



Thermoregulation and temperature taking in the developing world: A brief encounter[☆]



Jacqueline Smith, NNP

The Townsville Hospital, Neonatal Unit, Douglas, Townsville, Queensland 4815, Australia

Available online 16 April 2014

KEYWORDS

Developing world
community;
Neonate;
Temperature

Abstract There are a number of electronic, liquid crystal and infrared temperature measurement devices available for use in the axilla, tympanic, skin, temporal, rectal and abdominal region. However not only is agreement about the effectiveness of the various types of thermometers in the neonatal population remain unclear, ease of use, education and economy becomes a consideration when working in the developing world, however it is still important to understand the most devices and methods used in these countries, especially in the preterm and sick newborn, but also infants born at home with resource limited professional health care.

Caregivers, volunteers, field and hospital workers also need to be aware of the various temperature measurement methods, devices and factors influencing neonatal temperature how to recognize hypothermia and to be able to rapidly care for infants who are cold.

Evidence based practice remains important in developed and developing countries and studies need to continue into the accuracy and reliability of different temperature measurement devices and methods.

Crown Copyright © 2014 Published by Elsevier Ltd on behalf of Neonatal Nurses Association. All rights reserved.

Introduction

We understand that thermoregulation and therefore obtaining an accurate temperature measurement is an integral part of our work, almost innate,

[☆] Portions of this work were presented and published in thesis form in fulfillment of the requirements for the D.N.Sc for Student J Smith from James Cook University.

E-mail addresses: jackiesmith3@me.com, jacqueline_smith@health.qld.gov.au.

when working with this vulnerable population, as prevention of hypothermia is one of the basic tenets of newborn care.

Cold stress in neonates was first documented in 1907 (Budin, 1907) but it was not until 1958 that Silverman et al. (1958a,b) demonstrated the association between higher environmental temperatures and decreased mortality (Budin, 1907; Silverman et al., 1958a). Hypothermia can cause complications such as an increase in oxygen requirements, difficult resuscitation, increase incidence of disseminated intravascular coagulation, increased glucose utilization, post delivery acidosis, delayed adjustment from foetal to newborn circulation, worsening respiratory distress syndrome, necrotizing enterocolitis, and increase morbidity from infection (Soll, 2008; Knobel and Holditch-Davis, 2007). Accuracy of body temperature is essential to help maximize quality of care in preterm and term infants.

We are measuring heat content of the infants body (Holtzclaw, 1993), which plays an important role in clinical decisions. To ensure we have accurate, consistent, reliable methods and devices of temperature taking studies need to continue and devices need to be investigated prior to use in this sensitive population.

Hypothermia has been associated with high morbidity and mortality, in developing countries, where rates of newborn hypothermia are high (Mullany, 2010; Black and et al., 2010). It is obvious in the developing world there are many common constraints which include poverty, hunger, high mortality rates, poor education systems, war and poor sanitation, therefore up-to-date technology are out of reach for most of the population, which can have a major impact on health and education, therefore wellbeing from the cradle to the grave may be compromised.

This paper will predominately consider developing world communities, as regards to temperature taking in the neonate, and to highlight the importance of thermoregulation, therefore help these communities confidently predict infants who are cold and help decrease hypothermia rates, which may have some impact on decreasing mortality rates.

Vital signs are usually closely observed in sick or preterm infants, which can include, heart rate, respirations and blood pressure. Temperature is another vital statistic we need to monitor. Temperature taking is seen as significant because a deviation from the normal range (high or low temperature) can give an indication that there is a pathological condition.

The body has a temperature because combustion processes are constantly taking place in living organisms, releasing energy. Some of this energy will be conserved for later use, the rest evolves as heat, and can build up in the body, therefore causing an increase in body temperature, which is known as pyrexia.

Heat, like fluids, runs down a gradient (Newton's law of cooling), the heat generated in the body can readily be dissipated into the environment, so long as it is cooler than the body, which in turn will help decrease body temperature.

The body has the amazing ability to regulate core temperature, therefore humans are known as homeotherms. Body temperature is regulated automatically. Thermo sensors continuously monitor the body temperature throughout the body, and constantly transmit the data to the controller, which is located in the brain; this is then related to the thermoeffectors. Thermoeffectors are activated to try and normalize any deviations in body temperature (hypothermia/hyperthermia). This system is known as a 'close loop negative feedback system'. The body has many different temperatures; generally core temperatures are higher, more uniform and stable than skin temperature.

The most accurate and appropriate method of measuring core and skin temperature in newborns has been a topic of concern for many years. The use of the glass mercury thermometer has been phased out (in the developed world) because of potential health problems associated with mercury, however is still used frequently in many developing countries, because it is affordable, easy to use, needs no batteries, no special storage and no covers are needed to take a temperature. In addition to rectal, skin and axillary methods, there are newer modes of measuring temperature such as tympanic temporal artery and forehead methods, which at present are out of reach for most developing countries.

Many routes and devices have been used to obtain and accurate body temperature measurement in the neonates; however a consensus on the best site and device to be used has not been reached (El-Radhi and Barry, 2006).

In general, any site near a major artery is suitable for assessing body temperature (Nierman, 1991) known as the core temperature. It has been established core temperature should be measured via the pulmonary artery or oesophagus. Both sites cover a large central vasculature area and are close to the heart (Nierman, 1991; Holzhauser and et al., 2009), but not practicable to use in many situations.

Download English Version:

<https://daneshyari.com/en/article/2631273>

Download Persian Version:

<https://daneshyari.com/article/2631273>

[Daneshyari.com](https://daneshyari.com)