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Thermoregulation in the newborn: an integrative review in the literature

Termoregulación en el recién nacido: una revisión integrativa en la literatura

Termorregulação no recém-nascido: uma revisão integrativa na literatura

ABSTRACT

Objective: Analyze the current publications on the thermal control of the newborn, with the aim of revealing the current literary scenario, in view of the high neonatal mortality rate. **Method:** This is a descriptive study that used the integrative review carried out by searching databases such as Scientific Electronic Library Online, Latin American and Caribbean Literature in Health Sciences and BDEF. **Results:** Thermoregulation is one of the determining factors for the success of the newborn's cardiocirculatory and respiratory balance soon after birth. **Conclusion:** It was concluded that it was clear that thermal stability is an extremely important part of neonatal care, in which most of the articles understood that the adequate heating of the newborn is more relevant to obtain thermal control, as well as the need for further studies due to the serious consequences that this instability causes for the newborn.

DESCRIPTORS: Thermoregulation; Newborn; Nursing.

RESUMEN

Objetivo: Analizar las publicaciones actuales sobre el control térmico del recién nacido, con la intención de dar a conocer el escenario literario actual, en vista de la alta tasa de mortalidad neonatal. **Método:** Este es un estudio descriptivo que utilizó la revisión integradora realizada con búsquedas en bases de datos tales como Scielo Biblioteca Electrónica Científica en Línea, Literatura Latinoamericana y Caribeña en ciencias de la salud y BDEF. **Resultados:** La termorregulación es uno de los factores determinantes para el éxito del equilibrio sistema cardiocirculatorio y respiratorio del recién nacido poco después del nacimiento. **Conclusión:** La estabilidad térmica es una parte importante de cuidado neonatal, en el que la mayoría de los artículos revelan que el calentamiento adecuado de recién nacido tiene mayor relevancia para obtener el control térmico, así como esta temática, se necesitan más estudios debido a las graves consecuencias que causas de inestabilidad para el recién nacido.

DESCRIPTORES: Termorregulación; Recién nacido; Enfermería.

RESUMO

Objetivo: Analisar as atuais publicações sobre o controle térmico do recém-nascido, com intuito de revelar o cenário atual literário, tendo em vista a alta taxa de mortalidade neonatal. **Método:** Trata-se de um estudo descritivo que utilizou a revisão integrativa realizada através de pesquisa em bancos de dados como Scientific Electronic Library Online, Literatura Latino-Americana e do Caribe em Ciências da Saúde e BDEF. **Resultados:** A termorregulação é um dos fatores determinantes para o êxito do equilíbrio cardiocirculatório e respiratório do recém-nascido logo após o nascimento. **Conclusão:** Conclui-se que a estabilidade térmica é uma parte extremamente importante dos cuidados neonatais, no qual a maioria dos artigos revela que o aquecimento adequado do recém-nascido tenha maior relevância para se obter o controle térmico, bem como esta temática necessita-se de mais estudos devido às graves consequências que esta instabilidade causa para o recém-nascido.

DESCRIPTORES: Termorregulação; Recém-nascido; Enfermagem.

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INTRODUCTION

Thermoregulation is an essential factor for the newborn's survival in extrauterine life, as it controls body temperature. However, in extreme temperature conditions, this condition is impaired by the physical inability to maintain homeostasis.¹

Hypothermia in premature newborns is of great concern. In addition to occurring frequently, it is a risk factor for a worse prognosis, increasing neonatal morbidity and mortality.² In Brazil, in 2016, there were 20.176 deaths in the Early Neonatal period, constituting 53,2% of infant deaths, with an Early Neonatal Mortality Rate (Taxa de Mortalidade Neonatal Precoce - TMNP) of 6,7 deaths per thousand Live Births.³

Circumstances of moderate to severe cooling can result in metabolic acidosis, hypoxemia, hypoglycemia, decreased perfusion, cyanosis, apnea, increased oxygen consumption and pulmonary hemorrhage, which, if left untreated, can lead to premature death.⁴

Temperature values are considered normal when they are between 36,5°C and 37,5°C in term newborns and between 36,3°C and 36,9°C in preterm newborns. The neonate may lose heat due to radiation, conduction, convection or evaporation.⁵

Some factors predispose newborns to heat loss, such as the large surface area in relation to weight, inefficient thermal insulation, due to the thin layer of fat and the mechanism of heat production, that is, thermogenesis without tremor.⁵ In addition to considering another important factor, which is the skin, as some premature infants have an underdeveloped epidermis, being devoid of keratin.⁶ In the international scenario, Brazil assumed the goals of the Millennium Development Goals, among which is the reduction of the mortality of children under 5 years of age, by two thirds, between 1990 and 2015.⁷

It appears that with the advances in technology applied to neonatal care, there has been an increase in the survival of preterm premature infants, associated with the modern technologies of the Neonatal Intensive Care Units (NICU), considered a milestone in the care of at-risk newborns.⁸

Preference was given to this theme, as studies reveal that one of the main complications that affects NBs is ineffective thermoregulation as a result of evaporation and the temperature of the external environment.⁹ Thus, this study aimed to analyze the current publications on the thermal control of the newborn, in order to reveal the current literary scenario, encouraging other

studies, in view of the relevance of the theme considering the high neonatal mortality rate.

METHOD

It is a descriptive study that used the integrative review that refers to Evidence-Based Practice, which allows the researcher to analyze and synthesize scientific knowledge in relation to the object of the study, through the results of previous research.¹⁰

The research was carried out in databases such as Scielo (Scientific Electronic Library Online), and VHL (Virtual Health Library) that includes the LILACS and BDENF databases, from May to June 2020. To achieve the objectives of this research were surveyed, together with the aforementioned databases, published in Portuguese, Spanish between the years 2010 to 2019 that had free access to the full text, using the descriptors: ttermorregulação AND recém-nascido AND enfermagem, making a total of 43 works. After reading, the sample consisted of 5 articles that could be analyzed, as well as those that were in Portuguese and Spanish.

The data were collected after inclusion of descriptors in the search bar of the databases, after which the filters were applied for collection based on the

inclusion and exclusion criteria of the research. Being used for a better understanding of the information, a structured script with the following variables: journals in which they were published, name of the author (s), title of the article, year, objectives and main results. After the selection of scientific articles, the texts were carefully read and the research results were analyzed. During all the analytical stages, records were made for a better organization and understanding of the results, which were categorized based on the integrative review method.

The research included articles published in the period between 2010 and 2020, articles published in Portuguese and Spanish, which were available in full in the databases, and with free access to the public. The study excluded those who, after reading, identified that they had no correlation with the topic addressed or that appeared in duplicate on more than one basis, as well as review articles. Of the 5 articles selected in the database, 01 came from the SCIELO database and 04 from the VHL (LILACS and

BDENF), totaling 5 articles. The articles were reviewed in pairs.

RESULTS

For a better understanding of the results found, they were distributed in chart 01, stratified according to the journal and year, author of the research, the title of the work, objectives and main results.

It was observed that each article presents a different methodology, ranging from a retrospective documentary

Chart 01: Characterization of the articles studied, according to Name of the journal, Authors, Title, Year of study, Objectives and Main results. Campina Grande, 2020.

PERÍODICO/ ANO	AUTORES	TÍTULO DO ARTIGO	OBJETIVO DO ESTUDO	PRINCIPAIS RESULTADOS
Revista Rene 2010	Rolim KMC, Araújo AFPC, Campos NMN et al.	Cuidado quanto à termorregulação do recém-nascido prematuro: o olhar da enfermeira	Conhecer a percepção da enfermeira quanto aos cuidados de enfermagem na termorregulação dos RNPT na UTIN.	Explicitou a necessidade de que as enfermeiras atuantes na UTIN estabeleçam rotinas acerca da termorregulação dos RNPTs.
Revista Rene 2013	Balbino AC, Cardoso MVLML, Lélis ALPA et al.	Termorregulação do recém-nascido: cuidados na admissão em unidades de emergência pediátrica	Investigar os cuidados realizados quanto à termorregulação do recém-nascido durante a admissão em unidade de Alta Complexidade de Emergência Pediátrica.	A hipotermia moderada foi o indicador de risco mais presente e que os cuidados quanto à termorregulação
An Pediatr (Barc) 2013	Braga AFC, Santos ARC, Castro NB et al.	Fatores de riesgo de hipotermia AL ingreso em el recién nacido de muy bajo peso y morbimortalidad asociada.	Analisar a temperatura na admissão na (UTIN) de recém nascidos de muito baixo peso e / ou <30 semanas de idade gestacional e identificar as variáveis perinatais associadas.	As variáveis perinatais associadas ao independente da temperatura foram corioamnionite, PRN, parto vaginal versus cesariana e ressuscitação cardiopulmonar avançada (RCP).

Revista Rene 2014	Braga AFC, Santos ARC, Castro NB et al.	Acurácia dos indicadores clínicos dos diagnósticos de enfermagem na hipo e hipertermia em RN	Determinar a acurácia dos indicadores clínicos dos Diagnósticos de Enfermagem na hipo e hipertermia no RN.	Diagnóstico Hipertermia, taquipneia, vasodilatação e apneia. Hipotermia irritabilidade inquietação, bradicardia, palidez, icterícia, taquicardia, preenchimento capilar lento, vasoconstricção periférica e hipotonia
Revista Gaúcha de Enfermagem 2019	Martins LA, Silveira SPX, Avila IM FT et al.	Implantação do protocolo de termorregulação para RN em procedimentos cirúrgicos.	Descrever a implantação do protocolo de termorregulação para cirurgia em RN.	Redução de eventos adversos por instabilidade térmica procedimentos cirúrgicos.
SOURCE: Own authorship, 2020.				

study to a prospective cohort study, as well as the objectives were also shown to be unusual, in which it does not allow data to be consistent, reveals an approach from several angles, in addition to pointing out the range of possibilities that the theme allows, also highlights the fragility of the information in the literature so that comparative studies can be carried out.¹¹

In one of the articles, the author pointed out the implementation of a protocol on thermoregulation in surgical procedures at his workplace. This attitude allows researchers to search for new methods and strategies of care with the NB, considering the risks of adverse events, mainly of cooling, in which the newborn runs when safe surgery is not performed.

DISCUSSION

In general, the studies revealed important issues to be addressed, among the main findings, it is highlighted that in a cohort study carried out on the admission of the NICU of low birth weight infants, it was possible to verify the high proportion of patients admitted with lower temperature 36°C, and the relationship between this and the newborn's weight (more than with gestational age), with the type of delivery and the need for advanced CPR.

This study was very important be-

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cause many authors associate neonatal morbidity and mortality with thermal instability. In contrast, most research is not aimed at understanding what variables are correlated with the risk factors for hypothermia, as well as what damage to the newborn that hypothermia is actually causing.

With regard to the nurses' perception about the thermal control of the NB in a qualitative approach, it was noted that, according to the nurses, the main difficulties that interfere in care are the lack of maintenance of equipment and the scarcity of these due to overcrowding, procedures that require excessive handling and, lack of systematization and knowledge on the part of professionals.¹

Due to the physiological conditions in which the premature infant presents, it is believed that there must be knowledge aligned with technology in favor of being able to monitor the NB to keep it normothermic, however, by revealing this scarcity of devices and their lack of maintenance, nurses denote a weakness that may be influencing an inefficient care for the thermal control of the newborn.

Moderate hypothermia was presented as the alteration that most appeared in his study on care on admission to a pediatric emergency unit. Listing the importance of evaluating the transport conditions that the NB undergoes

when they need a transfer, as well as the absence of record information in the medical records, especially with regard to the characteristics of extra-hospital transport, in which it underreports the information limiting the documentary research.¹²

The lack of production of articles draws attention, considering the relevance of the theme. Cohort study work with this aim of associating neonatal morbidity and mortality with thermal cooling is important to have meta-analysis studies, in order to evolve in the establishment of efficient care for better quality of life and survival of neonates.

CONCLUSION

It was observed in this study, that thermoregulation is one of the fundamental aspects of neonatal care, that

The lack of production of articles draws attention, considering the relevance of the theme.

studies are still incipient in this theme, given the relevance that thermal control has for newborns and how much it may be influencing newborn survival, leading taking into account the high rate of neonatal morbidity and mortality.

Most of the articles understood that the adequate heating of the NB is more relevant to obtain thermal control, since hypothermia was the indicator of greater risk and the extent to which there are gaps in the studies to be filled regarding the newborn's thermoregulation so that reach a broad approach and, therefore, bring benefits to them thus ending improvements in the field of neonatology. Thus, it is expected that this study will awaken further investigations and further research on the proposed theme, considering the importance it represents for the life of premature infants. ■

REFERENCES

1. Rolim KMC, Araújo AFPC, Campos NMM, Lopes SMB, Gurgel EPP, Campos ACS. Cuidado quanto à termorregulação do recém-nascido prematuro: o olhar da enfermeira. *Rev Rene*. 2010; 11(2):44-52.
2. BRASIL. Ministério da saúde. Secretaria de atenção à Saúde Departamento de Ações Programáticas e Estratégias. Cuidados com o recém-nascido pré-termo. Série A. Normas e Manuais Técnicos. Brasília: Ministério da Saúde, 2011.
3. BRASIL. Ministério da Saúde. Departamento de Informática do Sistema Único de Saúde (DATASUS). Estatísticas Vitais [Internet] 2016.
4. Araújo BF, Nader SS. Cuidado integral ao recém-nascido: Prevenção e condutas terapêuticas. Rio de Janeiro: Rubio; 2015.
5. Mccall EM, Alderdice F, Halliday, HL; Jenkins JG, Vohra S. Interventions to prevent hypothermia at birth in preterm and/or low birthweight infants. *Cochrane Database Syst Rev*. 2010; 23(1):CD004210.
6. Altimier L. Thermoregulation: what's new? What's not? *Newborn Infant Nurs Rev*. 2012; 12(1):5163.
7. Bissinger RL, Annibale DJ. Thermoregulation in very low-birthweight infants during the golden hour: results and implications. *Adv Neonatal Care*. 2010; 10(5):230-8.
8. BRASIL. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Ações Programáticas Estratégicas. Atenção à saúde do recém-nascido: guia para os profissionais de saúde. v.1, 2. Ed. atual. Brasília: Ministério da Saúde, 2014.
9. Ribeiro JF, Silva LLC, Santos IL, Luz VLE, Coêlho DMM. o prematuro em unidade de terapia intensiva neonatal: a assistência do enfermeiro *Rev enferm UFPE on line*. 2016; 10(10):3833-41.
10. Polit DF, Beck CT. Using research in evidence-based nursing practice. In: Polit DF, Beck CT, editors. *Essentials of nursing research: methods, appraisal and utilization*. Philadelphia (USA): Lippincott Williams & Wilkins; 2006.457-94.
11. Rodrigo FGM, Rodríguez SR, Quesada CS. Factores de riesgo de hipotermia al ingreso en el recién nacido de muy bajo peso y morbimortalidad asociada. *An Pediatr (Barc)*. 2014; 80(3):144-150.
12. Balbino AC, Cardoso MVLML, Lélis ALPA, Fontoura FC, Melo GM. Thermoregulation of the newborn: care during the admission in a pediatric emergency UNIT. *Rev Rene*. 2013; 14(2):320-30.
13. Braga LFC, Santos ARC, Castro NB, Nunes MN, Lopes MVO, Silva VM. Acurácia dos indicadores clínicos dos diagnósticos de Enfermagem hipertermia e hipotermia em recém-nascidos. *Rev. Rene*. 2014 set-out; 15(5):789-95.
14. Martins LA, Silveira SPX, Avila IMFT, Moraes JAS, Santos DSS, Whitaker MCO, et al. Implantação do protocolo de termorregulação para recém-nascido em procedimentos cirúrgicos. *Rev Gaúcha Enferm*. 2019;40(esp):e20180218.
15. DSS, Whitaker MCO, et al. Implantação do protocolo de termorregulação para recém-nascido em procedimentos cirúrgicos. *Rev Gaúcha Enferm*. 2019;40(esp):e20180218.