# Nurses' knowledge Regarding Nursing Care of Neonatal Hypothermia at Gaffer Ibnuf Pediatric Hospital, Khartoum State, Sudan (2017)

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**Date:  ……..  2017**

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**Date of Examination 9/112017**

بسم الله الرحمن الرحيم

قال تعالى :

(فَرَدَدْنَاهُ إِلَى أُمِّهِ كَيْ تَقَرَّ عَيْنُهَا وَلا تَحْزَنَ وَلِتَعْلَمَ أَنَّ وَعْدَ اللَّهِ حَقٌّ
وَلَكِنَّ أَكْثَرَهُمْ لا يَعْلَمُونَ)

**صدق الله العظيم**
**سورة القصص الآية : (13)**

# DEDICATION

I dedicate this work to

My mother and father,

Brothers and sisters

And my lovely friends

# Acknowledgement

Firstly, my thanks to Greatest Allah who gave me the ability to write and assemble my study.

I would like thanks Gezira University Faculty of applied   medical sciences for the great work

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# Nurses' Knowledge Regarding nursing care of Neonatal hypothermia In Gaffer Ibnuf  Pediatric Hospital, Khartoum state, Sudan.(2017)

## Mysoon Abdalshaife Ahamed Abaker

# Abstract

Hypothermia has been defined as body temperature below the normal range , remains to be one of the major healthcare problems around the world , Nurses have an important role in prevention of hypothermia and prevent of its complications The is descriptive hospital based study  conducted at Gaffer Ibnuf pediatric Hospital,  Aimed at assessing nurses' knowledge  regarding  nursing care of neonates hypothermia. The sample size consisted of (60) nurses who constituted available number of nurses during the study period   from January-April 2017. The Data was collected using questionnaire designed for the study. Data was analyzed  using Statistical Package for Social Sciences (SPSS) ,The essult showed that (33.3%and58.3%) of the study population responded with corrects answers for the information about definition and type of neonatal hypothermia respectively , more than half (52.7%) of them responded with correct answers regarding risk factors and causes of neonatal hypothermia. (51.%) of the study population responded with correct answers  regarding warning signs of **hypothermia,** (39.9%) of them responded correctly regarding complications of neonatal hypothermia , (59.9% )of the participant responded with correct answers regarding **prevention** of neonatal **hypothermia ,** (46.6%) of the study sample responded with correct answers regarding **nursing care of neonatal hypothermia.** The study concluded that, nurses general knowledge and nursing management regarding neonatal hypothermia was in adequate knowledge, with total means score (48.8%)   The study recommended that, regular training program, accompanied with supervision to maintain the high quality of newborn care, hand book for nurses about care of neonatal  hypothermia  design  and available in the hospital.

# معرفة الممرضين والممرضات تجاه العناية التمريضة انخفاض درجة الحرارة للاطفال حديثى الولادة بمستشفي جعفر ابن عوف , ولاية الخرطوم , السودان (2017م)

ميسون عبد الشافع احمد أبكر

ملخص الدراسة

انخفاض درجة الحرارة الجسم عن المعدل الطبيعي عند اطفال حديثى الولادة تمثل احد اكبر مشاكل العناية الصحية في العالم.تقوم الممرضين دورا مهما في الوقاية والمعالجة من انخفاض درجة الحرارة ومنع المضاعفات , أجريت هذه الدراسة الوصفية بمستشفى جعفر ابن عوف التخصصي للاطفال , هدفت تقييم معرفة الممرضين فيما يتعل بالرعاية التمريضة للاطفال المصابين بانخفاض درجة الحرارة خلال الفترة يناير- ابريل 2017. تم جمع البيانات باستخدام استبيان صمم من اجل الدراسه. تم تحليل البيانات باستخدام برنامج الحزمة الإحصائية للعلوم الاجتماعية (SPSS) وتكونت عينة الدراسة (60) وهى التى تمثل العينة المتاحة اثناء فترة البحث. أظهرت النتائج أن حوالي(58.3%و33.3) من عينة الدراسة كانت إجابتهم صحيحة عن التعريف و عن أنواع انخفاض درجة الجرارة على التوالى (52.7%) من عينة الدراسة إجابتهم صحيحة عن عوامل وأسباب انخفاض درجة الحرارة لدى الاطفال،( 51%) أدلو إجابات صحيحة عن أعراض وعلامات (39.3%) من عينة الدراسة كانت إجابتهم صحيحة عن المضاعفات الناتجة من انخفاض درجة الحرارة عند الأطفال حديثى الولادة( 46.6%) من عينة الدراسة كانت إجابتهم صحيحة بالرعاية التمريضية. خلصت الدراسة الى ان المعرفة العامة الممرضين و عن انخفاض درجة الحرارة عند الأطفال حديثى الولادة معرفة غير كافية .متوسط المعرفة الكلية (48.8 %).

وأوصت الدراسة بإقامة برنامج تدريب دورية حول رعاية انخفاض درجة الحرارة عند الأطفال حديثي الولادة لضمان تقديم خدمة عالية الجودة لحديثي الولادة ,وعمل كتيبات للممرضين عن رعية انخفاض درجة لدى حديثى الولادةو ان تكون متوفرة فى المستشفى .

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# List of Abbreviations

| WHO | World Health Organization |
|-----|---------------------------|
| BAT | Brown Adipose Tissue |
| CNS | Central Nervous System |
| EGA | Estimated Gestational Age |
| LBW | Low birth weight |
| NTE | Neutral Thermal Environment |
| SPSS | Statistical Packages for Social Sciences |
| NICU | Neonatal Intensive Care Unit |
| PICU | Pediatric intensive Care Unit |
| M DG | Millennium Development Goal |
| HDU | High Dependency Unit |

# Chapter One

## Introduction

# 1-Introduction

## 1-1 Background

Hypothermia is an important cause of morbidity and serious mortality in neonatal period. Hypothermia has been defined by World Health Organization (WHO) as body temperature below the normal range (36.5 ºc-37.5 ºc )Actions such as delaying the drying inappropriate thermal protection of the newborn and bathing immediately after birth are the causes of neonatal hypothermia. Although the exact incidence of the condition is unknown it is a common phenomenon in low resource settings and is estimated that 17 million newborns develop hypothermia annually in low income countries , Hypothermic newborns are susceptible to peripheral vasoconstriction, decreased peripheral perfusion, ischemia, metabolic acidosis and increased basal metabolic rate, Control of body temperature in newborns is achieved by some mechanisms in hypothalamus and mediated by endocrine pathways. (Demling ,H ,2008),Drop in body temperature occurs after birth because the temperature of the delivery room is lower than intrauterine environment. On the other hand, the rate of body surface area to body weight of a newborn is approximately three times than that of an adult. In prolonged hypothermia fall in cardiac output may be observed and bradycardia may occur which is usually refractory to sympathomimetic drugs,Hypothermia decreases cerebral blood flow17 and brain stem reflexes disappear at core temperature of lower than 28ºc. Neonatal hypothermia is increasingly recognized as a risk factor for newborn survival. (Walker N ,et al ,2009)

## 1-2 Problem statement

Worldwide: Neonatal deaths are unequally distributed around the globe. Half of the world's newborns die at home, and more than 99% of all deaths occur in developing countries, where the average neonatal mortality rate is 33 per 1,000, compared with 4 per 1,000 in high-income countries. Since neonatal deaths account for more than 40% of under-5 mortalities, reaching Millennium Development Goal (MDG) 4 will require a substantial reduction in newborn mortality. Although addressing neonatal hypothermia might facilitate this goal, it has so far been a neglected challenge. Maintaining a normal body temperature is a critical function for newborn survival. Newborns achieve this through sophisticated mechanisms of body temperature

regulation controlled by the hypothalamus and mediated by endocrine pathways through shivering and non-shivering thermo genesis. However, particularly in premature and low birth weight infants, thermoregulatory mechanisms are easily overwhelmed, leading to metabolic deterioration and direct death from hypothermia or indirect mortality from associated mortalities such as severe infections .

( Lunze K, Hamer DH, 2012)

In Developed countries**:** the prevalence of hypothermia in the United Kingdom is about 7-12 % from the total births which account 574000 per year. This is a serious and big problem which leads to increase in mortality and morbidity rate among group of newborn (WHO, 2011).

Developing countries:  In some developing countries hypothermia is reported as Occurring universally at birth. In south Asian and sub-Saharan countries, only 3 –12% of infants born at home receive care from a trained provider within three days of birth. Basic strategies to prevent hypothermia that are standard care in developed countries are not as readily available in resource limited countries, and especially in rural areas. Financial resources for neonatal care are limited and existing hospital maternity wards and nurseries are often overcrowded.     ( Foster ,M ,B ,2014)

In Sudan  : some reasons for hypothermia ,which has been show to be an independent risk factor for death in neonates in Sudan , Neonatal hypothermia  due to the lack of body contact with the mother can be due to financial problem and  mortality rate of hypothermia due to neonatal sepsis at the hospital was 24% of total death in the hospital.

## 1-3 Justification

 Each year an estimated 3.6 million neonatal deaths occur primarily due to infection, complications of preterm birth, and hypothermia . In developing countries nearly half of neonates do not receive care after exposure to hypothermia, and become complication with serious complications like( hypoglycemia ,apnea, hemorrhage) this serious complication can be prevented if the proper nursing care  provided to the neonates including proper assessment and interventions . Nurses  play an important role in the care of  neonatal hypothermia, the nursing thus depends on scientific knowledge of the human behavior in heath and in illness, this knowledge involves interactive action that must be built on the ethical dimension between nurse and the patients. Nursing is the first step in the successful treatment of hypothermia.

## 1-4 Objectives:-

### 1.4.1 General objective

- To study Nurses' Knowledge regarding nursing care of neonatal hypothermia in Gffer Ibnuf pediatric Hospital, during period of the study from January to April 2017.

### 1-4-2 Specific objective

- To assess nurse's knowledge regarding nursing care of neonatal hypothermia in Gffer Ibnuf pediatric Hospital such as ( definition, causes, types , complication and prevention ) during period of the study from January to April 2017.

- To assess nurse's knowledge regarding nursing care of neonatal hypothermia such as (assessment, plan, intervention ) during period of the study from January to April 2017.

# Chapter Two

# Literature review

# 2-LiteratureReview

## 2-1 Definition

Hypothermia is a common alteration of thermoregulatory state of the neonates, Neonatal hypothermia occurs when the body temperature drops below 36.5c in the newborn intfant. Normal body temperature is between36.5c to37.5c, has been sub-classified into three grades: mild (36 ºc- 36.5 ºc), moderate (32 ºc- 35.9ºc), and severe (<32 ºc) hypothermia. A newborn is suddenly faced with wet and cold environments immediately after birth. In the absence of thermal protection, the baby may lose significant amounts of body heat. Low body temperature may result in worsening of respiratory distress and can predispose neonates to pulmonary hemorrhage and disseminated intravascular coagulation, heat loss in newborns occurs approximately four times more compared with adults. Peripheral vasoconstriction followed by heat generation is the first reaction to hypothermia. Release of catecholamine, cortisol and other stress hormones in response to hypothermia occurs which could lead to wasting of fat, carbohydrate and proteins. Hypothermic neonates are susceptible to bacterial infection because of white blood cell dysfunction resulting from impaired phagocytosis, delayed cytokine release and decreased neutrophil chemo tactic activity .(Pelletier T, et , al 2009)

## 2-2 Temperature control

Means regulating baby's body temperature with external equipment. if the thermal environment is properly controlled, a baby will not have to use extra oxygen and calories to produce heat .an otherwise healthy baby can become sick if cold stressed. (Baumgamt, R,2008)

## 2-3 Neutral thermal environments

The external temperature range with in which metabolic rate and hence oxygen consumption is at a minimum while the infant maintains a normal body temperature different amounts of external heat are required to establish neutral thermal environment for babies of different sizes and ages (Sarman M, et ,al ,2009)

## 2-4  Type  of hypothermia in neonate

The thermo neutral state of neonates is considered within the normal range of 36.5 C°
to 37.5C.

The stages of hypothermia are as follows:

- Cold stress: when the body temperature of newborn baby is between 36 to 36.4 C°
then the body is under cold stress.

- moderate hypothermia: an infant with temperature of 35 C° to 35.9C° has moderate
hypothermia which is danger to the baby.

 -Severe hypothermia: an infant with temperature of below 32 C°

is suffering from severe hypothermia, which need urgent skilled care. (cullumn V ,
2009 )

## 2-5 Risk factors of neonatal  hypothermia

- Lack of awareness and attention, about the importance of warmth for neonates,
among health care providers, inappropriate care of the baby immediately after
birth by inadequate   Drying and wrapping.
- Separation of baby from the mother, Cold environment at the place of delivery
and baby care areas.
- Change of temperature from womb to cooler extra uterine environment,
Inadequate warming procedure before and during transport of the baby,
Excessive heat loss by evaporation, convection, conduction and radiation from
wet baby to the cold linen, cold room and cold air, certain characteristics of
neonate, i.e. large body surface area per unit of body weight, large head,
developmental immaturity of heat regulation center, poor insulation due to less
subcutaneous fat in LBW baby and reduced brown adipose tissue (BAT) as
heat source ( Sayed, B, 2007).
- High risk neonates − LBW baby, birth asphyxia, congenital malformations
and mother having anesthetic drugs, Preterm, central nervous system (
CNS),endocrine ,or cardio respiratory abnormalities, Hypoglycemia,
electrolyte imbalances, infection, or nutritional problems, Open skin defects
(e.g., abdominal wall defects, neural tube defects) , Exposure to
neuromuscular blocking agents, analgesics, and/or anesthetics Infection: with

sepsis it is commoner to get hypothermia than hyperthermia, especially in premature baby (Majumdar,N 2008) .

## 2-6 Mechanisms of heat transfer:

Heat transfer occurs between the neonate and the environment through four mechanisms:-

Conduction: heat transfer via direct contact, heat loss occurs when neonates come in contact with any cold surface, such as X-ray plate, mattress.

Convection: heat loss occurs when cold air circulates around a baby , this is the mode of heat transfer that provides heat gin in incubators.

Radiation: heat loss occurs when the baby is near, but not in direct contact with, acold object.

Evaporation: heat loss occurs when a liquid evaporates from a wet warm skin. (Blackburn, LA,etal, 2008)

## 2.7 Clinical features of neonatal hypothermia:-

## 2.7.1. Early clinical signs:

Skin temperature of the neonate is below 36.5 Cº., Hands, feet, abdomen are cold to touch ,Weak sucking ability, weak cry and lethargy, Blue hands and feet due to Peripheral vasoconstriction.

## 2.7.2. Late sings due to persistent hypothermia:

Gradual fall of body temperature, shallow and irregular respiration, bradycardia ,lethargy and poor response, pale body with face and extremities of bright red color ,central cyanosis may present, edema and sclera (localized hardening of the tissue) may present, weight loss ( Passlick,A,2009).

Cold stress will lead to:

Hypoglycemia: due to in ceased metabolic rate to produce heat that will consume glycogen stores and blood glucose.

Acidosis: hypothermia will covert brown fat to heat and fatty acids. This acidosis in turn, causes vasoconstriction of pulmonary blood vessels leading to hypoxia .

Hypoxia: with hypothermia ,the baby needs more oxygen to produce heat,   RR will increase to get extra oxygen; also grunting, nasal flaring retractions. (James ,H, 2010)

Tachypnea, restlessness, , Respiratory distress, apnea  , poor feeding.

shivering (mature neonate in presence of severe hypothermia) ( Bahm, Z,2008).

## 2.8 Assessment of Temperature in neonates

Low reading thermometer should be used to measure the neonate's body temperature same thermometer should be used in an individual neonate at the same site ., Auxiliary temperature is preferable as it is safe and hygienic . It reflects rectal temperature if taken properly for accurate results ,the neonate's arm should be adducted with the thermometer bulb deep in the axillary pit . Axillary temperature is as good as core temperature provided thermometer kept for 3 minutes normal axillary temperature range is 36.3 to 37 C$^o$ Skin temperature is measured by thermistor (telethemometer) taped to skin of abdomen . the normal skin temperature for term babies is 36 to 36.5 C$^o$ and in preterm babies 36.2 to 37.2 C$^o$

Rectal temperature is not recorded in neonates for routine monitoring it is used only for a sick hypothermic newborns .normal rectal temperature in neonates is 36.6 to 37.2 C rectal thermometer to be inserted with precaution in backward downward direction ,the depth of insertion should be 3 cm for term babies and 2 cm for preterm babies Baby's temperature can be assessed with reasonable precision by human touch abdominal temperature is representative of the core temperature and reliable in the diagnosis of hypothermia  (WHO,2007).

## 2.9 Treatment of hypothermia

### Equipment

Closed incubator –are usually used for infant who weigh less than 1800g.

Maintain a constant body temperature using of the following devices:

- Servo controlled skin probe attached to the abdomen of the infant.
- Air temperature probe that hangs in the incubator near the infant and maintain a constant air temperature.

**Radiant warmer** :is typically used for very unstable infant or during the performance of medical procedures the temperature can be maintained in the servo mode.

- Temperature regulation in the normal infant (wt>2500)
- Place the infant under a preheated radiant warmer immediately after delivery, Dry the infant completely to prevent evaporative heat loss, cover the head with a cap, place the infant, wrapped in blankets ,in crib (Passlick,2009).
- In moderate hypothermia (32-35.9 C°) the neonate should be placed with mother in skin to skin contact in a warm room and warm bed. Radiant warmer or incubator can be used if available, Rewarding should be continued till the temperature reaches normal range. Monitor temperature eve 15to30 minutes. (Baumgamt,R,2008)
- In sever hypothermia, rewarming should be done with air heated incubator (35-36 C°) monitor blood pressure, heart rate, temperature and blood glucose level, Preventive measures to reduce heat losses from the baby should be followed.
- Preventive measures should be implemented against neonatal hypothermia to reduce morbidity and improved survival of newborn babies, which are more easier than the curative management and rewarming for neonatal hypothermia, Good quality obstetrical and neonatal care services and attention of concerned health care providers are essential for prevention of this health hazards. the health worker and mother should have knowledge and skill for assessment and prevention of hypothermia with used of common sense , which is more important than the availability of expensive equipments to keep the baby warm (Mayfied,B,2010)

## 2.10 Prevention of hypothermia

### 2-10-1At neonatal care unit

When mother is sick and unable to take care of her baby then neonates are kept in the neonatal care unit, Precautions should be taken to prevent hypothermia along with other essential care receiving the neonate in prewarmed cot, covering the baby with adequate clothing including head and extremities and avoiding undue exposure.

Keeping the ambient atmospheric temperature warm for baby's weight and age (28-32C), Maintaining humidity around 50percent, Early feeding with breast milk, Monitoring baby's temperature 3 hourly, during initial postnatal days considering axillary temperature is as good as core temperature, gradual rewarming of the baby if she or he is cold. Using extra warming devices whenever needed like radiant warmer, room heater, heated water filled mattress, isolate or incubator. A voiding direct use of hot water bottles, Decrease heat loss by convection, conduction and radiation. (Crowley ,D, et al 2010).

## 2.10.2 During transportation:

Transportation is potential weakest link of warm chain, temperature maintenance during transport is an important aspect of prevention of neonatal hypothermia, baby should be transferred after establishment of thermal stability, assess the baby's condition and temperature Baby's hands and feet should be as warm as abdomen.

Baby can be transferred in skin to skin contact with mother in kangaroo method or mother can keep the baby close to her chest. Baby should be wrapped in prewarmed cloth. Baby's head, and extremities should be covered properly avoid undressing the baby unnecessarily, baby can be transferred within thermocol box with prewarmed linen, plastic bubble sheet or silver swaddler, Simple open transport trolly should be avoided (Grantham,M, 2010)

## 2.10.3.At home:

Nurse should teach the mother and family members about neonatal care at home at home especially for maintenance of warmth and breastfeeding. Warmth to be maintained by warm room (rooming-in), skin contact (kangarooing), adequate clothing, exclusive breastfeeding with warm water in warm room, oil massage and use of solar heat. Mother should be taught to assess the thermal state by touch. The warm and pink feet of the baby indicate that the baby is in thermal comfort. But when feet are cold and abdomen is warm to touch, the baby is in cold stress. In hypothermia both feet and abdomen are cold to touch (Davis, B, 2007)

**2.11.Complication of neonatal hypothermia**

- hypoglycemia
- Cold or pale skin.
- Brady cardiac
- Feed intolerance.
- Hemorrhage
- Apnea
- Shallow breathing.
- Weak, irregular pulse
- Hypoxia.
- Death
- Dilated pupils (Cllum,N, M2010).

## 2.12 Nursing care of neonatal hypothermia

-Assess environment and what clothing baby wearing.

- Add layer of clothing and extra blanket if needed.

-Maximum layers for neonate- single., grow suit, hat, socks/booties, one wrap and one blanket,

- Re-measure neonate's temperature half to one hour after each intervention.

- Pre-warm receiving bed in the delivery room.

-keep delivery room warm.

-keep incubator portholes closed when not working with the baby.

-dry the baby quickly after delivery.

- delay bathing until stable body temperature.

-keep nursery warm (-26c) even if a baby is in incubator.

- For prolonged procedures place neonate on radiant warmer

- Observe for signs of complications

**-** using other warming devices as indicated by condation, correct any environmental factor .(knoble,H,2009)

**Nursing Diagnosis**

**Ineffective Thermoregulation** related to immature CNS (central regulation of residues, reduced lean body mass to surface area, subcutaneous fat loss, inability to feel cold and clammy)

Goal: Thermoregulation becomes effective in accordance with the development.

Expected outcomes:
Maintaining the skin or axillary temperature (35 - 37,50C).

**Interventions :**

- Assess the temperature with a rectal temperature checkat first, then check the temperature of the axilla or use a thermostat with an open base and spreader warm.
- Place the baby in an incubator or in a warm state.
- Monitor the temperature control system, spreader warm (keep the upper limit of 98.6 ° F, depending on the size and age of the baby)
- Assess output and urine specific gravity.
- Monitor weight gain in a row. If weight gain is inadequate, increase the ambient temperature as indicated.
- Note the development of tachycardia, redness, diaphoresis, lethargy, apnea or seizure activity

**Altered Body Temperature** related to abnormal births, exposure to environmental temperature, cold or hot.

**Purpose 1:** Identifying infants at risk or actual body temperature instability.

Interventions:

1. Assess the factors related to the risk of fluctuations in body temperature in infants, such as; prematurity, sepsis and infection,  the ambient temperature is too hot or cold.

2. Assess the potential and actual hypothermia or hyperthermia:

Monitor body temperature, do measurements on a regular basis.

- Monitor the temperature of the environment.

- Prevent conditions that cause heat loss in infants such as baby clothes are not wet or dry, exposure to outside air or air conditioning.

- Check the respiratory rate (tachypnea), depth and pattern.

- Observe the color of the skin.

- Monitor irritability, tremors and seizures activity.

- Monitor the presence of flushing, respiratory distress, apnea episodes, moisture, and fluid loss.


**Purpose 2:** Prevent conditions that can trigger fluctuations in body temperature.


Interventions:

. Protect the wall incubator with:

Laying incubator right place.

- Room temperature maintenance / operating room maintained.

- Use protective pads or heat in the incubator.

. Dry the newborn immediately below the heater.

. The water bath above 37 ° C and bathing the baby, after the baby is stable and 6-12 hours postnatally, dry immediately.

. Use a mat on the table resuscitation or heating.

. Close surface resuscitation table with a warm blanket, first warmed incubator.

. Keep the skin temperature from 36 to 36.5 ° C.

. As little as possible to open the incubator.

. Warm always incubator before use.

. Hold the baby with skin attached to the mother's skin (kangaroo method).

. Give a hat and wrap in a blanket.


**Purpose 3:** Preventing complications cold.

Interventions:

1. Assess signs of cold stress on the baby:


- Decrease in body temperature to less than 32.2 ° C.

- Weakness and irritability.

- Poor feeding and lethargy.

- Pallor, cyanosis of central or mottling.

- Cold clammy skin.

- The redness of the skin.

- Bradycardia.

- Slow breathing, irregular accompanied by grunting.

- Decreased activity and reflexes.

- Distesi abdomen and vomiting.(Long K.etal,2013)

## 2-13 previous studies:

Study done by (Richard,M2012).The aim of the study to investigate the nurses care and management of neonatal hypothermia ,The result showed that minority of the nurses of the definition to neonatal hypothermia ,types, causes and complication of hypothermia (55%,56%,39%and33.9%) respectively. Also their knowledge about hypothermia were correct about the definition, causes, signs and symptoms, degree and evaluation of hypothermia with the percentage of(52%,39%and44%) respectively, regarding nurses performance most of them had good skills about, administering medication, incubator setting , nose gastric tube insertion (86%,55%,68%)respectively the study concluded that most of the nurses were lack their knowledge regarding of their neonatal hypothermia.

**In developed countries:**

A study on 160 medical and paramedical staff dealing with neonatal care in Australia showed that only 47.8% of the subjects defined neonatal hypothermia the subjects defined neonatal hypothermia correctly. In addition, only 18.6% of the interviewees had knowledge about the correct method of recording the temperature in a newborn Previous reports from different Asian and African developing countries showed that most of the neonates became hypothermic soon after birth in developed countries, however, awareness of the problem has resulted in improved care and the incidence of neonatal hypothermia was mostly confined to out born, premature and LBW infant. ( Mahdi et al, 2009)

**In developing countries:** A study was conducted to assess the knowledge of staff nurses regarding care of neonates with hypothemia at selected maternity hospital of Bagalkot, 2012. This study reported that among 100 staff nurses , on an average of 55% had good knowledge regarding mode of prevention of hypothemia. On an average of 48% of different nursing care methods . On an average of 50.0% of staff nurses had poor hygienic practices and measures (David, Mary, 2012).

**In Sudan**

A study was conducted in Sudan, Khartoum to assess the knowledge, Attitude and Practices of nurse care of neonatal hypothermia In Khartoum state teaching hospitals (2011) objectives of this study was to examine the relationship between knowledge, attitudes, and the self-perception of preparedness of nurses regarding their abilities to manage neonates. Data collected from 96 nurse from different hospitals, interviewed using structured Questionnaire and Observation check list, to assess their performance. The result showed that, study population had a fair knowledge level (50.6%), in spite of this; their performance level of practices was poor (41.1%) towards care of neonates. . NMs' performed well below competency levels for knowledge and skills regarding care of the newborn This evaluation highlighted the need for training and periodic assessment to address gaps and develop targeted continuing education modules ( Alameen,S ,2011)

# Chapter three

# Materials and methods

# 3. Materials and Methods

## 3.1. Study Design

This is Descriptive  hospital based study .

## 3.2. Study Area

The study was conducted  in Gaffer Ibnuf  Pediatric Hospital ,Khartoum state ,Sudan The hospital is  located in central  of Khartoum , It was established in 1979.  The hospital receives patients from different areas of the locality. it includes  , clinical refer department , Medical  departments (endocrine, nephrology, neurology, Cardiology, GIT and chest) and  Dialysis department ,  PNICU  ,  NICU, HDU, Endoscopy unit, Blood bank, Laboratory,  X-ray  Infection control, Ambulance department, Physiotherapy,  Diet Therapy, Kitchen, Security, pediatric and Wards(all units ).

**Table (3.1) Distribution of man power  in the Gaffer Ibnuf  Pediatric Hospital:**

| Man power position | Number s |
|---|---|
| Consultants | 45 |
| Pharmacy | 35 |
| Nurses' : | |
| Diploma | 30 |
| Bachelor | 30 |
| Masters | 15 |
| Technician-X -ray | 10 |
| Technicians-laboratory | 40 |
| Security | 45 |
| Secretaries | 30 |
| Nutrition department(kitchen, dietitian) | 10 |
| Medical engineers | 25 |
| **Total** | 315 |

Source: Statistical Department of Gaffer Ibnuf  Pediatric Hospital  (2016)

### 3.3. Study population

This study was carried out among the nurse who are working In Gaffer Ibnuf pediatric Hospital study period from (January- April )2017

### 3.3.1. Inclusion Criteria

The study include 60 numbers of the nurse ,who working In Gaffer Ibnuf pediatric Hospital during period (January- April )2017

### 3.3.2. Exclusion criteria

Nurse under training ,student and nurses on holidays.

### 3.4. Sampling size

The sample consisted of (60) of nurses who constituted all available nurses during the period of the study period from (January- April )2017

### 3. 5. Data collection tools

The data collected using a structured questionnaire was designed by the researcher and utilized for tow purposes parts follows:

First : The Socio demographic data of nurses such as(Age , gender , education, year of experience and level of education )

Second: The nurses Knowledge regarding nursing care of neonatal hypothermia, In Gaffer Ibnuf Pediatric Hospital such as( definition of hypothermia, type, signs and symptoms).

Nurse's knowledge was evaluated according to the WHO scales includes :

<50% inadequate knowledge.

- 51%to74 % moderately adequate knowledge

->75% adequate knowledge .

### 3.6 Ethical consideration

-Permission was obtained from the hospital administrative authority to collect the necessary data.

-Explanation for the nurses about the study questionnaire

-Questionnaire was distributed for each available nurse to fill within 20-30 minutes under the researcher guidance.

## 3.7 Data analysis

Data was analyzed and entered to the computer by using statistical package for social science (SPSS).

# Chapter four

## Results and discussion

# 4-1 Results

**Table (4-1) Distribution of study sample according to their age groups and gender**

<div align="right">

**(No=60)**

</div>

| Age | Frequency | Percentage |
|---|---|---|
| 20-29 | 32 | 53% |
| 30-39 | 24 | 40% |
| 40-49 | 3 | 5% |
| Above 50 | 1 | 2% |
| Total | 60 | 100% |
| **Sex** | | |
| Male | 8 | 13.3% |
| Female | 52 | 86.6% |
| Total | 60 | 100% |

Table (4-1)  illustrated that slightly more than half of study sample,(53%) are aged between 20-29 year, while (40%) are aged between 30-39  the remaining were in the 40-49 age group (5%) and over 50 (2%) and  the majority (86.6%) of the study sample were females.

**Table (4-2) Distribution of the study sample according to their level of education and years of experience**

| Qualification | Frequency | Percentage |
|---|---|---|
| Diploma | 15 | 25% |
| Bachelors | 38 | 58.3% |
| Master | 7 | 12% |
| P H D | 0 | 5% |
| Total | 60 | 100% |
| Years of experiences | | |
| 1 -3 years | 42 | 70% |
| 4-6 years | 8 | 13.3% |
| Above 6 years | 10 | 16.6% |
| Total | 60 | 100% |

The table (4-2) showed that (63%) of study sample were bachelor's holders, (25%) diplomas and 12% has masters degrees, majority of them (70%) have only 1-3years of experiences.

**Table (4-3) Distribution of the study sample according to their source of information and previous training course in NICU**

| Source of in formation | Frequency | Percentage |
|---|---|---|
| colleagues | 12 | 20% |
| books and references | 11 | 18.3% |
| Mass-media | 35 | 58.3% |
| University | 13 | 21% |
| Total | 60 | 100% |
| Did you received course in NIICU | Frequency | Percentage |
| Yes | 40 | 66.6% |
| NO | 20 | 33.3% |
| Total | 60 | 100% |

Table( 4-3) indicates that almost more than half of the study sample (58.3%) got their information through  mass –media , while 21% through university  ,remaining were in lectures( 20%) . And (66.6%) of the study sample attended training courses in NICU.

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**Table ( 4-4) Distribution of study sample according to their knowledge about definition of neonatal period and of neonatal hypothermia**

**(No=60)**

| Definition of neonatal period | frequency | Percentage |
|---|---|---|
| the first (7 ) days | 5 | 8.5% |
| (7- 28) days | 8 | 13.3% |
| ( 0-28) days | 47 | 78.3% |
| Total | 60 | 100% |
| **definition of neonatal hypothermia** | frequency | percentage |
| normal body temperature is between36, 5to37, 5 C | 25 | 41.6% |
| abnormal body temperature drop below35C | 35 | 58.3% |
| Total | 60 | 100% |

Table (4-4)     clarified that most   (78.3%) of study sample respondent with correct answer regarding definition of neonatal period, (58.3%) of them responded with correct answer regarding definition of neonatal hypothermia.

**4-5 Distribution of study sample according to their types of neonatal hypothermia**

(No=60)

| types of neonatal hypothermia | frequency | Percentage |
|---|---|---|
| Mild hypothermia 36. C to36.4C | 8 | 13.3% |
| moderate hypothermia32.C to35.9C | 14 | 23.3% |
| sever hypothermia less than 32.C | 18 | 30% |
| All above | 20 | 33.3% |
| Total | 60 | 100% |

Table (4-5) showed that (33.3%) identified the correct answer according to their type of neonatal hypothermia .

**Table (4-6) Distribution of the study sample according to their knowledge about causes and risk factors of neonatal hypothermia**

(No=60)

| Causes | correct | | Incorrect | |
|---|---|---|---|---|
| | Frequency | Percentage | Frequency | percentage |
| Separation of baby from the mother | 45 | 75% | 25 | 16.7% |
| Cold environment at the place of delivery and baby care areas | 40 | 66.6% | 20 | 8.3% |
| adequate warming procedure before and during transport of the baby | 22 | 36.6% | 38 | 63.3% |
| Risk factors | Correct | | Incorrect | |
| | Frequency | Percentage | Frequency | percentage |
| Term baby | 20 | 33.3% | 40 | 45% |
| cold environment at the place of delivery and baby care areas | 33 | 55% | 27 | 45% |
| abdominal wall defects | 30 | 50% | 30 | 50% |

Mean of knowledge=52.7%

Table ( 4-6 ) The above table illustrated that 52.7% of the study sample answered with correct regarding their  knowledge about the risk factors and causes of neonatal hypothermia.

**Table (4-7) Distribution of the study sample according to their knowledge regarding the consequence of cold stress and warning signs of hypothermia**

( No=60)

| Consequences of cold stress | correct | | | Incorrect |
|---|---|---|---|---|
| | Frequency | Percentage | Frequency | percentage |
| **Hyperglycemia** | 13 | 21.6% | 4 | 6.6 % |
| **Hypoxia** | 43 | 71.6% | 17 | 28.3% |
| **Refusal of feeding** | 42 | 70% | 12 | 20% |
| Signs of hypothermia | correct | | | Incorrect |
| | Frequency | Percentage | Frequency | percentage |
| **Cold extremities** | 28 | 46.6% | 32 | 53.3% |
| **Brady cardiac** | 25 | 41.6% | 35 | 58.3% |
| **hands, feet, abdomen are cold to touch** | 33 | 55% | 27 | 45% |

Mean of knowledge= 51%

Table (4-7) showed that (51%) of the study sample responded with correct answers regarding warning signs of hypothermia.

**Table (4-8) Distribution of the study sample according to their knowledge regarding potential complications of neonatal hypothermia**

| Complications | correct | | | Incorrect |
|---|---|---|---|---|
| | Frequency | Percentage | Frequency | percentage |
| Hypoglycemia | 20 | 33.3% | 40 | 66.6% |
| Vaso constriction (hemorrhage) | 17 | 28.3% | 43 | 71.6% |
| Death | 24 | 40% | 36 | 60% |
| Apnea | 35 | 58.3% | 25 | 41.6% |
| Total | 60 | 100% | 60 | 100% |

Mean of knowledge =39.9%

Table (4-8) Revealed that (39.9%) of the study responded with correct answers regarding complications of neonatal hypothermia.

**Table (4-9) Distribution of the study sample according to their knowledge regarding prevention of hypothermia**

(No=60)

| Prevention of hypothermia | correct | | | Incorrect |
|---|---|---|---|---|
| | Frequency | Percentage | Frequency | percentage |
| Early feeding with breast milk | 40 | 66.6% | 20 | 33.3% |
| Monitoring baby's temperature 3 hourly, during initial postnatal days considering auxiliary temperature is as good as core temperature | 30 | 50% | 30 | 50% |
| Covering the baby with adequate clothing including head and extremities and avoiding undue exposure. | 38 | 63.3% | 22 | 36.6% |
| Total | 60 | 100% | 60 | 100% |

Mean of knowledge= 59.9%

Table (4-9), clarifies (59.9%) of the participant responded with correct answers regarding prevention of neonatal hypothermia.

**Table (4-10) Distribution of the study sample according to their knowledge regarding nursing care in hypothermia**

(No=60)

| Nursing care of hypothermia | correct | | | Incorrect |
|---|---|---|---|---|
| | Frequency | Percentage | Frequency | percentage |
| Assess environment and what clothing baby wearing | 24 | 40% | 36 | 60% |
| Add layer of clothing and extra blanket if needed | 30 | 50% | 30 | 50% |
| Maximum layers for neonate- single, grow suit, hat, socks/booties, one wrap and one blanket | 27 | 45% | 33 | 45% |
| Re-measure neonate's temperature half to one hour after each intervention | 40 | 66.7% | 20 | 55% |
| For prolonged procedures place neonate on radiant warmer | 31 | 51% | 29 | 48.3% |
| Observe for signs of complications | 27 | 45% | 33 | 55% |
| Total | 60 | 100% | 60 | 100% |

Mean of knowledge= 47.6%

Table (4-10), shows that (47.6%) of the study sample responded with correct answers regarding nursing role of neonatal hypothermia care**.**

## 4.2 Discussion

Neonatal hypothermia is widely recognized as an important contributing factor to neonatal morbidity, especially in low and middle income countries  and has been associated with mortality risk in newborn. For hypothermia to be successful ,It requires meticulous understanding by health-care personnel working in the NICU, maternity and newborn units have adequate skills for prompt Neonatal hypothermia.

## Socio-demographic data

When discussing the demographic data of respondents, it is clearly observed that more than half of the study sample (53%) at age ranged from (20-29 )years, (86.6%) of them were females, ( 13.3%) of the study sample were male.and (58.3%,25%,12%,5%)  of the study sample at bachelor , diploma ,master ,PHD  and the majority of them (70%) with less than 3 years of experience.

This is similar to (Bhutta et al, 2009) study which was conducted amongst health care working in Kenyan hospitals, The study  revealed  that the vast majority of the sample(86%)  were  females   with high qualification(45%).

The result illustrated that (20%)of the study sample their source of knowledge regarding nursing  care of neonatal hypothermia from colleagues and only( 18%) of them  their source of knowledge from book and references and (58.3%) of them their source of knowledge from training program and   ( 21%) of them their source of knowledge from university, regarding training programs the result showed that (66.6%)  had receiving training program regarding to neonatal hypothermia( 33.3%) of them didn't.

## Nurse's knowledge

The current study revealed that    (78.3%) of study sample respondent with correct answers regarding definition of neonatal period, (54.3%) of them responded with correct answer regarding definition of neonatal hypothermia.

This is similar to what had been reported in the results of (  Mahdi et al, 2009) were only (59.5%) of the participants managed to score above the minimum  this practice level.

Regarding types of hypothermia (33.3%) identified the correct answer regarding type of neonatal  hypothermia, and( 52.7%) of the study sample responded with correct answer regarding risk factors and causes of neonatal hypothermia.

This is partially similar to the study of (Richard et al, 2012) were 57.5% of respondent health workers had adequate knowledge about risk factors and causes of neonatal hypothermia,The study also revealed that (59.4%) of the study sample responded with correct answers regarding warning signs of hypothermia, (39.9% )of them responded correctly regarding complications of neonatal hypothermia.

This is differ to had been reported in the Kenyan' s study of (Lasuba, 2009) where (43%) had inadequate knowledge regarding low birth weight babies definition and care.

The result revealed that (47.6 %) of the study sample responded with correct answers regarding nursing care of neonatal hypothermia. **This is also similar to** the study of (Richard et al, 2012) were ( 49.6%) of respondent health workers had inadequate knowledge about nursing care system regarding neonatal hypothermia.

# Chapter Five

## Conclusions and Recommendations

## 5-1 Conclusion

Based on the results of this study ,the researcher concluded that :

- Nurses knowledge regarding nursing care of neonatal hypothermia was moderately adequate knowledge, about causes and predisposing factor, total mean was (53.7%).

- Nurses knowledge regarding the complication of neonatal hypothermia was inadequate knowledge( 39.3%).

## 5.2 Recommendations

Based on results of this study ,the study recommended that:

- Regular training program; accompanied with supervision to maintain the high quality of newborn care.

- Provision of adequate resources that required during care of neonatal hypothermia.

- Design manual log book about care of neonatal hypothermia , should be available in the hospital .

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# Appendix

## University of Gezira

## Faculty of Applied medical Sciences

## Master batch three community health nursing

## Questionnaire-Nurse's knowledge regarding nursing care of neonatal hypothermia hospitalization in Gaffer ibnuf pediatric hospital Khartoum Sudan (2017)

Please "circle" or tick (√) the right answer:

**Section one : Demographic data:**

1-Age :-

    **1.**( 20- 29)years  (  )       2- ( 30 — 39)years  (  )

**3.** ( 40-49)years  (   )             4- above 40 years  (  )

**2- Sex: -**    **1-**  Male  (  )            2-  Female (  **)**

**3-Qualification: -**    **1.** Diploma (  )   2. Bachelor  (  )

              3- Master  (  )    4.  PHD     (  )

**4-Years of experiences: -**  **1.** 1-5years (  )    2. 6 -10 years  (  )

              3. 11-15 years (  )  4. 16---and above  (  )

**5-Source of information: -**  1.colleagues (  )  2. Books and Reference  (  )

              3. mass-media (  ) 4. University  (  )

6-Did you take a training course in NICU?

           1-YES (     )        2- NO (      )

section tow **: Nurse's knowledge :-**

**7-neonatal period is period with in: -**

    **1-** the first 7 days (  )        2- 7- 28 days (  )         3- 0-28days (  )

**8-what is neonatal hypothermia ?**

 **1** -normal body temperature is between36, 5to37, 5 C  (    )

     2- abnormal body temperature drop below35C  (    )

      3-all above              (    )

 **9-what are the types of hypothermia in newborn?**

1- mild hypothermia 36. 0c to36.4c                     (       )

2-moderate hypothermia32.0c to35.9c             (       )

3 - sever hypothermia less than 32.0c            (        )

4-all above                                (       )

**10- what are the Causes of hypothermia ?**

    1-heat loss to the environment              (      )

2-infection                            (      )

3-over heating environment                 (      )

11- when **newborn baby developed hypothermia may be due to:**

1-Separation of baby from the mother .                          Yes   (    )

No   (    )

2- Cold environment at the place of delivery and baby care areas.    Yes   (    )

No   (    )

3- Inadequate warming procedure before and during transport of the baby.   Yes   (    )

No   (    )

**12-what are the Risk factors of hypothermia?**

1-term baby                                      Yes   (    )

No   (    )

cold environment at the place of delivery and baby care areas.          Yes   (    )

2- No   (    )

3-abdominal wall defects.                              Yes   (    )

No   (    )

**13-cold stress will lead to?**

1-hypoglycemia                    Yes   (    )        No   (    )

2-hypoxia                         Yes   (    )        No   (    )

3- refusal of feeding             Yes   (    )        No   (    )

**14- which of the following is warning**
**singes of hypothermia ?**

1- cold extremities                              (         )

2-brady cardiac                                  (         )

3-hands,feet,abdomen are cold to touch .                (         )

**15 - which the following is potential complication of hypothermia?**

1- Hypoglycemia                                       (       )

2-Vaso constriction (hemorrhage)                 (      )

3-death                                                (      )

4-Apnea

## 16- prevention of neonatal hypothermia **in N I C U ?**

1- Early feeding with breast milk.                  Yes ( )      No ( )

2-Monitoring baby's temperature 3 hourly, during initial postnatal days considering axillary temperature is as good as core temperature.            Yes ( )
No ( )

3- Covering the baby with adequate clothing including head and extremities and avoiding undue exposure.                 Yes ( )      No ( )

**17-what is the Nursing care?**

1- Assess environment and what clothing baby wearing         ( )

2-Add layer of clothing and extra blanket if needed          ( )

3-Maximum layers for neonate- single , grow suit, hat (if on continuous monitoring), socks/booties, one wrap and one blanket .         ( )

4- Re-measure neonate's temperature half to one hour after each intervention. ( )

5-For prolonged procedures place neonate on radiant warmer.        ( )

6-Observe for signs of complications.                  ( )