the positive result of phenyl ketone urea.

**Tool II:** Observation checklist it was designed to assess nurses practice throughout the process of heel stick: it contain five parts;

**1-The place:** three closed end question to describe the place of collecting sample it was, suitable, clean and organized.

**2- Supplies:** this part contain 9 closed end question such as,filter paper (enough for two weeks), puncture devices (single use), alcohol wipes (are enough for two week), disposable gloves, sterile cotton, medical plaster, filter paper rack, safety box and towel for warmth the heel stick site.

**3-Newborn preparation;** which include three closed end questionsuch as, ensure the newborn is breast feeding before taking the sample, ensure newborn's age (3-7 days) and warmth the baby heel for three minutes.

**4-Take heel stick sample;** This part contain (11) questions cover the following data ; write the newborn and mother information on the blood spot card before the sample taken, wash hand, apply gloves, ensure the newborn's heel is down,clean the heel site by using cotton wool/gauze, taking the sample from the specific site(The heel is pricked The outers part from either side), remove first drop from the blood, allow the blood to fill the circle by natural flow, cover heel stick site by medical plaster, allow blood spots to air-dry and put the sample in paper envelope after completely dry.

**5-After taking the heel sticksample;** it is the last part of the cheek list which include (6) closed end question to collect data about , collect and dispose the remain equipment before remove the gloves, record the newborn information in the unit records, send the sample to the health district, Give health education for the parents about importance of newborn screening and importance follow-up the heel stick result, receive the sample results from the district and inform the newborn's parents about sample result that needs to be repeated and the date of repeated.

## **II. Administrative Design:**

An official permission was obtained from the Dean of the Faculty of Nursing, Helwan University to the manager of the Ashmoun health district, MenuofiaGovernorate to get an consent for data collection to conduct the study and practice the study in the rural health units at Ashmoun, Menuofia Governorate.

## **III: Operational design**

The study to be completed passed through different phases included: preparatory phases, pilot phase, filed work phase.

### **a) Preparatory phase:**

It included reviewing of national and international relate literature using journal, magazines, periodicals, textbook, internet and theoretical knowledge of the various aspect of this issue in order to develop the data collection tools.

### **b) Pilot study:**

It was conducted on 15 nurses. They presented about 10% of the total study sample. The aim of the pilot study was to evaluate the applicability and clarity of tools and estimate the time needed for the intervention. According to the obtained results modifications such as omission, addition and rewording were done. The sample of pilot study was included into the total sample.It was conducted at March/ 2017.

### **Tool content validity:**

Tools were developed by the researchers after reviewing the related literature and tested for its content validity. Validity indicated the degree to which the tool measures what it is expected to measure. It was tested through 3experts from community health nursing at faculty of nursing Helwan University and faculty of nursing Zagazig University to measure validity of tools and necessary modifications were carried out according to the panel judgment on clarity of the sentences and appropriateness of the contents.

### **Reliability:**

A reliability analysis was carried out in order to examine the internal consistency of its questions and identify the extent to which the items of tools measured the same concept and correlate with each other. The

reliability was measured by Cronbach's Alpha coefficient test. The value of Cronbach's Alpha reliability was above or = 0.84.

**C- Field work:**

- An official permission was obtained from the Dean of the Faculty of Nursing, Helwan University to the manager of the Ashmoun health district, Menuofia Governorate to get an consent for data collection to conduct the study and practice the study in the rural health units at Ashmoun, Menuofia Governorate.
- Oral approval was obtained from nursing staff after explaining the purpose of the study.
- Before starting the data collection, the researcher introduced herself and explained the purpose of the study to nurses to gain their cooperation. It took about 25-50 minutes to complete each questionnaire and observation.
- Study was conducted by staff nurses by distribution of the tool for them.
- The study work was carried out within sex month from March (2017) to Augustus (2017).
- The evaluation phase occurred to assess the nurse's knowledge and practice about newborn heel stick.

**D) Ethical considerations**

Ethical approval was obtained from the scientific research ethical committee of Faculty of Nursing, Helwan University. Informed consent was obtained from each participant. They were assured that anonymity and confidentiality were guaranteed and the right to withdraw from the study at any time.

**II. Results**

**Table (1)** shows that 76.7% of the study sample their age ranged between 44 ≤60years , 46.0% of them had 15<20years of experience and 53.3% of the study sample had taken training program about the newborn heel stick.

**Figure ( I )** shows that 94.7% of studied sample had nursing diploma, while 5.3% was nursing technician.

**Table (2):** assess the nurses' correct knowledge regarding newborn heel stick. Thistable shows that 41.3% of studied sample had correct knowledge about the meaning of newborn heel stick, 71.3% about right place for take the heel stick sample, 72.6% about suitable time to take the first sample, 38.7% about suitable time to take the repeated sample, 61.3% about reasons for taking the sample in the central l.abs in Cairo, 77.3% about reasons for taking the sample, 82.7% about translation line for the heel stick sample, 85.3% about causes for the heel stick sample are invalid, 88.0% about how samples are transferred from units to the district, 69.3% about action taking toward the positive samples, 56.0% about storing the filter paper in the unit before taking the sampling, 68.7% about the heel stick samples sent to the district from 1 o'clock to 3 o'clock and 100.0% about monthly report of the activity of early.

**Figure (II)** showed that, more than half of nurses had poor knowledge score about newborn heel stick , congenital hypothyroidism and phenylketonuria.

**Figure (III):** assess nurses done practices regarding newborn heel stick : this study showed that , 80% of the study sample had poor done practice and only 20% of the study sample had good done practice regarding newborn heel stick.

Table (10) showed that, there was astatically significant between total knowledge and total done practice for newborn heel stick.

**III. Tables and figures**

**Table (1):**Percent Distribution according to their Characteristics as the study sample (n=150).

Characteristics	No.	%
Age		
18 ≤30years	25	16.7
31 ≤43 years	10	6.6
44 ≤60years	115	76.7
Mean ± SD =		50.2 + 0. 734
Sex		
Females	150	100.0
Years of experience		
1<5	2	1.3
5<10	8	5.3
10<15	20	13.4
15<20	69	46.0
< 20	51	34.0
Training program inNewborn Heel Stick :		

Yes	80	53.3
No	70	46.7

Figure (I): Frequency distribution of nurses according to level of education (n=150).

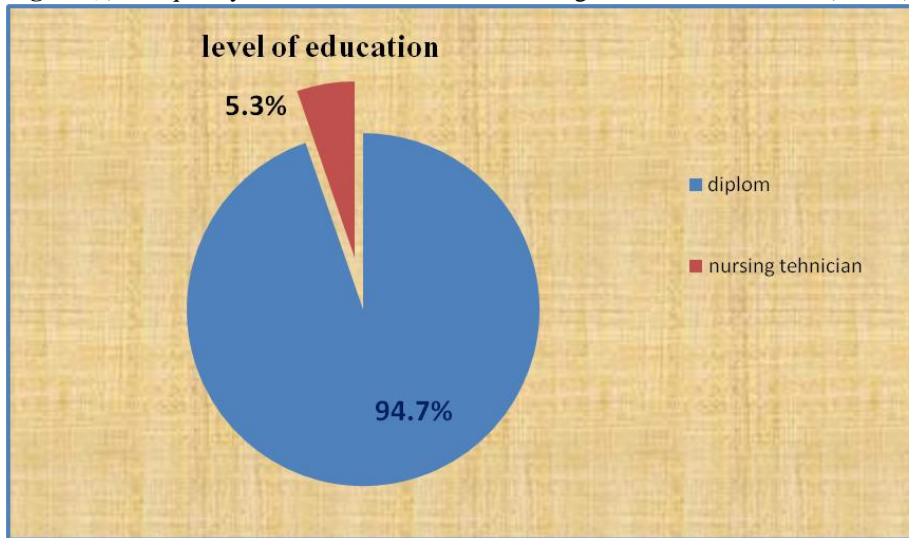


Table (2): Frequency distribution of the nurses' correct knowledge regarding Newborn Heel Stick (no=150).

Correct Knowledge		
	No	%
Meaning of newborn heel stick test	62	41.3
Right place for take the heel stick sample	107	71.3
The suitable time to take the first sample	108	72.0
The suitable time to take the repeated sample	58	38.7
Reasons for taking the sample in the central labs in Cairo	92	61.3
Reasons for taking the sample	116	77.3
Translation line for the heel stick sample	124	82.7
Causes for the heel stick sample are invalid	128	85.3
Samples transferred from units to the district	132	88.0
Action taking toward the positive samples	104	69.3
Storing the filter paper in the unit before taking the sampling	84	56.0
Heel stick samples sent to the district from 1 o'clock to 3 o'clock	103	68.7
Monthly report of the activity of early detection	150	100.0

\*Paired test (1)\*\* paired test (2).

Figure (II): Frequency distribution of nurses according to total correct knowledge regarding newborn heel stick test , congenital hypothyroidism and phenylketonuria. (n=150).

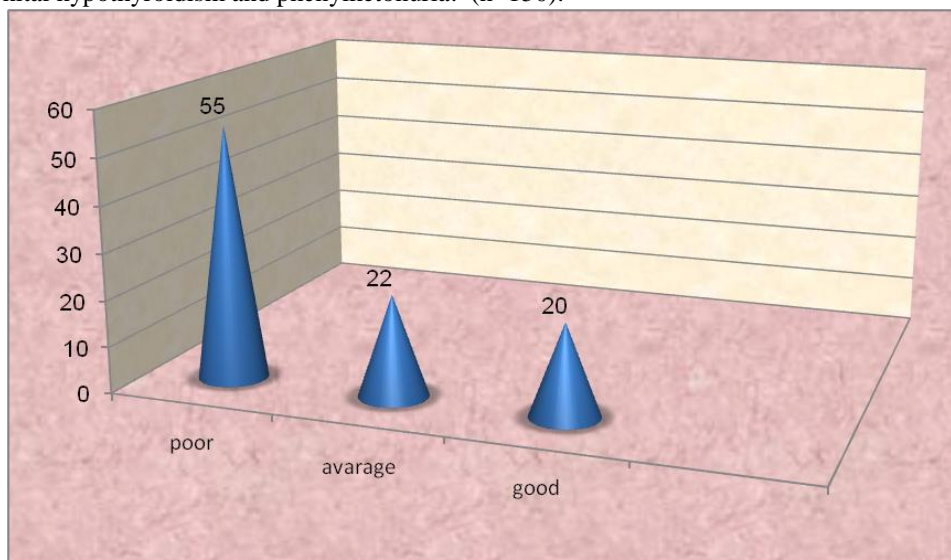


Figure (III): Frequency distribution of nurses according to total done practices for newborn heel stick (n=150).

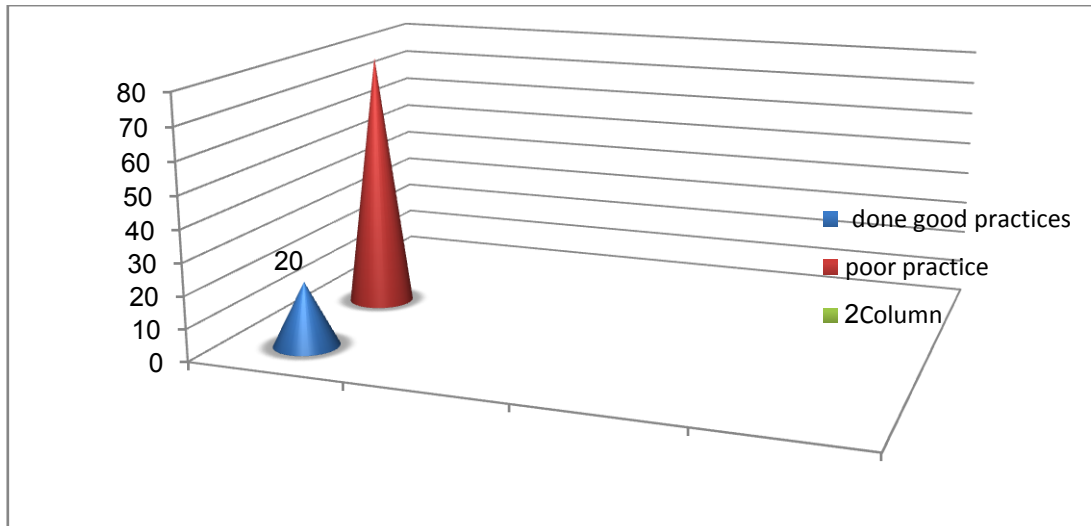


Table (10) Relation between total knowledge and total Done practice (n=150).

Variable	Total Knowledge (n=150)	
	r	P
Total practice	0.44	<0.001**

r-square=0.56 Model ANOVA: F=42.22, p<0.001

#### IV. Discussion

##### PartI: Nurse's characteristics of the studied sample

Regarding to Nurse's characteristics, the present study findings shows that the more than half of the nurses their ages ( $44 \leq 60$  years). These finding disagreed with study that done in Zagazig by *El-Dakhakhny, (2011)* about "Impact of an Educational Program on Nursing Care of Neonates with Congenital Hypothyroidism" who reported that the mean age of nurses was 28 years.

The present study showed that 94.7% of studied sample had nursing diploma, while 5.3% was nursing technician. this result agree with study done in USA by *Shu et al. (2014)*, about "Efficacy of swaddling and heel warming on pain response to heel stick in neonates: a randomized control trial." Reported that , more than two thirds had diploma in nursing, and agree with study done in USA by *Yates et al. (2013)* about "Safety of Noninvasive Electrical Stimulation of Acupuncture Points During a Routine Neonatal Heel Stick" reported that, their educational level was diploma in nursing,

Regarding to years of experience, more than third the nurse had between 15<20years of experience, this finding disagreed with *El-Dakhakhny, (2011)* who results showed that, nurses had 5.9 years of experience about newborn screening.

##### Part II:Research hypotheses I : health educational program will improve staff nurses knowledge regarding newborn heel stick test:

As regards to total correct knowledge score the present study revealed that the majority of studied sample had poor correct knowledge about newborn heel stick test, The present study results are on the same line with study done in Macedonia by *Anastasovska and Kocova. (2016)*, about "Newborn Screening for Thyroid-stimulating Hormone as an Indicator for Assessment of Iodine Status in the Republic of Macedonia." reported that, poor and average knowledge regarding to Newborn Screening And agreed with study done in Turkey by *Gokulu (2016)*, about "Comparative heel stick study showed that newborn infants who had undergone repeated painful procedures showed increased short-term pain responses" cited that, more than three quarters of the nurses had poor knowledge. These similarity might be due to lack of training program about newborn heel stick.

The present study shows that, poor level of the nurses' knowledge regarding meaning of the congenital hypothyroidism, thyroid gland are formation in the body and causes of the congenital hypothyroidism and good level of the nurses' knowledge regarding Site of the thyroid gland. This finding agree with the study that done in Zagazig by *El-Dakhakhny, (2011)* was poor nurses' knowledge regarding congenital hypothyroidism.

##### Part II:Research hypotheses :Health educational program will improve staff nurses practice regarding newborn heel stick test:

In the present study , found that ,regarding nurses' take blood sample, this study showed that poor level in nurses' done practice.This finding agree with study done in Zagazig by *El-Dakhakhny, (2011)* who reported that, One hundred percent of nurses had poor practice score before the program.

#### **Relation between total knowledge and total practice:**

This table shows that, there was astatistically significant between total knowledge and total done practice for newborn heel stick. These finding agree with study done in Ontario by *Hayeems, (2013)*,who reported the study indicated a positive significant correlation between nurses' knowledge and Done practice , and agree with study done by *Tluczek et al. (2010)*, who reported that there was a significant relation between the total knowledge and done practice scores.

In The researcher's opinion , when nurse have basic of knowledge and adequate done practice, they become able to give higher done practice .

### **V. Conclusion**

#### **Based on the results of the current study and research hypothesis it can be concluded that:**

There was poor in nurse's knowledge score and done practice regarding newborn heel stick in the rural health units.

### **VI. Recommendations**

Based on the study findings of the present study, the following recommendations are proposed:

1. Developing continuous training program for nurses of the rural health units about newborn heel stick.

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