

Hypothermia and the newborn's bath in the first hours of life

Hipotermia e banho do recém-nascido nas primeiras horas de vida
Hipotermia y el baño del recién nacido en las primeras horas de vida

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ABSTRACT

Objective: to analyze the occurrence of hypothermia in neonates before and after bathing in the first hours of life.

Method: a cross-sectional study in which the axillary temperature of newborns before bathing, after bathing, 30 and 60 minutes after bathing was verified at an Obstetric Center. In the statistical analysis, the Chi-Square, Student's t and Mann-Whitney tests were used, with $\alpha = 0.05$.

Results: A total of 149 newborns were included in the study, showing the prevalence of neonatal hypothermia in 40.3% of the cases, with a statistically significant association ($p < 0.001$) between the occurrence of neonatal hypothermia at all axillary temperature assessments. A statistically significant correlation was found between the variables: room temperature and temperature verification 60 minutes after bath ($p = 0.032$).

Conclusions: It is concluded that the first bath can be postponed to favor the adaptation of the neonate to the extrauterine environment, preventing the occurrence of neonatal hypothermia.

Keywords: Infant, newborn. Baths. Hypothermia.

RESUMO

Objetivo: analisar a ocorrência de hipotermia em recém-nascidos antes e após o banho nas primeiras horas de vida.

Método: estudo transversal, no qual se verificou a temperatura axilar de recém-nascidos antes do banho, após o banho, 30 minutos após o banho e 60 minutos, no Centro Obstétrico. Na análise estatística utilizou-se os Testes Qui-Quadrado, t de Student e Mann-Whitney, com $\alpha = 0,05$.

Resultados: Foram incluídos 149 recém-nascidos no estudo, evidenciando-se a prevalência de hipotermia neonatal em 40,3% dos casos, tendo associação com significância estatística ($p < 0,001$) entre a ocorrência de hipotermia neonatal em todos os momentos de verificação de temperatura axilar. Constatou-se correlação estatística significativa entre as variáveis: temperatura da sala de parto e a verificação da temperatura 60 minutos após o banho ($p = 0,032$).

Conclusões: Conclui-se que o primeiro banho pode ser adiado para favorecer a adaptação do neonato ao ambiente extrauterino, prevenindo a ocorrência de hipotermia neonatal.

Palavras-chave: Recém-nascido. Banhos. Hipotermia.

ABSTRACT

RESUMEN

Objetivo: analizar la ocurrencia de hipotermia en recién nacidos antes y después del baño en las primeras horas de vida.

Método: estudio transversal, en el cual se verificó la temperatura axilar de recién nacidos antes del baño, después del baño, 30 minutos después del baño y 60 minutos, en el Centro Obstétrico. En el análisis estadístico se utilizaron las pruebas Qui-cuadrado, t de Student y Mann-Whitney, con $\alpha = 0,05$.

Resultados: Se incluyeron 149 recién nacidos en el estudio, evidenciándose la prevalencia de hipotermia neonatal en el 40,3% de los casos, teniendo asociación con significancia estadística ($p < 0,001$) entre la ocurrencia de hipotermia neonatal en todos los momentos de verificación de temperatura axilar. Se constató correlación estadística significativa entre las variables: temperatura de la sala de parto y la verificación de la temperatura 60 minutos después del baño ($p = 0,032$).

Conclusiones: Se concluye que el primer baño puede ser pospuesto para favorecer la adaptación del neonato al ambiente extrauterino, previniendo la ocurrencia de hipotermia neonatal.

Palabras clave: Recién nacido. Baños. Hipotermia.

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INTRODUCTION

Newborns baths are routine procedures that follow cultural tradition and aim to remove residues of the skin and reduce its colonization. This procedure needs to be recommended when there are evidences, to avoid injuring the skin of the newborn, as it changes rapidly during the adaptive process from the intrauterine to the extrauterine environment⁽¹⁾.

The first bath of the newborn is a controverse type of care. A study suggests that the first bath should be delayed for at least 24 hours, without removing the vernix caseosa, which would bring a number of benefits to the newborn, like: adequate thermoregulation, hydration of the skin, absence of skin peeling, reduction of neonatal toxic erythema, improved wound healing and protection from colonization of the skin by non-pathogenic bacteria⁽²⁾.

When considering such benefits, it is recommended to avoid the separation of the mother and the newborn in the first hours of life, thus favoring skin-to-skin contact. This practice helps in several mechanisms of self-regulation of the newborn, among which the maintenance of body temperature. Therefore, early care procedures can interrupt the process of adaptation to the extrauterine environment⁽³⁾.

According to guidelines for the systematization of integral care for the newborn in the Brazilian Unified Health System (SUS), immediate and continuous skin-to-skin contact should be ensured, breastfeeding should be encouraged in the first hour of life and routine procedures should be postponed (like the bath, for example) for full-term infants with normal respiratory rhythm, normal muscular tonus and without meconium fluid⁽⁴⁾. The presence and contact of the mother/baby binomial provides several benefits to both, such as the prevention of neonatal hypothermia and the stimulation of early maternal breastfeeding⁽⁵⁻⁶⁾.

The importance of the study is due to the fact that there are controversies in the literature regarding the ideal moment for the first bath of the newborn. In the setting being discussed, the bath is carried out in the first two hours of life of the newborn, though there are recommendations to postpone the procedure for 6 hours after birth⁽⁷⁾, or even 24 hours⁽²⁾, to avoid the risk for hypothermia, present in the transition period from birth to neonatal life. It is believed that a methodological research is necessary to fill this gap of scientific knowledge, and that is the proposal of this study.

Consequently, considering the information about bathing in the first hours of life, this study proposes the following question: "What is the effect of the first bath on the axillary

temperature of the newborn in the first hours of life?". Therefore, its objective is to analyze the occurrence of hypothermia in newborns before and after bathing in the first hours of life.

METHODS

This is a cross-sectional study. This research belongs to a dissertation project linked to the Postgraduate Program in Nursing of the Federal University of Rio Grande do Sul (UFRGS)⁽⁸⁾. It took place in the delivery and newborn admission rooms of the Obstetric Center Unit (UCO), in a university hospital located in the city of Porto Alegre, Rio Grande do Sul, Brazil. The sample consisted of newborns whose delivery took place at the aforementioned hospital. Newborns in good general conditions, with a gestational age ≥ 35 weeks and weight ≥ 2000 g were included in the study. Newborns who needed to be admitted to the neonatal intensive care unit (NICU), newborns born to mothers with HIV and children of mothers with any STORCH infections were excluded. To calculate the sample, a 10% proportion was considered, with 80% power and significance index of 5%. Thus, the number of participants to compose the present study was of 149 newborns. The calculation was carried out using the WINPEPI software.

Data were collected in the delivery rooms and in the admission room of the Obstetric Unit of a university hospital, from April to October 2017, and stratified into four moments. Initially, the axillary temperature was checked with a "Medlevenson[®]" clinical thermometer for one minute before the baby's bath (moment 1). This occurred in the newborn admission room, with them under the cradle of radiant heat. After the bath, the axillary temperature was verified (moment 2), with the body of the newborn dry after the procedure. The axillary temperature was also verified 30 minutes (moment 3) and 60 minutes after the bath (moment 4). It should be noted that moments 1, 2 and 3 of axillary temperature verification occurred in the Admission Room, while the fourth moment took place in the Recovery Room, where the newborn returned to his mother.

The data collected, as well as the clinical and sociodemographic data of the mother and the newborn were taken from electronic nursing records. The present study used the definition of hypothermia of the American Association of Pediatricians⁽⁹⁾, in which axillary temperatures $\leq 36.4^{\circ}\text{C}$ correspond to neonatal hypothermia and the thermal range between 36.5° and 37.5°C corresponds to a normal temperature. The Brazilian norms and guidelines of Resolution 466 of 2012⁽¹⁰⁾ on human research were followed. The present study was approved by the Research Ethics Committee of the Institution, under protocol 160026. All

parents responsible for the newborn signed the Free and Informed Consent Form.

According to the routine of the hospital where the study was performed, the infant is born in the delivery and/or cesarean delivery rooms at the Obstetric Center Unit. In normal situations, it is placed on the chest/abdomen of the mother (after pediatrician evaluation and weighing) and remains in skin-to-skin contact for at least one hour, being stimulated breastfeeding in the first hour of life with the aid of the assistant team.

At the end of the skin-to-skin contact period, the mother is taken to the recovery room and the newborn is taken to the Admission Room to receive the first routine care, such as physical examination and bathing.

For this study, the first assessment of axillary temperature before bathing, with the newborn naked and under the radiant heat cradle, lasted for one minute with a "Medlevenson®" clinical thermometer. The routines of the institution recommend that, for the bath to take place, the axillary temperature of the neonate should be 36.8°C, the bath water temperature, 38°C, and the ambient temperature, between 25°C and 27°. The temperature of the water and ambient was checked by a digital thermometer of the brand "Incoterm®".

The second moment of verification was immediately after the bath (where the newborn was dry and under the cradle of radiant heat). The third time was 30 minutes after the bath ended, when the infant was still in the Admission Room (already dressed) and under an external source of heat. The fourth time, after 60 minutes of the end of the bath, the temperature was checked, when the baby was in the recovery room (accompanied by his mother), in skin-to-skin contact or in a crib (dressed) next to the mother's bed.

Statistical software SPSS version 18.0 was used to analyze the data. Initially, the data were treated descriptively through frequencies, mean, standard deviation, median and interquartile range. For the statistical analysis, the Chi-square test was used to verify the association between the hypothermia categories and the factors studied, such as the variables of duration of the first bath and of the period of the first bath. Student's t-Test and the Mann-Whitney test were used according to the distribution of the quantitative variables, to compare the means or distributions of the studied covariates, such as: gestational age, birth weight and assessments of axillary temperature. Spearman's correlation was used and the correlation degree of the quantitative variables was verified, such as: the temperature of the delivery room, the temperature of the admission room and the temperature of the water in the moments of axillary temperature verification. The accepted level of statistical significance was $\alpha = 0.05$.

■ RESULTS

A total of 149 newborns were included in the study. There were no losses and/or refuses to participate. Regarding the demographic data of the mothers, it was found that 63 (42.3%) of them were from 18 to 24 years, 56 (37.6%) had completed their high school, 98 (65.8%) were primiparous, and normal labors were the most common 93 (62.4%).

Sixty newborns (40.3%) had hypothermia in at least one of the four axillary temperature verification assessments. The prevalence of hypothermia was observed in 12% of the assessments before the bath, 11% immediately after the bath, 6% in 30 minutes after the end of the bath and 11.4% in 60 minutes after the bath.

To improve the analysis, data were stratified into two groups, the hypothermia group and the normothermia one. We sought to investigate the association between weight, gestational age and temperature verification moments, but no statistical significance was observed (Table 1).

Regarding the independent variables cited, the association between the four axillary temperature assessments and the occurrence or not of neonatal hypothermia was verified, and statistical significance was evident at all moments (Table 2).

When analyzing the temperatures of the delivery rooms, a median of 23.9°C (22.5-24.8°C) was observed, that is, about 80% of the newborns were exposed to an ambient temperature below 25°C. Regarding the newborn admission room, a median of 25.8°C (24.9-26.4°C) was found. It was observed that the admission room had higher temperatures than the delivery rooms, even so, about 20% of the newborns were exposed to an ambient temperature of less than 25°C during the first admission care.

When considering the characteristics of the first bath of the newborn, the temperature of the water, the moment in which the first bath was conducted and the duration of the bath were evaluated. Considering the temperature of the bath water, most of the verifications found values that were correct or close to the recommended by the institution where the present research was carried out, that is, 38°C.

The moment of the first bath was stratified in: between 1 and 2 hours of life, between 2 and 3h, and between 3 and 4h of life. It was found that most newborn received the first bath between 1 and 2 hours of life. The infants who received the first bath in this time frame account for 91.7% of the 60 cases of neonatal hypothermia due to bath observed in this study. We sought to investigate associations between the moment of the first bath and the occurrence or not of hypothermia, but no statistically significant associations were found.

Table 1 – Data of the newborns related to the variables of the research (n = 149). Porto Alegre, RS, 2017

Characteristics	Normothermia n=89	Hypothermia n=60	p*
Gestational Age (weeks)	39+2 (38+5- 40+2); [36-41]	40 (38+2 - 41); [35-42]	0.616
Weight (g)	3365(3052-3647); [2515-4595]	3332 (3047-3601); [2115-4065]	0.500
Moment 1 (°C)	37 (36.8 – 37.1); [36.5-38.1]	36.5 (36.2 – 36.9); [35.2-37.8]	0.200
Moment 2 (°C)	36.9 (36.7- 37.1); [36.5-37.8]	36.6(36.4 – 37); [35.6-37.2]	0.200
Moment 3 (°C)	37 (36.8 – 37.2); [37-38]	36.7 (36.5-36.9); [36-38]	0.200
Moment 4 (°C)	37 (36.8-37.1); [36.5-38.2]	36.6 (36.4-36.9); [35.7-38.4]	0.200

Source: Research data, 2017.
Median (interquartile range: P25 and P75) and [minimum and maximum].
* Student's t-test.

Table 2 - Prevalence of Hypothermia in moments of axillary temperature verification of the newborn. Porto Alegre, RS, 2017

	Hypothermia n = 60	Normothermia n = 89	p*
Moment 1	36,7 (36.2 -36.9); [35.2 -37.8]	37 (36.8 – 37.1); [36.5-38.1]	<0.001
Moment 2	36.7 (36.4 – 37); [35.6-37.6]	36.9 (36.7-37.1); [36.5-37.8]	0.001
Moment 3	36.8(36.5 -37); [36-38]	37 (36.8-37.2); [37-38]	<0.001
Moment 4	36.6 (36.4 -36.9); [35.7-38.4]	37 (36.8 – 37.1); [36.5-38.2]	<0.001

Source: Research data, 2017.
Median (interquartile range: P25 and P75) and [minimum and maximum].
* Mann-Whitney test.

The duration of the bath was stratified in: 1 to 2 minutes, 2 to 3 min, 3 to 4 min, 4 to 5 min or 5 min or more. It was observed that most baths lasted from 2 to 3 minutes.

We attempted to evaluate possible associations between bath time and hypothermia, but associations with statistical significance were not found (Table 3).

Table 3 – Duration of the first bath of the newborn (n = 149). Porto Alegre, RS, 2017

Interval	Hypothermia	%	Normothermia	%	Total	%	p*
1→2min	10	45.5	12	54.5	22	100	0,472
2→3min	15	36.6	26	63.4	41	100	
3→4min	13	37.1	22	62.9	35	100	
4→5min	11	34.4	21	65.6	32	100	
5min or more	11	57.9	8	42.1	19	100	

Source: Research Data, 2017.
* Chi-square test (Pearson's test).

Other possible associations between variables were analyzed, like: room temperature, admission room temperature and water temperature with axillary temperature verification moments. A significant but weak correlation was found between the variable of the delivery

room temperature and the fourth moment of axillary temperature check, that is, after 60 minutes of the end of the first bath, when the newborn was again in the company of his mother in the Recovery Room. Such data can be seen in Table 4.

Table 4 – Correlation between variables of the newborn (n = 149). Porto Alegre, RS, 2017

Variables	Moment 1		Moment 2		Moment 3		Moment 4	
	r	P	R	p	r	P	r	p
<i>Delivery Room</i>	-0.100	(0.223)	-0.088	(0.288)	0.021	(0.797)	0.175	(0.032)
<i>Admission Room</i>	-0.067	(0.414)	0.175	(0.033)	0.118	(0.151)	0.114	(0.167)
<i>Water temperature</i>	0.060	(0.464)	0.249	(0.002)	0.018	(0.824)	-0.108	(0.191)

Source: Research Data, 2017.

r (p): Spearman correlation.

■ DISCUSSION

Through the present study it was possible to analyze the occurrence of hypothermia in newborns before and after bathing in the first hours of life. The prevalence of neonatal hypothermia among the newborns in the sample was 40.3%. Newborns baths are controversial, and discussions about how to perform the procedure and the most appropriate time to do it in the first days of life are still present in neonatal care routine⁽¹¹⁾. In order to prevent neonatal hypothermia, the first bath is recommended to take place six hours after the newborn's birth⁽⁷⁾.

In a study carried out in four regions of Ethiopia, through interviews done in home visits by health professionals, it was demonstrated that postponing the first bath contributed to the maintenance of the body temperature of the newborn, in addition to keeping them alive due to the longer period of contact with the mother⁽¹²⁾. In a study conducted in the United States, it was shown that postponing the infant's first bath for 12 hours contributes to reducing the risk of neonatal hypothermia due to the separation of the mother/baby binomial, thus bringing several benefits for both⁽⁵⁾.

In this study, it was observed that the temperatures of the delivery room were below the range recommended by the literature, and a large number of newborns in the study were exposed to temperatures below 25°C at birth, while keeping a skin-to-skin contact with their mothers. In the admission room, on the other hand, the temperatures found were higher, and were in agreement with the recommendations for the newborn care⁽¹³⁾.

The lower delivery room temperatures raise the risk of heat loss by conduction and convection of the newborn, a study has shown that when newborns are exposed to lower temperatures (approximately 23°C), they tend to present hypothermia of moderate to severe intensity in admission care. Thus, it is recommended to increase the temperature of such rooms at the time of the procedure, in order to prevent maternal and neonatal hypothermia⁽¹⁴⁾.

Regarding the characteristics of the newborn bath, it was observed that the water temperature used for the first bath remained within the range recommended by the hospital where the study happened, that is, 38°C. With similar findings, a randomized clinical trial (conducted in Canada) showed that the immersion bath, with a water temperature range of 37.8°C to 38.8°C, can reduce the heat losses of healthy full-term infants. In addition, such care helps newborns to maintain higher body temperatures after the procedure⁽¹⁵⁾.

The first bath should be performed when the newborn reaches thermal and cardiorespiratory stability, and thus it is ideal to wait at least two hours to perform the procedure. One study suggests that bathing immediately after birth may compromise the thermal and cardiorespiratory stability of the newborn during the period of transition to extrauterine life. When measures of thermal control of the environment are adopted, the occurrence of such events is potentially reduced. Regarding the duration of the bath, the procedure is recommended to be as fast as possible, lasting from five to ten minutes. Limiting the bath to five minutes prevents stress from cold and reduces the exposure time of neonates to cleaning agents^(13,15).

In this study, hypothermia was found in 60 cases. However, there was no association between thermoregulation and newborn variables like weight and gestational age. The absence of statistical significance was attributed to the fact that it was a sample of healthy neonates. The median gestational age of both groups was greater than 39 weeks and the median weight was greater than 3.300 g., which shows good adaptation to extrauterine life. Considering the occurrence of hypothermia in the assessments of the present study, an association with statistical significance was found between the occurrence of hypothermia and all moments when the assessments were conducted. Such association could be understood as a result of the lower temperatures of the delivery rooms and the baths that were mostly performed between one and two hours of life⁽⁷⁾.

The first bath represents a challenge for the newborns to maintain adequate body temperature, because in addition to exposure to thermal variations of the environment, the procedure exposes newborns to heat losses by water conduction and evaporation. In this sense, care with the reheating of the newborn after bathing is important. A study conducted at a school hospital in the United States of America has shown that skin-to-skin contact after bathing may be a more effective technique in reheating the newborn than using the radiant heat cradle, as long as the staff provides attention to the correct positioning of the newborn over his mother^(13,16).

Finally, assessments of the statistical correlations between the thermal variables to which the newborn was exposed (delivery room, admission room and water temperature) and the four axillary temperature verification moments showed a statistical significance, with a weak correlation result, between the variable delivery room temperature and the fourth moment of assessment, that is, 60 minutes after the end of the bath. This finding can also be explained by the low temperatures of the neonate in the delivery room, since neonatal hypothermia is an event that may occur late (after bathing or hours after birth) if thermal admission care has not been efficient⁽¹⁶⁾.

Although studies have shown that the maintenance of infant body temperature can occur even when the first bath is carried out within a few hours of life, its postponement offers several benefits such as the early initiation of breastfeeding⁽¹¹⁾. Therefore, delaying any routine procedures during the first hours of life (such as the first bath) avoids the separation of the mother/baby binomial, allows their skin-to-skin contact, favors the newborn adaptation to the extrauterine environment and promotes the initiation of breastfeeding. Such care should be recommended, especially in places with few resources to care for the newborn⁽¹⁷⁾.

CONCLUSION

The present study found 60 cases of neonatal hypothermia among the 149 newborns included in the study. Protective factors of the thermal care provided to the newborn were observed, such as the existence of a nursing care routine for the performance of the procedure, whose guidelines address the initial care of the newborn for their care during admission, including the control of the axillary temperature, of the temperature of the bath water and the temperature of the room where the procedure is performed.

This study brings, as contributions for nursing care practice, evidences regarding the thermoregulation of the newborn at full-term and the practice of the first bath performed with few hours of life. The results suggest that a bath in the first hours of life can interfere with thermoregulation and should be postponed for a few hours. It is also worth mentioning the need for greater regulation and supervision of the temperature of the newborn's admission environment, considering this as one of the pillars of the attendance during the Golden Hour. Thus, this study suggests that the temperature of the newborn and their environment must be considered with greater care during the first bath. This should be recommended as a protective action in order to reduce the instances of neonatal hypothermia in the first hours of life.

Studies comparing the bath in the first hours of life and the bath postponed for a few hours are recommended, to evaluate the thermal stabilization of the newborn and the promotion of contact and permanence with the mother.

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