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Incidence of hypothermia in preterm neonates with gestational age below 34 weeks admitted to the ICU

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Abstract: Hypothermia is a constant concern of professionals who work with newborns in the neonatal intensive care unit. Brazil ranks 16th in deaths related to complications of prematurity, and one of these complications is hypothermia. The aim of this study is to analyze the prevalence of preterm infants who underwent hypothermia at birth, and their stability in the first 24 hours of life. This is a descriptive, quantitative, exploratory and prospective study carried out in a maternity hospital in the city of Vitória de Santo Antão-PE. 74 newborns under 34 weeks of gestational age participated in the study, but only 38 met the inclusion criteria, with a minimum weight of 935g and a maximum of 2,425g. The incidence of hypothermia on admission to the NICU was 100% (n=38), the adequate and complete use of physical means (plastic bag and cap) managed to reduce the time for temperature stabilization.

Keywords: Premature. Intensive care. Temperature corporal.

1. Introduction

It is estimated that there are 13 million preterm births in the world per year. Brazil is among the ten countries with the highest rate of preterm birth, this leaves Brazil in an uncomfortable situation (BALBI *et al*., 2015).

In Brazil, in 2013, the registered rate of preterm births, with gestation between 22 and 36 weeks were 331,871. In the Northeast region, 27.8% of these preterm births were registered (BRASIL, 2013). Brazil ranks 16th in deaths related to complications of prematurity. There are some factors associated with early deaths (between 0 to 6 days), are due to interventions, depends on care provided in the unit, and one of them is hypothermia (ALMEIDA *et al*., 2014).

It is defined as preterm newborn that with gestational age less than 37 weeks (ALMEIDA *et al*., 2014; MASTIJASEVICH *et al*., 2013; OLIVEIRA *et al*., 2015).

Preterm birth is related to pregnancy, socioeconomic factors, the precariousness of health care and unsatisfactory prenatal care, impairing the development of the embryo (OLIVEIRA *et al*., 2015).

Ensuring the survival of the PTNB is essential to regulate temperature, since hypothermia can cause: Hypoglycemia, metabolic acidosis, hypoxia, and may lead to death. (SANTOS *et al*., 2015; BRAZIL, 2011; ROLIM *et al*., 2010).

Preterm newborns are homeothermic and homeothermic. At birth its temperature is on average 37.5 ° C, followed by a drop of 0.3 ° C per minute. This decrease promotes an autonomic nervous system response, which releases noradrenaline into the nerve endings of brown fat, leading to a release of thyroid-stimulating hormone, specifically T3. (BRAZIL, 2011).

Preemies need too much and intense care, which makes it difficult for their temperature to settle. (ROLIM *et al*., 2010).

Heat losses can occur through various mechanisms, this loss is mainly done by evaporation, which is the loss of water by the skin, it can also be by radiation and convection. (BRAZIL, 2011).

According to the World Health Organization, hypothermia is defined depending on its severity. Mild hypothermia whose temperature is between 36°C and 36.4°, moderate hypothermia is the temperature that the values are between 32°C and 35.9°C, severe hypothermia whose values are lower than 32°C. (BRAZIL, 2011).

Preterm newborns exposed to hypothermia may have some physiological changes: decreased surfactant production; increased oxygen consumption; Metabolic acids; hypoglycemia; difficulty gaining weight; decreased cardiac output; increase in peripheral vascular resistance; if maintained hypothermia can lead to a constriction of the pulmonary vessels, leading to hypoxia, and death. (BRAZIL, 2011; ROLIM *et al*., 2010).

To prevent hypothermia, the nursing team makes use of some strategies: use of occlusive cover using polyurethane (PVC) plastic bag, reducing heat loss by evaporation, and cotton caps to minimize heat losses through the cephalic region. (SAINTS, 2015).

Heated cribs or incubators are also used. Currently there are three types of incubators: single-walled incubator, double-walled incubator, and incubator with humidification system. (BRAZIL, 2011).

All NB are at risk of ineffective thermoregulation, usually leading to hypothermia. However, the greatest risk is in the premature newborn, which has an immature thermoregulatory center Ineffective thermoregulation is a constant concern of health professionals working with babies in the neonatal intensive care unit (NICU).

There are needs to adopt some measures so that there can be a decrease in occurrences of neonatal hypothermia, and also to observe that all the measures that are being adopted are promoting the thermal regulation of the NB, especially in the first 24 hours of life.

The aim of this study is to analyze the incidence of preterm infants who evolved hypothermia at birth. To evaluate the birth conditions of premature infants with gestational age below 34 weeks, born in a maternity hospital in Vitoria de Santo Antão-PE; Describe the transport conditions of preterm newborns from the delivery room to the NICU; to characterize the PTNB admitted to the NICU; calculate the time for temperature stabilization of the PTNB, who presented hypothermia at birth.

2. Methodology

This is a descriptive, exploratory, prospective study with a quantitative approach. The study will be carried out at the João Murilo de Oliveira Hospital, which is located in the city of Santo Antão. The research population will consist of preterm infants up to 34 weeks of gestation admitted to the NICU.

The following criteria will be adopted:

Inclusion criteria: all NB with gestational age of up to 34 weeks admitted to the NICU of the João Murilo de Oliveira hospital, from 06/01/2016 to 10/30/2016.

Exclusion criteria: PTNB with gestational age above 34 weeks, those who have not described in medical records the temperature of the delivery room and deaths.

The data were recorded in the form elaborated by the researchers, containing the variables described below: Independent variables and dependent variables.

Independent variables**:** Gender; Gestational age; Type of delivery; Twin pregnancy; APGAR; Birth weight in grams; Time of birth; Temperature of the delivery room; Time of admission to the NICU; Procedures performed in the first 24 hours of life; Main diagnosis.

Dependent variables: Body temperature at admission to the NICU in °C; Temperature in the fifth minute of life of the newborn; Time in minutes between birth and admission to the NICU; Use of cap; Use of polyethylene film; Use of heated incubator during transport; Time for temperature stabilization.

Data collection began after approval of the project by the Ethics and Research Committee of Hospital Otavio de Freitas, under protocol no. 097431/2016.

The data after analysis were filed in the coordination room of the Integrated Faculties of Vitória de Santo Antão (FAINTVISA) under the responsibility of Prof. Ms. Ana Cecilia de Amorim.

To create the database, the Microsoft EXCEL® spreadsheet was used.

It should be emphasized that all research will follow the considerations and ethical observances recommended by resolution No. 466/2012 established by the National Health Council, which addresses works involving human beings, in which the information collected will be treated in a confidential manner, preserving the identity of the participants as well as the institutions to which they belong.

3. Results and Discussion

The study included 74 newborns under 34 weeks of gestational age, but only 38 met the inclusion criteria, with a minimum weight of 935g and a maximum of 2,425g .

In the delivery room, 14 NB (36.8%) required neonatal resuscitation and 38 (100%) presented hypothermia on admission to the NICU, with temperatures ranging from 33°C to 36.4°C. The mean interval between the time of birth and admission to the NICU was 37 minutes. All NB underwent procedures in the first 24 hours of life, taking on average 6 hours and 30 minutes to stabilize body temperature.

Table 1. Variables related to delivery of NB who presented hypothermia at birth

Variables		**N**	**%**
Sex	Male	19	50
	Female	19	50
Type of delivery	Normal	21	55,2
	Cesario	17	44,7
Forms of heating	Heated incubator	37	97,3
	Plastic bag	9	26,3
	Cotton cap	10	28,3

Source: Author

4. Conclusion

In this study with 38 newborns with gestational age less than 34 weeks, born in a reference hospital in the interior of the state of Pernambuco, of medium risk of the unified health system. The incidence of hypothermia on admission to the NICU was extremely high. The use of physical means (plastic bag and cap) reduces the time for temperature stabilization, these results report the urgency to start practices to maintain the normothermia in the first seconds after premature birth, such practices include the use of plastic bag, cap and heated incubator for thermal control, from birth to admission to the NICU.

This study allowed to identify the practices used for thermal control of the premature infant in the daily routine, and evidences the magnitude of the problem, also reports the simple interventions that help in the reduction of hypothermia on admission to the NICU, and to increase the survival of preterm infants.

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