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NON-PHARMACOLOGICAL NURSING MANAGEMENT OF PEDIATRIC PATIENTS WITH FEVER AND HYPERTHERMIA: A SYSTEMATIC REVIEW

Manejo não farmacológico da enfermagem em pacientes pediátricos com febre e hipertermia: uma revisão sistemática
Manejo de enfermería no farmacológico del paciente pediátrico con fiebre e hipertermia: una revisión sistemática

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ABSTRACT

Objective: to describe the nurse's non-pharmacological management of pediatric patients with fever or hyperthermia. **Method:** the review followed PRISMA and included empirical studies that addressed non-pharmacological management in children with fever, studies between 2013 and 2023. The databases were Adolec, BVS, Embase, LILACS, Web of Science and the SciELO library, with the descriptors “child”, “hyperthermia”, “fever”, “nursing” and “pediatric nursing”. **Results:** 7 studies were selected, describing non-pharmacological management as massage therapy, compresses, warm water, and soap with Marshmallow. The use of antipyretics (paracetamol) and other non-pharmacological measures were shown to be effective. There is a lack of protocols to guide professionals in caring for children with fever, in addition to professionals relying on their beliefs in care. **Conclusion:** non-pharmacological use was effective in conjunction with antipyretics. There is a need for further studies and development of protocols to guide professionals in helping.

DESCRIPTORS: Child; Nursing care; Nursing; Fever;

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RESUMO

Objetivo: descrever o manejo não farmacológico do enfermeiro frente ao paciente pediátrico com febre ou hipertermia. **Método:** a revisão seguiu o PRISMA, contou com estudos empíricos, que abordassem o manejo não farmacológico em crianças com febre, estudos entre 2013 e 2023. As bases de dados foram Adolec, BVS, Embase, LILACS, Web of Science e a biblioteca SciELO, com os descritores “criança”, “hipertermia”, “febre”, “enfermagem” e “enfermagem pediátrica”. **Resultados:** selecionado 7 estudos, descrevem que o manejo não farmacológico são massoterapia, compressas, água morna e sabonete com Marshmallow. O uso de antitérmico (paracetamol) e outra medida não farmacológica foi evidenciada como efetiva. Há lacuna de protocolos para guiar os profissionais para o atendimento da criança com febre, além dos profissionais se basearem em suas crenças na assistência. **Conclusão:** o uso não farmacológico foi eficaz em conjunto com antitérmico. Há necessidade de outros estudos e desenvolvimento de protocolos para guiar os profissionais na assistência.

DESCRIPTORIOS: Criança; Cuidados de enfermagem; Enfermagem; Febre;

RESUMEN

Objetivos: describir el manejo no farmacológico de la enfermera del paciente pediátrico con fiebre o hipertermia. **Método:** la revisión siguió PRISMA, incluyó estudios empíricos que abordaron el manejo no farmacológico en niños con fiebre, estudios entre 2013 y 2023. Las bases de datos fueron Adolec, BVS, Embase, LILACS, Web of Science y la biblioteca SciELO, con los descriptores “niño”, “hipertermia”, “fiebre”, “enfermería” y “enfermería pediátrica”. **Resultados:** se seleccionaron 7 estudios que describen manejo no farmacológico como terapia con masajes, compresas, agua tibia y jabón con Marshmallow. Se demostró eficaz el uso de antipiréticos (paracetamol) y otras medidas no farmacológicas. Faltan protocolos que orienten a los profesionales en el cuidado de niños con fiebre, además de que los profesionales se basen en sus creencias sobre el cuidado. **Conclusión:** el uso no farmacológico fue efectivo en conjunto con antipiréticos. Es necesario realizar más estudios y desarrollar protocolos que orienten a los profesionales en la prestación de asistencia.

DESCRIPTORIOS: Niño; Atención de enfermería; Enfermería; Fiebre.

INTRODUCTION

Fever is a natural defense mechanism of the body that results in an increase in body temperature above normal. This rise in temperature is triggered by the hypothalamus in response to regulatory substances such as cytokines, which are released during inflammatory and immunological reactions, often in response to infections. Although the axillary temperature range considered to be fever can vary in the literature, it is generally between 37°C and 38°C. However, in clinical practice, many health professionals consider a fever when the child's temperature reaches 37.8°C or higher.¹⁻³

Fever can be classified into two main categories: i) bacterial fever, which is often associated with more serious clinical conditions that can lead to a deterioration in the person's condition; and viral fever, which generally resolves more quickly and poses less risk to the individual's health. Curiously, although it is an adaptive response, parents often interpret fever as a sign of risk and severity of illness, resulting in worry, fear and anxiety that lead them to seek assistance from the multidisciplinary team in urgent and emergency services.¹⁻³

Hyperthermia is also characterized by an increase in body temperature due to an imbalance between heat production and dissipation. This condition differs from the febrile state, since the hypothalamic thermal threshold remains intact, and the increase in body temperature results from excessive heat production, failure in its dissipation, or malfunctioning of the thermal regulation center.⁴

However, feverphobia, which represents the irrational and unfounded fear of parents, caregivers and health professionals in relation to fever, often leads them to seek urgent and emergency services, resulting in approximately 30-40% of the demands on these places.^{2,5} This search for medical assistance is often based on mistaken beliefs about fever, generating exaggerated fear and leading to hasty actions, including the inappropriate prescription of medication, tests and unnecessary care. The inadequate understanding of fever as a threat can result in negative consequences, such as the overloading of health services, dissatisfaction among patients and health professionals, as well as a lack of continuity of care. Consequently, this situation is exacerbated by the inappropriate use of emergency services, which should be reserved for serious conditions.^{1,5,6}

With regard to nursing care for paediatric patients with fever, it is essential to adopt a scientifically-based approach in order to manage the patient correctly and avoid further problems and complications.⁷ Educating and reassuring parents is another approach to be adopted, since for parents every manifestation of fever is an indication of something harmful and worrying, and not just a reaction of the human organism.⁸ In addition to helping parents decide whether or not to go to the urgent and emergency care service, it also avoids exposing children to pathological agents in the hospital environment and relieves the need for this service, given that fever is currently the main reason why parents are taking their children to this sector.⁹

The scientific literature lacks information on protocols that aim to support nurses in their conduct and make all health

professionals share the same practice, thus generating greater credibility in the service provided and reducing the anxiety and fears that parents have in the face of fever. In view of this gap, the question arises: what does the scientific literature say about nurses' non-pharmacological management of pediatric patients with fever or hyperthermia? To answer this question, this study aims to gather and summarize empirical evidence from the literature on nurses' non-pharmacological management of paediatric patients with fever or hyperthermia.

METHOD

This systematic review of the literature was conducted in accordance with the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses PRISMA.¹⁰ The authors Carvalho, Pianowski and Santos¹¹ describe the process of preparing a systematic review as a process that requires some necessary steps in the development of the manuscript. This procedure presents: i) the search strategy used; ii) the descriptors and Boolean operators used; iii) the databases; iv) the period in which the studies were searched; v) the process of selecting the studies found; vi) the criteria used in the process of selecting the studies included in the review; vii) the exclusion criteria; viii) the process of selecting and biasing the studies; and, ix) the extraction of the data that will make up the systematic review.

The material selected for this study consists of empirical articles with a qualitative, quantitative and/or mixed approach on nurses' non-pharmacological management of pediatric patients with fever or hyperthermia. The eligibility criteria were articles published between 2013 and 2023, in peer-reviewed and indexed journals, available in full, in Portuguese, English and Spanish, studies carried out nationally and internationally, and classified as open access in the respective databases. The exclusion criteria

were duplicate articles in the databases, theses, dissertations, monographs, commentaries, editorials, literature reviews, gray literature and articles that did not refer to the subject matter. The search for articles took place in September 2023 and covered the period from January 2013 to September 2023. The databases used for this review were Adolec, BVS, Embase, LILACS and Web of Science and the SciELO library (Scientific Electronic Library Online). These databases and libraries were chosen based on the relevance of their publications in the area studied.

The process of selecting the studies took place simultaneously and independently in the following stages: stage 1 - identifying the studies in the databases using the descriptors in DeCs/MeSH; stage 2 - searching for the articles: the titles of the publications and abstracts were first analyzed to determine whether the study addressed the topic of interest; stage 3 - eligibility: the studies were assessed by reading them in full to determine their suitability for the topic and whether they met the eligibility criteria, culminating in the inclusion of the studies.

The descriptors used were consulted in DeCS and through the PICO strategy (Population - children; Interest - fever/hyperthermia; Context/Outcomes - management of fever by health professionals). The descriptors "child", "hyperthermia", "fever", "nursing" and "pediatric nursing" were used, along with the respective terms in English; the Boolean operator used was AND. Table 1 shows the search strategy used in the databases and the respective results. Figure 1 shows the flowchart for selecting the studies that make up this review.

To assess the quality of the studies used in this review, the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) tool was used, which uses recommendations to improve the quality of the description of observational studies. The STROBE instrument consists of a 22-item checklist relating to the respective subdivisions of the article: title, abstract, introduction, method, results and discussion.¹²

Table 1 - Search strategy for articles in the databases and the results obtained.

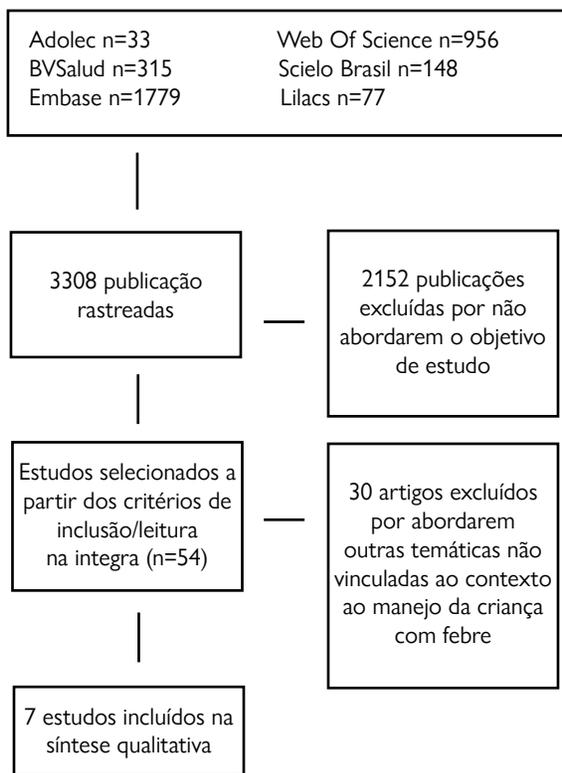
Database/Library	Search used	Search results	Result when applying the filters	Selected for full reading	Selected for this review
Adolec	(hyperthermia) AND (nursing)	1	0	0	0
Adolec	(Fiebre) AND (enfermería pediátrica)	0	0	0	0
Adolec	(Fever) AND (nursing pediatric)	0	0	0	0

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Adolec	(hyperthermia) AND (nursing pediatric)	0	0	0	0
Adolec	(Fiebre) AND (niños) AND (enfermería)	5	0	0	0
Adolec	(Fever) AND (Children) AND (nursing)	2	0	0	0
Adolec	(hyperthermia) AND (children)	25	1	1	0
BVS	(criança) AND (febre) AND (enfermagem)	315	137	11	0
EMBASE	Child AND fever AND nursing	1779	581	7	5
LILACS	Febre and Criança and Enfermagem	77	46	6	0
SciELO	(criança) AND (enfermagem) AND (febre)	3	2	2	1
SciELO	(febre) AND (crianças)	144	39	3	0
SciELO	(Febre) AND (hipertermia) AND (enfermagem pediátrica)	1	1	1	0
Web of Science	Child AND fever AND nursing	925	335	4	1
Web of Science	Child AND hyperthermia AND nursing	31	14	2	0

Source: Developed by the researchers.

Figure 1 - Flowchart of the article search strategy used in this integrative review



Source: Developed by the researchers.

RESULTS

The search of the databases resulted in a total of 3,308 articles, including 33 articles from Adolec, 315 articles from the BVS, 1,779 articles from Embase, 77 articles from Lilacs, 956 articles from the Web of Science and 148 articles from the SciELO library. After applying the filters, reading the title and abstract of the articles to select the articles that would be read in full, 37 articles were selected for reading in full, of which seven articles were selected to make up the qualitative analysis of this study.

Table 2 shows the articles that make up this study according to author, year, country, study objective, methodological approach used, study sample and its characteristics and the main results of the selected studies. Table 3 shows the results of the STROBE instrument, demonstrating that most of the studies met the items in the instrument, guaranteeing the reliability and scientific criteria of the studies.

Most of the studies are international, one from Ireland, one from Indonesia, one from Iraq, one from the UK, one from Iran, one from Italy, with only one national study; most were published in the year 2022. The methodological approach of the studies was 3 randomized clinical trials, 3 quantitative

studies and 1 mixed study. There is a lack of studies in the Brazilian context on this approach to health care.

The studies reviewed address the management of fever in various contexts of child health care. Nurses often lack knowledge and appropriate attitudes about fever management in children in the emergency unit, which leads to inconsistent practices. On the other hand, the use of massage therapy can effectively reduce the body temperature of children with fever. The ongoing education of health professionals in this approach was emphasized in the studies, for example, a comprehensive educational program to improve nurses' knowledge in caring for children with febrile convulsions. In addition, teaching during undergraduate studies was highlighted, since students had misconceptions and inappropriate attitudes towards fever, highlighting the need for adequate education on the management of fever in pediatrics.

DISCUSSION

The aim of this study was to check the literature on how nurses manage children with fever or hyperthermia. The articles show that there are no standard protocols in the countries or health institutions, with different approaches and behaviors depending on the prior knowledge or beliefs of the professionals. Due to the lack of knowledge among professionals and protocols to guide them, many show insecurity in caring for children with fever or hyperthermia, as well as in the instructions to be given to parents.

Although there is the NICE protocol,¹⁴ which helps to guide health professionals in their care, there is a gap in the availability of a greater number of protocols and standardization of how to provide care for hyperthermia. The use of antipyretics, such as paracetamol, ends up being the unanimous first line of care,^{14,15} but the use of practices that are unaware of the scientific evidence remains an obstacle that needs to be reviewed and can hinder care for febrile children.^{14-16,19}

With regard to alternative practices for minimizing fever, alternatives such as the use of compresses and massage therapy on the body temperature of children with fever have been scientifically presented, suggesting an effective alternative therapeutic approach;¹⁷ the use of warm water and soap with Marshmallow plant extract¹⁵ were efficient practices in the management of fever, but in the Brazilian context, the use of compresses was not effective.¹⁹ On the other hand, actions such as sponge baths and the use and abuse of antipyretics are questioned based on scientific evidence, showing the deleterious effects they have on children's health.⁵

The national study¹⁹ highlighted the ineffectiveness of applying warm compresses as a complement to antipyretics, suggesting that, in some cases, isolated pharmacological measures are more effective than other methods. Therefore, the practice of non-pharmacological measures alone should not be recommended for the management of febrile children.⁸ It should be noted that the combined use of pharmacological

Table 2 - Description of the studies containing authors, year and country, objective, type of study, population, sample characteristics and main results.

Author, Year, Country	Objective	Type of study	Population	Sample characteristics	Main results
Aneed et al. ¹³ , 2020, Iraque	To assess nurses' knowledge of the nursing care procedure for children with febrile convulsions	Cross-sectional quantitative research.	100 Nurses	Nurses aged between 19 and 45. Of these, 83 were women and 17 were men, 60% had less than three years' experience in pediatrics, 25% between 3-5 years and 14% over five years	The study suggested the implementation of a comprehensive educational program, involving courses and the distribution of pamphlets, focusing on the procedures and care related to patients suffering from febrile convulsions
Brick et al. ¹⁴ , 2017, Reino Unido	A survey of medical and nursing staff in 35 pediatric intensive care units and transport staff in the UK and Ireland established attitudes to the management of children with fever.	Quantitative cross-sectional research.	219 nurses and 171 doctors	Not informed.	The survey consisted of eight questions established the respondent's place of work, profession, treatment limits for fever, use of paracetamol, attitudes to NICE (National Institute for Health and Care Excellence) guidelines and attitudes to a clinical trial of temperature control. Pediatric ICU teams in the UK and Ireland tend to treat temperatures in the febrile range. The percentage of nurses using an alternative to paracetamol for fever control was 78% and the percentage of medical staff was 51%.

Goodarzi et al. ¹⁵ , 2022, Irā	To determine the effect of Marshmallow liquid soap on childhood fever.	Randomized clinical trial	92 children	Children of both sexes, from 6 months to 10 years old	All the children were given paracetamol. One group received a body wash with warm water and the other with Marshmallow plant extract. The children's temperature from the start of the study was checked and recorded every 15 minutes for the first hour and at the 4th and 6th hours. The liquid soap with Marshmallow extract reduced the children's fever in a shorter period of time and without side effects. The study suggests using the soap as a complementary method to reduce fever.
Greensmith ¹⁶ , 2013, Irlanda	This study aims to describe nurses' knowledge and attitudes towards fever management in a children's hospital in Ireland	Quantitative descriptive research design	116 nurses	Age range: < 25 years: 7. Between 25 and 35: 65. Between 35 and 45: 29. Between 45 and 55: 1	Nurses' low levels of knowledge and inadequate attitudes towards fever and fever control result in inconsistent practices that are not always based on scientific evidence. Inferential statistics showed that professionals' attitudes were related to the context of febrile convulsions, fever and antipyretics.
Herliana ¹⁷ , 2020, Indonesia	To identify whether massage therapy has an effect on the body temperature of children with fever	Randomized clinical trial	41 children	Not informed	The study used a pre- and post-test with a control design, comparing the difference between before and after receiving compresses and antipyretics in the control group and the difference between before and after receiving antipyretics and massage therapy in the experimental group. The result was a significant difference in mean body temperature before and after the application of compresses and massage therapy. As a health service, hospitals should implement a policy in which massage therapy could be an alternative treatment for fever management. It should also be noted that further research should be carried out into massage therapy in order to enrich knowledge about fever management

Milani et al. ¹⁸ , 2022, Itália	To investigate the attitude towards pediatric fever among undergraduate nursing students	Mixed study	1121 final year undergraduate nursing students	A total of 100 female and 21 male students	This study shows that misconceptions and inappropriate attitudes towards fever in children are common among final year nursing students. More than 80% of nurses and medical students would not administer an additional dose of antipyretic medication or associate another for a high body temperature. In addition, approximately 20% of nurses and medical students believe that fever can cause brain damage. Finally, the association of misconceptions and personal experiences related to childhood fever in both groups of students supports the notion that learned characteristics have an insignificant impact on the approach to fever..
Souza et al. ¹⁹ , 2022, Brasil	To evaluate the effect of applying a warm compress associated with the prescribed antipyretic, compared to the effect of the prescribed antipyretic alone, in reducing fever in hospitalized children	Randomized clinical trial	33 children	Children aged 1 month to 11 years, 11 months and 29 days. 16 girls and 17 boys	The application of warm compresses in association with antipyretics was not effective in reducing fever in hospitalized children when compared to the use of pharmacological measures alone

Table 3 - Classification of the 23 subtopics categorized according to the STROBE initiative in the 7 articles that make up this review.

Subtopics Strobe/ Classification	Suitable	Inadequate
1a - Title and/or abstract study design	5 (60%)	3 (40%)
1b - Informative and balanced summary	8 (100%)	
2 - Context / Justification (Introduction)	8 (100%)	
3 - Objectives (Introduction)	8 (100%)	
4 - Study design (Method)	8 (100%)	
5 - Context (Method)	8 (100%)	
6 - Participants (Method)	8 (100%)	
7 - Variables (Method)	6 (80%)	2 (20%)
8 - Data sources/ measurement (Method)	6 (80%)	2 (20%)
9 - Bias (Method)	7 (90%)	1 (10%)
10 - Study size (Method)	7 (90%)	1 (10%)
11 - Quantitative variables (Method)	7 (90%)	1 (10%)
12 - Statistical methods (Method)	6 (80%)	2 (20%)
13 - Participants (Results)	7 (90%)	1 (10%)
14 - Descriptive data (Results)	4 (50%)	4 (50%)
15 - Outcome (Results)	7 (90%)	1 (10%)
16 - Main results (Results)	5 (70%)	3 (30%)
17 - Other analyses (Results)	5 (70%)	3 (30%)
18 - Main results (Discussion)	8 (100%)	
19 - Limitations (Discussion)	4 (50%)	4 (50%)
20 - Interpretation (Discussion)	8 (100%)	
21 - Generalization (Discussion)	8 (100%)	
22 - Financing (Other information)	6 (80%)	2 (20%)

Source: Developed by the researchers

and non-pharmacological actions can help to minimize the febrile condition and negative consequences for the child.

Professionals should provide care to the child and their family with an individualized approach, provide comfort, a cool, calm environment and encourage fluid intake to avoid dehydration and future complications due to the febrile condition.⁵ Most of the time, nurses are faced with parents of febrile children who have irrational concerns, so it is important that the professional provides information based on scientific evidence in a consistent manner and proceeds with validated protocols to minimize consequences.

One way of contributing to parents' concerns is to prepare information materials, based on up-to-date evidence. This is essential to ensure that parents receive accurate and consistent information about the fever and its treatment while they are in hospital and after they are discharged, as well as how to proceed with the health care flowchart in the city of residence to minimize concerns and the period of care for the child.^{6,7}

There is a knowledge gap among nursing students regarding the management of fever in children, a fact that has repercussions on professional practice, since the gap remains after graduation. It is recommended that there be continuing education actions to minimize these gaps in professional practice, in addition to implementing the teaching plans of undergraduate courses to prepare students with a scientific basis in the management of children with fever.^{13,18}

There is a need to improve education and practices related to the care of febrile children, since the literature presents divergent approaches, such as alternative therapies to evaluating the effectiveness of specific pharmacological treatment methods; the fact that there are no scientifically validated protocols to guide professionals provides unqualified care.

Most of the time, nurses are faced with parents of febrile children who have irrational concerns, so it is important that the professional consistently provides information based on scientific evidence and proceeds with validated protocols to minimize consequences. One way of contributing to parents' concerns is to prepare information materials, based on up-to-date evidence. This is essential to ensure that parents receive accurate and consistent information about the fever and its treatment while they are in hospital and after discharge, as well as how to proceed with the health care flowchart in the city of residence to minimize concerns and the period of care for the child.

Some limitations should be mentioned in this study, such as the language of publication of the studies, the period of publication of the studies, the restriction of the number of databases used for the study and the restricted theme used for this study may have contributed to the restriction of the number of articles selected for this study.

FINAL CONSIDERATIONS

Nursing professionals' lack of knowledge and inadequate attitudes towards fever in children and its management results in inconsistent practices that are not always based on

current scientific evidence. Educating nursing students and newly qualified nurses about the correct management of fever is essential to avoid the perpetuation of incorrect practices and inadequate attitudes. In addition, it is essential to have up-to-date protocols and regular continuing education for professionals in order to provide qualified care for children and their families.

Various perspectives on the knowledge of professionals, types of practice and protocols used in relation to the management of fever in children end up restricting the quality of care. In order to prevent these aspects from occurring, it is suggested that new studies and the development of scientifically validated protocols for non-pharmacological care in febrile children should be carried out.

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