



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Shendi University



Faculty of graduate studies and scientific research

Assessment nurse's Knowledge Regarding Management of Post- Birth Hypothermia

Athesis Submitted in requirements to partial fulfill master degree in Pediatric nursing.

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الاية

قال تعالى في محكم تنزيله

اللَّهُ نُورُ السَّمَاوَاتِ وَالْأَرْضِ مِثْلُ نُورِهِ كَمِشْكَاةٍ فِيهَا
مِصْبَاحٌ الْمِصْبَاحُ فِي زُجَّاجَةٍ الزُّجَّاجَةُ كَأَنَّهَا كَوْكَبٌ دُرِّيٌّ يُوقَدُ
مِنْ شَجَرَةٍ مُبَارَكَةٍ زَيْتُونَةٍ لَّا شَرْقِيَّةٍ وَلَا غَرْبِيَّةٍ يَكَادُ زَيْتُهَا يُضِيءُ
وَلَوْ لَمْ تَعْسَسْهُ نَارٌ نُّورٌ عَلَى نُورٍ يَهْدِي اللَّهُ لِنُورِهِ مَنْ يَشَاءُ
وَيَضْرِبُ اللَّهُ الْأَمْثَالَ لِلنَّاسِ وَاللَّهُ بِكُلِّ شَيْءٍ عَلِيمٌ

صدق الله العظيم

سورة النور (35)



Dedication

To soul of my father Mamoun Hassan

To my mother Rogia a. hamdon

To my husband Tag-eldien Babkir

To my son Mohammad Tag-eldien

To my sisters and my brother

Acknowledgement

Firstly whole heartedly I would thank Allah for giving me a lot and helping me to complete this study, and deep gratitude and appreciation to my supervision

Dr. Marim Elnageeb she was gave me continuous assistance and guidance and gave me freely from her time, knowledge and experience from the beginning of this study till the end.

My thanks are expanded to all of my colleagues and friends and every one who support me during this study and to all nurses in Elmek Nimer university hospital who were cooperative with me to complete this research.

Abstract:

This study was conducted in Elmek Nimer University hospital in period extended from August to September 2014 to assess nurse's knowledge regarding management of post-birth hypothermia. An observation practical-count hospital based study. Data was collected by a specially designed questionnaire. The total subject of nurses included was 70 nurses.

Regarding nurse's knowledge about management of post-birth hypothermia the total knowledge of study group presented only (34.3%) of nurses had good knowledge, (30%) of them had fair knowledge and (35.7%) had poor knowledge.

The study recommended by involving nurses staff in internal and external academic exchange through hospital, in aim to exchange knowledge and practice and invitation to hospital conference to discuss the new trend in management of post-birth hypothermia.

الخلاصة

أجريت هذه الدراسة لقياس معرفه الممرضين عن معالجه انخفاض الحرارة الذي يعقب الولادة في مستشفى ألك نمر الجامعي في الفتره من اغسطس حتي ديسمبر 2014 . جمعت المعلومات عن طريق نموزج استبيان شمل 70 ممرضة .

وخلصت نتيجة البحث إلي أن 34.3% فقط من الممرضات يملكن معرفة جيدة ، 30% يملكن معرفة متوسطة بينما 35.7% معرفتهن ضعيفة فيما يختص بمعالجة انخفاض الحرارة الذي يلي الولادة .

وقد اوصت الدراسة بتضمين الممرضين في التبادل الداخلي و الخارجي بين المستشفيات بهدف تبادل المعرفة و المهارة كما نوصي بالدعوة لاقامة مؤتمرات داخل المستشفيات لمناقشة التطورات الجديدة في مجال العناية بحديثي الولادة و التي تسهم في تحسن الوضع الصحي داخل المستشفيات .

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Chapter One

- **Introduction**
- **Objectives**
- **Justification**

Introduction:

In under-resourced settings in low- and middle-income countries, hypothermia at birth is one of the most important risk factors for morbidity and mortality in newborn infants of all birth weights and gestational ages.

It is estimated 4 million babies that die each year worldwide during the neonatal period (0-27 days) live in those settings; for example, complications of preterm birth are a leading cause of mortality (54%) in Southeast Asia. Furthermore, (47%) of all mothers and newborns in developing countries do not receive skilled care during childbirth, and (72%) of all babies born outside health-care facilities do not receive any postnatal care (1).

Evidence shows that the first days of life are critical as most neonatal deaths occur during this period (25%–45%) within the first 24 hours. These statistics represent the critical gaps in the continuum of care due to a backdrop of poverty, suboptimum care-seeking, weak health systems and poor training health care provider.(2)

Additionally, a baby born with a low birth weight, particularly if the baby is also preterm, is at much greater risk of dying or getting sick than other newborns. (3)

Prevention and management of hypothermia is the key of interventions for reducing neonatal mortality and morbidity. (3)

According to UNICEF, such interventions can help reduce neonatal mortality or morbidity by(18%–42 %).(4)

The objective of this study review was to assess nursing knowledge and practice regarding management and prevention of post-birth hypothermia in Elmek Nimer university hospital.

Rational and justification

This study conducted because Post-birth neonatal hypothermia is a serious condition and one of important issues after birth, so it's need high nursing attention this attention must be include full knowledge and practice about manegment ,complication and prevention method to obtain good outcome and establish neonatal body temprature to minimize neonatal morbidity and mortality rate .

Objective:

General objective:

- To assess nurses knowledge regarding management of post-birth hypothermia.

Specific objective:

- To assess nurses knowledge regarding identification of post-birth hypothermia.

- To assess nurses intervention regarding post-birth hypothermia.

- To assess nurses knowledge regarding preventive method of post-birth hypothermia.

- To assess nurses knowledge regarding complication of post-birth hypothermia.

Chapter Two

➤ **Literature review**

Literature review:

The normal newborn continues to adapt to the extra uterine life within the first week after child birth remaining vulnerable to hypothermia. The baby remains depended on mother for nutrition and protection.

Mother is responsible for maintaining the body temperature of the baby among other functions essential for survival. Due to certain characteristics such little subcutaneous fat, low birth weight babies, exposing the baby to the cold climatic conditions increases risk of hypothermia. ⁽¹⁾

1. Path-physiological background:

- **After birth body temperature may fall significantly because:**
 - ❖ Their skin is thin and blood vessels are close to the surface.
 - ❖ They have little SupQutanous fat to serve as a barrier to heat loss.
 - ❖ They have 3x the surface to body mass as an adult.
 - ❖ Preterm infants are especially susceptible to heat loss because their tone is poor and they have even less fat and thinner skin than full term babies.

Thorough drying and then swaddling the newborn is necessary in order to prevent excessive heat loss!

- **The term newborn can regulate body temperature by:**
 - ❖ Sweating
 - ❖ Increasing metabolic rate
 - ❖ Non-shivering thermo genesis

❖ Triiodothyronine stimulates thermogenin which converts proton energy to heat.

- **This mechanism may be ineffective in:**

- ❖ Hypoxia

- ❖ Nutritional depletion

- ❖ Heat Loss Occurs through one or more than one of this ways :

- ❖ Convection: loss from body surface to cooler ambient air. Regulate ambient temp, plastic covers, avoid drafts

- ❖ Radiation – loss from body surface to cooler solid object NOT in contact with body. TX: keep away from windows; use double wall isolates.

- ❖ Conduction – loss to cooler solid object IN contact with body. Warm all solid objects in contact with baby.

- ❖ Evaporation – loss through conversion of skin water to vapor. TX: dry immediately and keep dry. Bathe after temp stable; keep clothing/linen dry.⁽⁶⁾

- **Effects of Cold Stress:**

- ❖ Increase Metabolic Rate: leads to increase use of glucose and decrease production of Surfactant. This can lead to hypoglycemia and respiratory distress.

- ❖ Non-Shivering Thermo genesis-metabolism of Brown fat. This leads to increased production of free fatty acids, which leads to metabolic acidosis and jaundice.

- ❖ Vasoconstriction: leads to pale, mottled skin and shut down of pulmonary vessels, which leads to fetal circulation patterns.⁽⁷⁾

▪ **Distribution and incidence:**

Hypothermia in the newborn occurs throughout the world, often during the cooler seasons, and in regions where there is a large temperature difference between day and night. As similar environmental condition prevails in northeastern regions of India the newborn are at risk of hypothermia⁽⁵⁾.

In a study conducted in Ethiopia, on admission, 67% of low birth weight and high-risk infants admitted to a special care unit were hypothermic. In Nepal, during the winter months, over 80% of the infants born became hypothermic after birth and 50% remained hypothermic at 24 hours.

Many more research evidences are available supporting the role of environmental temperature in the development of hypothermia in newborn.⁽⁶⁾

Hypothermia and its grads:

The newborn with a temperature of 36.0-36.4°C (96.8-97.5°F) is under cold stress (mild hypothermia). A baby with a temperature of 32.0-35.9°C (89.6-96.6°F) has moderate hypothermia, while a temperature below 32°C (89.6°F) is considered to be severe hypothermia.⁽⁶⁾

Causes:

Hypothermia of the newborn is mainly due to lack of knowledge. In many hospitals incorrect care of the baby at birth is the most important factor in causing hypothermia, delivery rooms are not warm enough and the newborn is often left wet and uncovered after delivery.

The newborn is weighed naked and washed soon after birth. The initiation of breast-feeding is frequently delayed for many hours, and the

baby is kept in a nursery, apart from the mother. In many newborns these practices will result in hypothermia. ^(2'6)

At home, families and Trained Birth Attendants (TBAs) may also not be aware of the importance of drying and wrapping the newborn immediately after birth. Other risk factors include asphyxia, use of anesthetic or analgesic drugs during delivery, infection or other illness of the infant and inadequate measures taken to keep the baby warm before and during transportation. ⁽⁶⁾

Risk factors for hypothermia:

Various studies identified several risk factors for newborn hypothermia, which we categorize as follows.

◆ Environmental

An infant's body temperature is associated with maternal temperatures. Several studies have confirmed the intuitive association with environmental temperatures and with the cold seasons. The Gadchiroli trial, with an overall hypothermia prevalence of (17%), showed variations from summer (14.8%) to winter (21.5%). Other studies from Haryana in Northern India recorded an overall hypothermia prevalence of (11%), ranging from (3%) in the summer to 19% in winter. In Uttar Pradesh, hypothermia was detected in (14%) and was found to strongly correlate with environmental temperature. Another study from the same state found a higher rate of (45%), which likewise was correlated with environmental temperatures and varied considerably over the seasons, ranging from (70%) during winter to (20%) during summer. Studies from Nepal suggest that the higher prevalence of hypothermia in hospitals during winter months can successfully be addressed through staff training of early drying, wrapping, and breastfeeding. The Sarlahi trial found that while

even in the hottest season of the year almost one-fifth of infants were hypothermic, the risk of moderate-to-severe hypothermia further increased by (41%) for each 5^oC decrease in ambient temperature⁽⁸⁾

◆ **Physiological:**

While newborns of all gestational ages are at risk of losing body heat after birth, premature and small babies are particularly vulnerable due to their physiologic disadvantages. A newborn's thermal regulatory mechanisms are highly sophisticated, but particularly in babies born prematurely easily overwhelmed. Neonatal anatomic characteristics add to the metabolic burden of increased energy requirements: term babies have a 2.7 times greater body surface and preterm babies an up to 4.0 time's greater surface per weight than adults.

Several conditions of immature thermal regulation, such as LBW, prematurity, intrauterine growth restriction, and asphyxia (with heat loss due to lack of oxygenation and, where attempted, during reanimation efforts) during birth are significantly associated with an abnormal low body temperature. Hypoglycemia is an important contributor to hypothermia, and vice versa: it maintains a vicious circle, which leads to feeding weakness, weight loss and finally increased mortality, which first was shown in studies in the 1950s and 1960s. Breastfeeding therefore treats hypothermia not only through bonding with and warming through the mother, but also by replenishing a newborn's glucose levels^(8,9)

• **Behavioral:**

Early bathing contributes significantly to heat loss and increases the incidence of hypothermia in cold climates and even in a warm environment and should be postponed until at least after the first 6 h of life,

and possibly longer. It is, however, a widespread practice even in high-risk environments. ⁽⁸⁾.

Massage and oil applications to clean the child early after birth continues to be a widespread tradition. Evidence for the influence of massage and oil application on hypothermia is contradictory. While suggesting protection from hypothermia and against nosocomial infections in preterm very low birth weight infants , it has also been shown in other studies to have detrimental effects on the skin as a protective barrier and to lead to heat loss ^(8,9)

- **Socioeconomic factors:**

An infant's low body temperature is also associated with having a young and inexperienced mother, coming from a family with low socioeconomic status, or being born to a mother who already had multiple births. ⁽⁹⁾

While some of these physiologic risk factors have been documented decades ago, awareness of the risks associated with hypothermia, as indicated in a multinational survey and another one from India, indicating that healthcare professionals have limited knowledge of the diagnosis and management of newborn hypothermia. Facilities in resource-limited environments rarely have sufficient capacity to address thermal protection.⁽⁸⁾ In a recent study in Zambia, we found that health centers are not well prepared to provide thermal protection, with only very few equipped with heat control for the delivery room (7%) or a neonatal warmer (9%).⁽⁹⁾

Signs of hypothermia:

An early sign of hypothermia is feet that are cold to the touch. If prolonged leads to hypothermia, the baby becomes less active, suckles

poorly, impaired feeding and has a weak cry.⁽⁶⁾
In severely hypothermic babies the face and extremities may develop a bright red colour. The baby becomes lethargic and develops slow, shallow and irregular breathing and a slow heart⁽⁵⁾

Low blood sugar and metabolic acidosis, generalized internal bleeding (especially in the lungs) and respiratory distress may occur. Such a level of hypothermia is very dangerous and unless urgent measures are taken, the Baby will die.⁽⁶⁾

Effects of hypothermia:

There is no evidence that hypothermia has any beneficial effect immediately after birth, for example cold stress is not needed at birth, as commonly believed, to initiate or stimulate breathing. Although many traditional practices are beneficial such as heating the delivery room in cold weather, wrapping the baby and keeping it close to the mother⁽⁷⁾

On the contrary there is sample evidence that hypothermia is harmful. Prolonged hypothermia is linked to impaired growth and may make the newborn more vulnerable to infections, others are harmful such as sprinkling the newborn with cold water to stimulate breathing, bathing the baby soon after birth, delaying breast-feeding in the belief that colostrums is harmful or useless⁽⁶⁾

Management of hypothermia:

Thermal protection of the newborn is the series of measures taken at birth and during the first days of life to ensure that the baby does not become either too cold (hypothermia) and maintains a normal body temperature of 36.5-37.5°(97.7-99.5°F).

Newborns found to be hypothermic must be rewarmed as soon as possible. It is very important to continue feeding the baby to provide calories and fluid. Breast-feeding should resume as soon as possible. If the infant is too weak to breast-feed, breast milk can be given by, spoon or cup. It is important to be aware that hypothermia can be a sign of infection. Every hypothermic newborn should therefore be assessed for infection⁽⁶⁾

Management in hospital:

In hospital a diagnosis of hypothermia is confirmed by measuring the actual body temperature with thermometer.

In cases of mild hypothermia the baby can be rewarmed by skin-to-skin contact, in a warm room (at least $25^{\circ}\text{C}/77^{\circ}\text{F}$).

In cases of moderate hypothermia the clothed baby may be rewarmed by the following measures:

- Under a radiant heater;
- In an incubator, at $35\text{-}36^{\circ}\text{C}$ ($95\text{-}96.8^{\circ}\text{F}$);
- By using a heated water-filled mattress;
- In a warm room: the temperature of the room should be $32\text{-}34^{\circ}\text{C}/89.6\text{-}93.2^{\circ}\text{F}$
- In a warm cot: if it is heated with a hot water bottle, these should be removed before the baby is put in.
- The rewarming process should be continued until the baby's temperature reaches the normal range.

In cases of severe hypothermia studies suggest that fast rewarming over a few hours is preferable to slow rewarming over several days. Rapid rewarming can be achieved by using a thermostatically-controlled heated mattress set at 37-38°C (98.6-100.4°F) or an air-heated incubator.⁽⁶⁾⁽⁷⁾

The "warm chain" is a set of ten interlinked procedures carried out at birth and during the following hours and days which will minimize the likelihood of hypothermia.

- The room where the birth occurs must be warm (at least 25°C/77°F) and free from draughts.
- At birth, the newborn should be immediately dried and covered, before the cord is cut.
- While it is being dried, it should be on a warm surface such as the mother's chest or abdomen (skin-to-skin contact).
- If this is not possible, alternative means of preventing heat loss and providing warmth — such as wrapping, placing the baby in a warm room or under a radiant heater.
- Bathing and weighing the baby should be postponed^(5,6,7)

Management at home:

- At home, skin-to-skin contact is the best method to rewarm a baby.
- The room should be warm; the baby should be covered with a warm blanket and be wearing a cap.
- The mother should continue breast-feeding as normal.
- If the baby becomes lethargic and refuses to suckle, these are danger signs and it should be taken to hospital

- While being transported, the baby should be in skin-to-skin contact with the mother during transportation^(6,7)

Prevention of hypothermia:

- Refrain from bathing the newborn immediately post delivery.
- When bathing a neonate wash and dry only a small area of the body at a time, keeping the rest of the infant's body covered.
- The baby should be dried well and then wrapped.
- Avoid unnecessary exposure when attending to baby's needs.
- The mother should keep the baby close to her body to avoid hypothermia.
- In general, newborns need a much warmer environment than an adult^(6,7)

Complications of Hypothermia:

The nurse's position at the bedside affords the first line of intervention when complications arise in the infant with hypothermia undergoing cooling therapy. An intimate understanding of what to anticipate and the transient changes in baseline monitoring parameters are needed. Several complications also occur as a result of hypothermia.

- Bradycardia may also occur but subsides when the infant is warmed slightly. Monitoring for other cardiac arrhythmias is also necessary, as these have been reported.

- Hypotension may also occur secondary to hypovolemia, reduced cardiac output, and reduced stroke volume.
- A reduced blood flow and hyperviscosity have been reported in the hypothermic infant, which poses a potential risk for microembolism, but evidence does not show the cooled infant to suffer more emboli than the other infants.
- Coagulation is prolonged during hypothermia, but if the coagulation is normal before cooling, the infant should not experience problems as a result of the cooling therapy. It is not unusual, however, for the asphyxiated patient to have abnormal clotting studies secondary to hypoxic injury to the liver. Monitoring of liver function tests (LFTs) as well as other clotting studies would be indicated at regular intervals. The nurse will also be cognizant of physical signs of coagulopathy, such as petechiae; oozing from heelsticks or venipuncture sites; or bloody urine, gastric secretions, or endotracheal secretions.
 - The risk for seizures and skin complications.
 - Hypothermia my case death^(5,6,4)

Measuring a Temperature in neonate:

Side:

Most physicians recommend taking a baby's temperature rectally, by placing a thermometer in the baby's anus. This method is accurate and gives a quick reading of the baby's internal temperature. Axillary (underarm) temperature measurements must be held in place for 10 minutes. The tympanic (ear) type thermometers may not be accurate for newborns and require careful positioning to get an accurate reading. Skin strips that are

pressed on the skin to measure temperature are not recommended for babies. Touching a baby's skin can let you know if he/she is warm or cool but you cannot measure body temperature simply by touch⁽¹¹⁾

Preparing the thermometer:

There are different instructions depending upon which type of thermometer you are using to take your baby's temperature. Be sure to follow the instructions for each carefully. Mercury in glass thermometers:

- Check the thermometer carefully for cracks or splinters. If broken, do not use. Do not touch mercury and dispose of properly.
 - Disinfect the thermometer with rubbing alcohol or an antiseptic solution.
 - Rinse well in cool, not hot water.
 - Hold the thermometer on the opposite end of the bulb between your thumb and fingers.
 - Hold the thermometer just below your eye level to read it.
 - Roll the thermometer until you can see the line of mercury.
 - Make sure the temperature reads below 96° F.
 - If the reading is higher, use quick, whip-like movements of your wrist to shake the mercury down.
 - Shake over a bed or carpet. This helps prevent the thermometer from breaking if you accidentally drop it while shaking it.

- Lubricate the thermometer bulb with a water-soluble lubricant or petroleum jelly electronic digital thermometers:

- Place a disposable sheath over the thermometer.

Zero or reset the thermometer.

- Lubricate the insertion end with a water-soluble lubricant⁽¹¹⁾

Taking the baby's rectal temperature:

- Oral and rectal mercury thermometers have different shapes and one should not be substituted for the other. Do not use oral thermometers rectally as these can cause injury. Rectal thermometers have a security bulb designed specifically for safely taking rectal temperatures.

- Place the baby across your lap or changing table, on his/her abdomen, facing down.

- Place your hand nearest the baby's head on his or her lower back and separate the baby's buttocks with your thumb and forefinger.

- Using your other hand, gently insert the lubricated bulb end of the thermometer one-half to one inch, or just past the anal sphincter muscle.

- The thermometer should be pointed towards the child's navel.

- Hold the thermometer with one hand on the baby's buttocks so the thermometer will move with the baby.

- Use the other hand to comfort the baby and prevent moving.

- Never leave a baby unattended with a rectal thermometer inserted.

- Movement or a change in position can cause the thermometer to break.

- Hold thermometer for at least 2 minutes or until an electronic thermometer beeps or signals.
- Remove the thermometer.
- Wipe the bulb.
- Read immediately and record.
- Disinfect the thermometer with rubbing alcohol or an antiseptic solution.

If a baby's temperature is 100.4°F or higher, make sure he/she is not dressed too warmly or over bundled with blankets. Crying may also raise a baby's temperature. Retake the baby's temperature again in about 30 minutes. If the temperature is still physician immediately.⁽¹¹⁾

Nursing Care Plan for Hypothermia - Diagnosis and Interventions:

Definition of Hypothermia:

Circumstances where an individual experiencing or at risk of decreased body temperature constantly below 36 ° C per-rectal because of the increased vulnerability to external factors.

Related factors:

Situational (personal, environmental)

- related to the heat, rain, wind
- related to clothes that do not fit with the climate
- related to decreased circulation: extreme weight loss
- related to dehydration
- related to inactivity

Major data:

- Temperatures below 35.5 ° C per-rectal
- Cold skin
- Pallor (medium)
- Chills (mild)

Minor data:

- Mental disorder / sleepy / restless
- Decrease in pulse and respiration
- Cachexia.

Expected outcomes are:**Individuals will:**

- Identifying risk factors for hypothermia.
- Connecting method of maintaining the warmth / heat loss prevention.
- Maintain body temperature within normal limits.

Nursing Interventions - Nursing Care Plan for Hypothermia:

1. Teach family to reduce exposure to the cold environment of the old.
2. Explain to family members that neonates, infants are more susceptible to heat loss.
3. Teach early signs of hypothermia: skin cold, pale, and shivering.

4. Explain the need to start early breast feeding
5. Explain the need to avoid exposure of neonate after bathing.
6. Teach for extra wear.⁽¹¹⁾

Related to management:

The bedside nurse is responsible for providing cardiorespiratory monitoring and pulse oximetry. The nurse must be aware that hypothermia will induce changes in the baseline parameters of vital signs, and therefore, assessment parameters are adjusted accordingly. The most common change seen with hypothermia is a reduction of the infant's heart rate. The heart rate can be expected to fall by 14 beats per degree centigrade between the temperature ranges of 37 to 33 in infants⁽¹¹⁾

Preparing the infant in a timely manner for placement of central vascular access on arrival to the NICU is a key component to care. An umbilical arterial catheter is commonly required for arterial blood sampling and continuous monitoring of blood pressure. An umbilical venous catheter or central venous line is also necessary for venous access to deliver fluids, nutritional support, medications, and blood products that will be urgently needed. In hypoxic or "shock states," peripheral intravenous access is often challenging to obtain and maintain⁽¹¹⁾

Placement of an indwelling urinary catheter will be necessary to monitor urinary output. Low urinary output may be secondary to hypovolemia and should be treated accordingly with volume administration.

The output may also be affected by decreased myocardial contractility. Using serum electrolyte measurements and monitoring urinary output are essential to recognizing a vascular tubular necrosis or syndrome of

inappropriate antidiuretic hormone secretion, which are conditions resulting from the initial hypoxic event⁽⁶⁾⁽¹¹⁾

The infant may require resuscitative efforts for cardiopulmonary failure and will need intubation and ventilator support, including nitric oxide.

Continuous pulse oximetry provides an accurate measurement of the oxygen saturation status, and the bedside nurse should be in tuned to needed adjustments in oxygen regardless of delivery method for this critical patient. Blood gases analysis will be affected by the temperature of the patient and should be interpreted accordingly. It is the nurse's responsibility to record the patient's temperature so that the blood gas analyzer can be programmed properly to ensure accurate blood gas analysis. At lower temperatures, more CO₂ is absorbed into the gas. Thoresen and Whitelaw explain that the partial pressure of CO₂ is reduced approximately 4% for each degree centigrade that the core temperature is reduced. In addition, the reduced metabolism of the hypothermic infant reduces carbon dioxide production, resulting in hypocapnia. The goal is to keep CO₂ within a reference range because the seizure threshold may be lower with alkalosis secondary to hypocapnia. Small effects are also noted on the Pao₂ and pH as a result of hypothermia; however, they are considered insignificant and adjustment is not indicated. The infant would benefit from more frequent turning with close monitoring of suctioning need because the secretions are thicker during hypothermia. Saline instillation may be necessary to maintain endotracheal tube patency^(6,7)

The infant is also at risk for infection secondary to central line placement, and a baseline complete blood count and surveillance blood culture are indicated. It is the nurse's responsibility to observe strict aseptic

technique with all handling of central lines, when managing intravenous therapy, medication administration, and blood sampling⁽⁵⁾

Chapter Three

➤ **Material & Methodology**

Methods and material:

Study design:

Descriptive cross sectional hospital base study to assess nurses knowledge regarding management of post birth hypothermia.

Study area:

This study was done in Shendi city , river Nile state , Sudan , which is located north of Khartoum about 176 Km , population about 80000 persons (WHO 2003) most of them are farmers.

In shendi there was University of shendi with different faculties, Three regional Hospitals, The teaching Hospital, the Military Hospital and ElmekNimer University hospital. All these hospitals have different department.

Setting:

ElmekNimer university hospital, established in 2002 , it was consist of the following departments : medicine , surgery , ICU , CCU , obstetrics and gynecology , pediatric , NICU ,cardiac catheterization center, clinical refer , dressing room (out-patient) , psychiatric , pharmacy, laboratory , X-ray,Echo,ultrasound,renal unit and endoscopy unit.

Target population:

The nurses in department of obse and nursery who are providing post delivery neonatal care.

Sampling:

Convenient sample.

Sample size:

70 nurses found during period of study.

Material:

Data collection tool:

By used pretested-precoded questioner.

Data collection technique:

By asked question through questioner sheets. (Interview)

Data analysis:

Was analysis by used SPSS program.

Pretest questioner:

Was tested in 7 nurses.

Ethical consideration:

Verbal agreement

Chapter Four

➡ **Results**

Result:

Table (1): distribution of the study group according to age:

Items	Frequency	Percent
20-25 years	22	31.4%
26-30 years	36	51.4%
more than 30 years	12	17.2%
Total	70	100%

Table (1): showed that 31.4% of study group their age rang between 20-25 years ,51.4% rang between 20-25 years and 17.2% was more than 30 years.

Table (2): distribution of the study group according to Sex:

Items	Frequency	Percent
Female	70	100%
Male	00	0%
Total	70	100%

Table (2): reveal that all nurses under study (100%) were female.

Table (3): distribution of the study group according to Experience:

Items	Frequency	Percent
0-5 years	38	54.2%
6-10 years	26	37.1%
More than 10 years	6	8.5%
Total	70	100%

Table (3): showed that 54.2% of nurses there experience less than 5 years , 37.1% there experience between 6-10 years and 8.5% more than 10 years of experience .

Table (4):distribution of the study group according to Level of education:

Items	Frequency	Percentage
Diploma	0	0%
Bacloria	65	92.8%
Master	5	7.2%
phD	0	0%
Total	70	100%

Table (4): showed that 92.8% had bacloria of nursing and 7.1% had a master degree in nursing.

Table (5): distribution of the study group according to Sides of work:

Items	Frequency	percentage
Nursery	30	42.8%
labor room	40	57.2%
Total	70	100%

Table (5): showed that 42.8% of study group worked in nursery and 57.1% worked in labor room.

Table (6): distribution of the study group according to their knowledge about definition of post-birth hypothermia

Items	Frequency	Percent
Good knowledge	7	10%
Fair knowledge	24	34.3%
Poor knowledge	39	55.7%
Total	70	100%

Table (6): showed that 10% of study group had good knowledge, 34.3% had fair knowledge and 55.7% of nurses had poor knowledge about definition of hypothermia.

Fig (1): distribution of the study group according to knowledge about grads of post-birth hypothermia

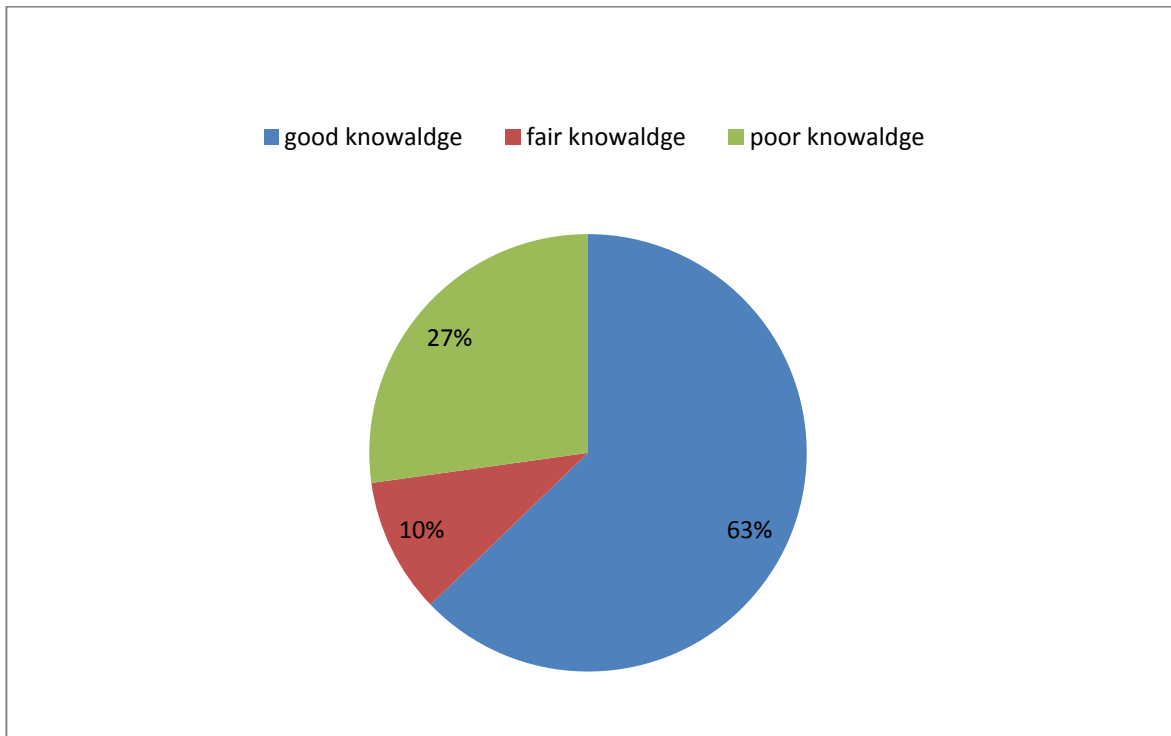


Fig (1): showed that 62.8% of nurses had good knowledge, 10% had fair knowledge and 27.2% had poor knowledge about grads of post-birth hypothermia

Fig (2): distribution of the study group according to knowledge about signs and symptoms of post-birth hypothermia

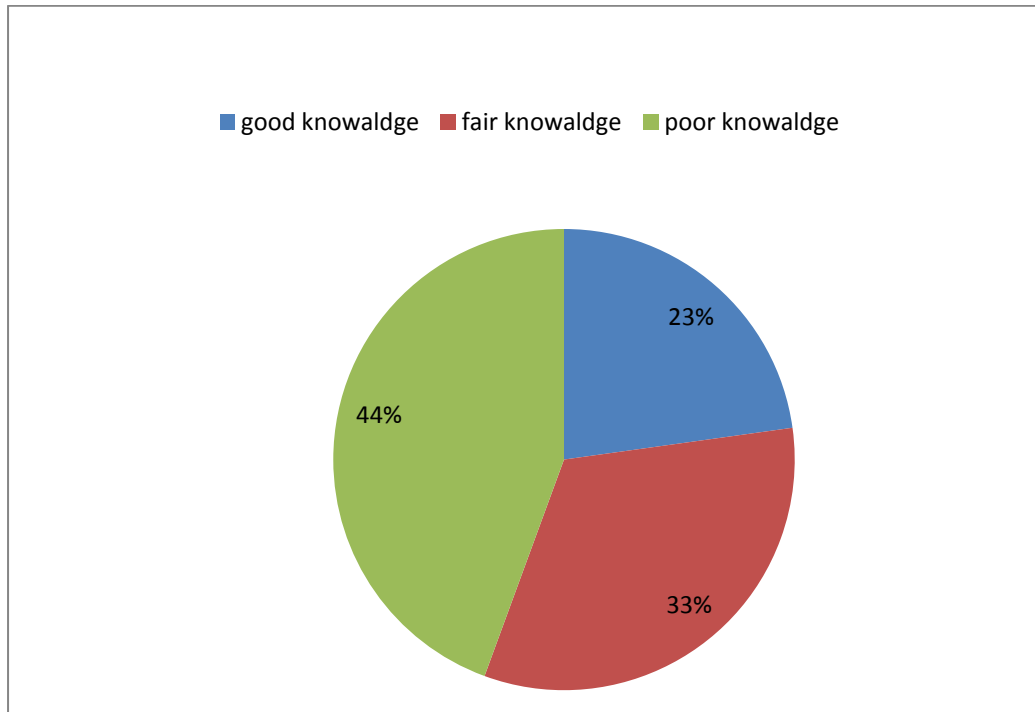


Fig (2): showed that 22.8% of nurses had good knowledge, 32.8% had fair knowledge and 44.4% had poor knowledge about signs and symptoms of post-birth hypothermia .

Fig (3): distribution of the study group according to knowledge about Sites of temperature measurment in neonate

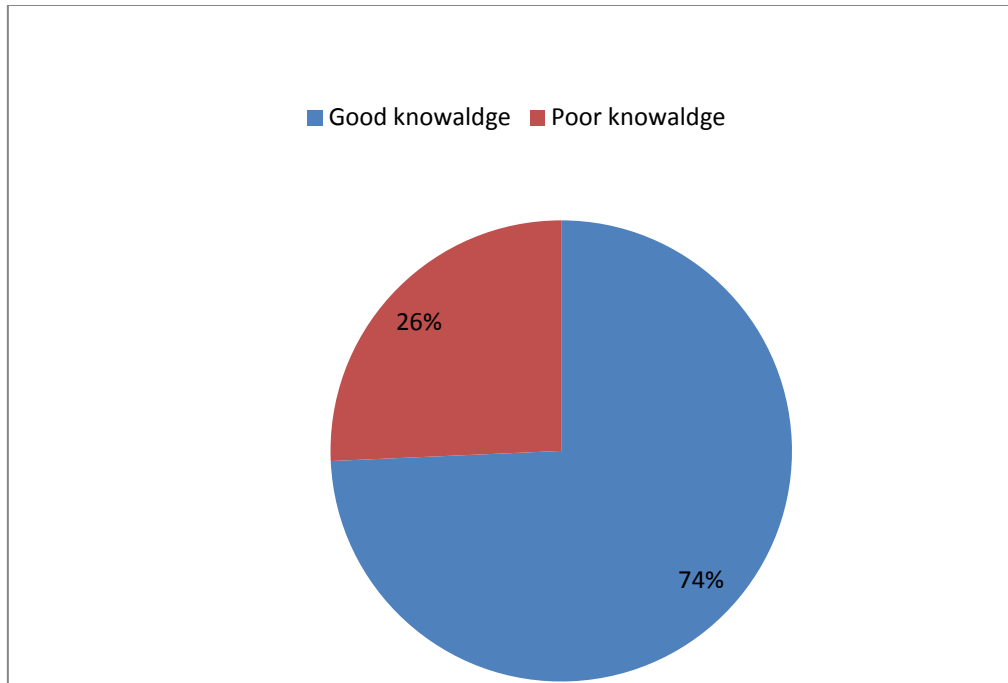


Fig (3): showed that 74.3% of nurses had good knowledge while 25.7% of them had poor knowledge about Sides of measure temperature of neonate.

Fig(4): distribution of the study group according to knowledge about high risk neonate to post-birth hypothermia

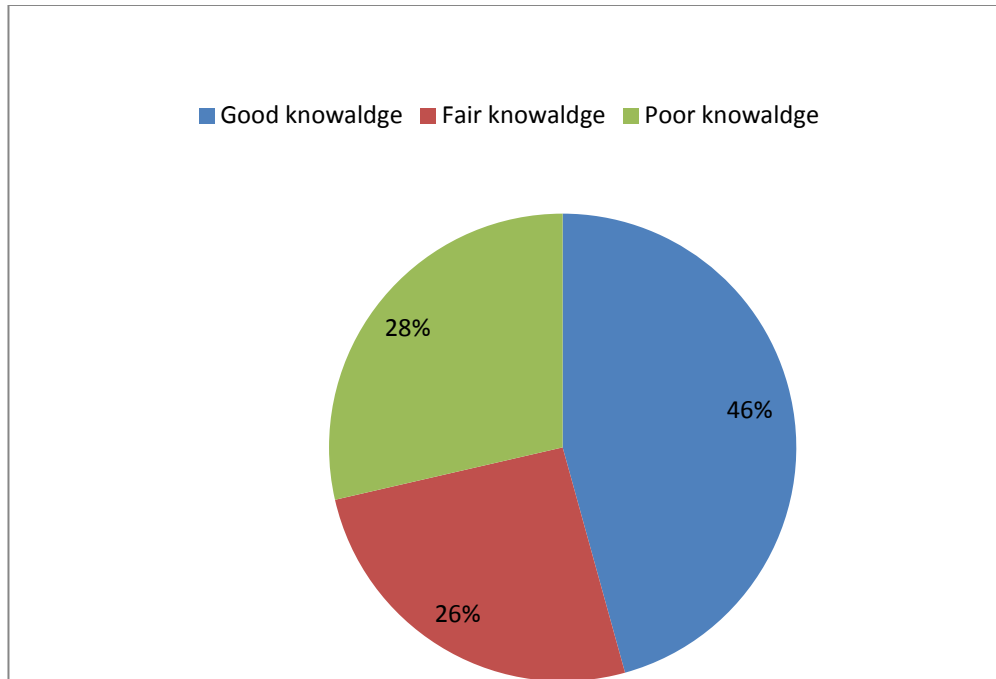


Table (4): showed that 45.7% of nurses had good knowledge, 25.7% had fair knowledge and remin 28.6% had poor knowledge about high risk neonate to post-birth hypothermia.

Table (7): distribution of the study group according to knowledge about management of mild post-birth hypothermia

Items	Frequency	Percent
Good knowledge	18	25.7%
Fair knowledge	33	47.1%
Poor knowledge	19	27.2%
Total	70	100%

Table (7): showed that 25.7% had good knowledge, 47.1% had fair knowledge and 27.2% had poor knowledge about management of mild post-birth hypothermia.

Table (8): distribution of the study group according to knowaledge about management of moderate post-birth hypothermia

Items	Frequency	Percent
Good knowledge	24	34.2%
Fair knowledge	15	21.4%
Poor knowledge	31	44.2%
Total	70	100%

Table (8): showed that 34.2% of nurses had good knowledge, 21.4% had fair knowledge and 44.2% had poor knowledge about management of moderate post-birth hypothermia.

Table (9): distribution of the study group according to knowledge about management of sever post-birth hypothermia

Items	Frequency	Percent
Good knowaledge	33	47.1%
Fair knowaledge	17	24.2%
Poor knowaledge	20	28.8%
Total	70	100%

Table (9): Showed that 47.1% of nurses had good knowaldge, 24.2% had fair knowledge and 28.8% had poor knowledgable about management of sever post-birth hypothermia.

Table (10): distribution of the study group according to knowledge about home management post-birth hypothermia:

Items	Frequency	Percent
Good knowaledge	22	31.4%
Fair knowaledge	19	27.2%
Poor knowaledge	29	41.4%
Total	70	100%

Table (10): Showed that 31.4% of study group had good knowledge, 27.2% had fair knowledge, and 41.4% had poor knowledge about home management post-birth hypothermia.

Table (11): distribution of the study group according to Nurses knowledge about management of all types of post-birth hypothermia

Items	Frequency	Percent
Good knowaledge	24	34.3%
Fair knowaledge	21	30.0%
Poor knowaledge	25	35.7%
Total	70	100%

Table (11): Showed that 34.3% of nurses had good knowledge, 30% had fair knowledge and 35.7% had poor knowledge about all types of management of post-birth hypothermia.

Table (12): distribution of the study group according to knowledge about preventive methods of post-birth hypothermia

Items	Frequency	Percent
Good knowaledge	37	52.8%
Fair knowaledge	17	24.4%
Poor knowaledge	16	22.8%
Total	70	100%

Table (12): reveled that 52.8% of study group had good knowaledge, 24.4% had fair knowledge and 22.8% of nurses had poor knowaledge about preventive methods of post-birth hypothermia.

Table (13): distribution of the study group according to knowledge about complication of post-birth hypothermia

Items	Frequency	Percent
Good knowledge	22	31.5%
Fair knowledge	25	35.7%
Poor knowledge	23	32.8%
Total	70	100%

Table (13): Showed that 31.5% of nurses had good knowledge, 35.7 had fair knowledge and 32.8% had poor knowledge about complication of post-birth hypothermia.

Table (14): associations between age group and management of post-birth hypothermia

Age group	Management of post-birth hypothermia						P-value
	Good knowledge		Fair knowledge		Poor knowledge		
	F	%	F	%	F	%	
20-25 years	7	10%	5	7.3%	10	14.2%	0.008
26-30 years	1	27.3%	1	14.2%	7	10%	
more than 30 years	2	2.8%	6	8.5%	4	5.7%	
Total	28		21		21		

Table (14): showed that 10% of (20-25years)age group had good knowledge ,7.3% of (20-25years)age group had fair knowledge ,14.2% of (20-

25years)age group had poor knowledge and showed that 27.3% of (26-30years)age group had good knowledge ,14.2% of (26-30years) age group had fair knowledge and 10% had poor knowledge ,table also reveled 2.8%of age group(more than 30 years) had good knowledge ,8.5% had fair knowledge and 5.7% had poor knowledge about manegment of all types of post-birth hypothermia.

. Table (15): assocation between expirance and management of post-birth hypothermia

Expirnce	Management of post-birth hypothermia						p-value
	Good knowledge		Fair knowledge		Poor knowledge		
	F	%	F	%	F	%	
0-5 years	12	17.1 %	7	10%	19	27.3%	0.048
5-10 years	8	11.4 %	6	8.5%	12	17.2%	
more than 10 years	4	5.7%	1	1.4%	1	1.4%	
Total	24		14		32		

Table (15): showed that 17.1% of study group with experince (less than 5years) had good knoweldge ,10% of them had fair knoweldge ,27.3% of them had poor knoweldge and showed that 11.4% of study group with experince between (5-10 years) had good knoweldge ,8.5% of them had fair knoweldge and 17.2% had poor

knowledge ,table also revealed 5.7% of study group with experience (more than 10 years) had good knowledge ,1.4% of them had fair knowledge and 1.4% had poor knowledge about management of all types of post-birth hypothermia.

Table (16): Show association between level of education and management of post-birth hypothermia

Level of education	management of post-birth hypothermia						p-value
	Good knowledge		Fair knowledge		Poor knowledge		
	F	%	F	%	F	%	
Baclori a	15	21.4%	9	27.4%	31	44.2%	0.006
Master	3	4.2%	1	1.4%	1	1.4%	
Total	18		20		32		

Table (16): showed that 21.4% of study group with bacloriadeegree had good knoweldge, 27.4% of them had fair knoweldge and 44.2% of them had poor knoweldge and showed that 4.2% of study group with master degree had good knoweldge, 1.4% of them had fair knoweldge and 1.4% had poor knoweldge bout manegmt of all types of post-birth hypothermia.

Table (17): association between level of education and management of post-birth hypothermia

Side of work	manegment of post-birth hypothermia						p-value
	Good knoweldge		Fair knoweldge		Poor knoweldge		
	F	%	F	%	F	%	
Nursery	17	24.4%	10	14.4%	3	4.2%	0.846
Labor room	20	28.5%	15	21.4%	5	7.1%	
Total	37		25		8		

Table (17): showed that 24.4% of study group worked in nursery had good knoweldge, 14.4% of them had fair knoweldge and 4.2% of them had poor knoweldge table also showed that 28.5% of study group worked in labor room had good knoweldge, 21.4% of them had fair knoweldge and 7.1% of them had poor knoweldge about manegment of all types of post-birth hypothermia.

Chapter Five

- **Discussion**
- **Recommendation**
- **Conclusion**

Discussion:

Outcome of the information about the nurses' knowledge regarding management of post-birth hypothermia that was conducted in Elmek Nimer university hospital, 70 nurses were interviewed. The following results were obtained using a specifically designed questionnaire:

Out of 70 nurses, their age was (31.4%) between the range of 20-25 years, (51.4%) ranged between 20-25 years and (17.2%) was more than 30 years.

All nurses under study (100%) were female (Elmek Nimer hospital policy reveals that all nurses in nursery and labor room must be a female).

According to nurses' experience, more than half of them and their experience was less than 5 years, a round one third (37.1%) their experience between 6-10 years and (8.5%) more than 10 years and majority of nurses (93%) had a Bachelor's degree in nursing and just a little have a master's degree (7%).

Regarding site of work, nurses in this study were divided into (42.8%) working in nursery and (57.1%) working in labor room.

Nurses' knowledge regarding definition of hypothermia ranged from (10%) had good knowledge, about one third (34.3%) had fair knowledge and around half (55.7%) of nurses had poor knowledge, and it was not good. In comparison with nurses' knowledge regarding grades of hypothermia, the present study revealed that more than half of nurses (62.8%) had good knowledge, while (10%) had fair knowledge and (27.2%) had poor knowledge.

About nurses' knowledge regarding signs and symptoms of post-birth hypothermia, the result showed that (22.8%) of nurses had good

knowledge and (44.4%) had poor knoweldge and this result was dircty affected in management of hypothermia through missed diagnosis.

The study was reveald that most (74.3%) of nuses had good knowledge about best site to measure temperature of newborn while one quarter (25.7%) of nurses had poor knowaldge.

In this study nurses knowledge about high risk neonate to post-birth hypothermia (45.7%) of nurses had good knowledge, (25.7%) had fair knowledge and other (28.6%) had poor knowaldge about high risk neonate to post-birth hypothermia.

Out of nurses knowledge about different types of post birth hypothermia, the best result obtiened is (47.1%) of nurses had good knowalde about hospital management of severs post birth hypothermia following by (34.2%) of nurses had good knowledge about mangement of moderate type, (31.4%) had good knowledge about home mangement of post birth hypothermia and (25.7%) had good knoweldge about mild post-birth hypothermia.

Nurses knowlede about mangement of moderate hypothermia was top poor result (44.2%) followed by nurses poor knowledge about home mangement (44.1%), then nuses knowledge about management of severe (28.8%) type and finally (27.2%) had poor knowledge about mild post-birth hypothermia.

After get nurses knoweldge about mangement of every type of post-birth hypothermia the result processed to get nurses knowledge about mangement of all types of post-birth hypothermia by calculated mean of (mild ,moderate, severe and home management) the result showed that

(34.3%) of nurses had good knowledge,(30%) had fair knowaldge and (35.7%) had poor knowledge .

Regarding preventive method of post birth hypothermia about half (52.8%) of nurses had good knowlede and less than quarter (22.8%) of nurses had poor knowaldge, its generaly good result in compered with nurses knowledge about complication of post-birth hypothermia that one third(31.5%) of nurses had good knowledge and one third(32.8%) had poor knowaldge.

Chi square was applied to see whether relation between differante variable and management of hypothermia and the result show:

There was significant relation between age and mangement of hypothermia (p value=0.008), while there was no significant relation between site of work and management of hypothermia p value=0.846, There was significant relation between experience and mangement of hypothermia (p value=0.048) and also there was significant relation between level of education and management of hypothermia p value=0.006

Conclusion:

Going from the result obtained from this study, these following findings can be reached:

Regarding nurse's knowledge about management of post-birth hypothermia the total knowledge of study group was only (34.3%).

More than half (55.7%) of study group had poor knowledge about identification of post birth hypothermia and about half (52.8%) of them had good knowledge regarding preventive method of post birth hypothermia, compared with nurses knowledge about complication of post-birth hypothermia that just one third (31.5%).

Recommendations:

- ❖ Provide continuous education and training for nurses to minimize chance of poor knowledge and care.
- ❖ Continues assessment of nursing knowledge is key point to detecte nurses knoweldge and apply education protocol to improve there knoweldge.
- ❖ Involved nurses staff in internal and external academic exchange through hospital, in aim to exchange knowledge and practice.
- ❖ Invitation to hospital conference to dissection the new trend is responceplitiy of head nursing manager.

➤ **References**
➤ **Appendix**

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University of shendi

Fucly of postgraduate studies and research

Master of nursing science –nursing peditrics

Batch (3)

**Outsioner to assessment of nurses knowledge regarding management of
post-birth hypothermia in elmik neimer university hospital**

Part one: personal data:

- No []
1. Age: []
2. Sex:
- 1=male []
- 2=female []
3. Years of experience:
- 1= 0-5 years []
- 2=6-10 years []
- 3=more than 10 years []
4. Level of education:
- 1=deploma []
- 2=bacloria []
- 3= master []
- 4=PhD []
5. Side of work:
- 1=nersary []

2=labor room []

Part two :(identification of hypothermia):

6. Post-birth hypothermia is:

1=temperature between 36-36.4 []

2=temperature less than 36 []

3= condition that body fails of adaptation to extra-uterine life []

7. Different grades of post birth hypothermia :

1= mild hypothermia 36.0-36.4°C (96.8-97.5°) []

2= moderate hypothermia 32.0-35.9°C (89.6-96.6°F) []

3= severe hypothermia below 32°C (89.6°F) []

8. Signs and symptoms of post birth hypothermia :

1=cold feet & weak cry []

2= less activities & poor sucking []

3= slow, shallow and irregular breathing []

4= slow heart beat []

5=metabolic acidosis []

6=low blood sugar []

9. Best site to measure temperature of newborn:

1=oral []

2=rectal []

3=axillary []

10. Neonate there are high risk to neonatal hypothermia:

1=all of baby have equal chance to get hypothermia post birth []

2=low birth weight []

3=preterm baby []

4=congenital anomalies []

Part three: (nursing intervention):

11.hospital mangment of mild post birth hypothermia:

- 1= under a radiant heater []
- 2= skin to skin contact []
- 3= in an incubator, at 35-36°C []
- 4= no need to intervention []

12.hospital mangment of moderate post birth hypothermia:

- 1= under a radiant heater []
- 2= skin to skin contact []
- 3= in an incubator, at 35-36°C []
- 4= by using a heated water-filled mattress []
- 5= by using a warm cot []

13.hospital mangment of sever post birth hypothermia:

- 1= by thermostatically-controlled heated mattress set at 37-38°C []
- 2=by an air-heated incubator []
- 3=by warm chain []

14.home mangment of post birth hypothermia:

- 1= skin-to-skin contact []
- 2= covering baby with a warm blanket []
- 3= continue breast-feeding []
- 4=refer to hospital in case of lethargic and refuses to suckle []

Part four : (preventive method):

15.preventive method of post birth hypothermia:

- 1= baby cover immedatly after birth []
- 2= start early breast feeding []

- 3= Avoid unnecessary exposure []
- 4= baby should be dried from fluid []
- 5= avoid bathing the newborn immediately post delivery []
- 6= provide skin to skin contac []
- 7=stop fan &air condition during labir []

Part five: (complication):

16.complication of post birth hypothermia:

- 1= cardiac arrhythmias []
- 2= Hypotension []
- 3= reduced blood flow and hyperviscosity []
- 4= prolonged Coagulation []
- 5= seizures []
- 6= death []