








Massage for neonatal pain relief in intensive care units: a scoping review

Massagem no alívio da dor neonatal em unidades de terapia intensiva: scoping review

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ABSTRACT

Objective: to map the use of massage to relieve neonatal pain during procedures performed in Intensive Care Units. **Methods:** a scoping review conducted in 11 data sources, following the Joanna Briggs Institute recommendations. The question was: what is the knowledge about the use of massage to relieve pain in newborns during painful procedures in a neonatal intensive care unit? 12 studies were selected for the results. **Results:** therapeutic massage in newborns is positive in reducing the score on pain scales, decreasing heart and respiratory rates, increasing oxygen saturation, improvements in behavioral status, weight gain, neurological development, shorter crying time and performing the painful procedure. **Conclusion:** massage/reflexotherapy is effective in reducing neonatal pain in intensive care units, being performed on lower limbs, heel, back or at the procedure site, with light to moderate pressure and an average duration of five minutes.

Descriptors: Intensive Care Units, Neonatal; Pain; Reflexotherapy; Infant, Newborn; Massage.

RESUMO

Objetivo: mapear o uso da massagem no alívio da dor neonatal durante os procedimentos realizados em Unidades de Terapia Intensiva. **Métodos:** revisão de escopo realizada em 11 fontes de dados, seguindo recomendações do Instituto Joanna Briggs. Questionou-se: qual é o conhecimento sobre o uso da massagem no alívio da dor de recém-nascidos durante procedimentos dolorosos em unidade de terapia intensiva neonatal? Selecionaram-se 12 estudos para os resultados. **Resultados:** a massagem terapêutica em neonatos mostra-se positiva na redução da pontuação em escalas de dor, diminuição das frequências cardíaca e respiratória, aumento na saturação de oxigênio, melhorias no estado comportamental, ganho de peso, desenvolvimento neurológico, menor tempo de choro e realização do procedimento doloroso. **Conclusão:** a massagem/reflexoterapia mostra-se efetiva na redução da dor neonatal em unidades de terapia intensiva, sendo realizada em membros inferiores, calcanhar, dorso ou no local do procedimento, com pressão leve a moderada e duração média de cinco minutos.

Descritores: Unidades de Terapia Intensiva Neonatal; Dor; Reflexoterapia; Recém-Nascido; Massagem.

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Introduction

Neonatal intensive care units are specialized care environments that, due to rapid technological growth, can increase the life expectancy of high-risk newborns. It is estimated that newborns undergo about 11 to 12 invasive procedures per day, resulting in hyperalgesia and negative effects such as stress, changes in vital signs and instability⁽¹⁻²⁾. Among these painful procedures, the insertion of an epicutaneous catheter, airway clearance and arterial puncture are mentioned. Too much exposure to unpleasant sensations can trigger changes in vital signs and hemodynamic disorders⁽¹⁾.

Although newborns are unable to express their pain verbally, the literature indicates that they are able to feel it during this phase of life. Therefore, it is essential that professionals present a holistic approach and know how to identify, manage and assess this pain, considering that often the analgesia techniques existing in neonatal intensive care units are inappropriate or limited^(1,3). Therefore, in order to obtain a sensitive care and a warm responsiveness between the staff and newborns during their management, scales were created to standardize pain measurement, which assess physiological, emotional and behavioral aspects⁽⁴⁻⁵⁾.

In order to treat and prevent neonatal pain, there are non-pharmacological measures. Traditional Chinese Medicine is an example of these measures and addresses practices that involve the individual's body, mind and spirit, including Integrative and Complementary Health Practices. Integrative Practices use natural resources to promote disease prevention and restore health, avoiding the use of pharmacological resources through acupuncture, herbal medicines, music therapy, reflexology, massage, among others⁽⁶⁾.

Therefore, it is highlighted that massage/reflexotherapy can be used as a non-pharmacological method for pain relief in newborns undergoing painful techniques in Neonatal Intensive Care Units. Reflexotherapy is a therapeutic massage using digital pulps

and is based on the principle that the human body has reflex points located on the feet, hands and ears, which when stimulated through massage present somatic replications of all organs, glands and muscles in specific areas or reflex zones. When applied to the foot region, it acts on the regions of the reflex arches that are present in specific areas of the feet that are related to internal organs of the body. It is used to relieve the symptoms of various human diseases, reduce pain and stress and helps to form bonds between professionals and newborns⁽⁷⁾.

Pain management is necessary and essential in neonatal care, as it acts directly in the modulation stage of the painful experience. The multidisciplinary staff must perform this care, especially the nursing staff, since these professionals are closer to patients when performing their care activities. Nurses should implement actions that aim to reduce newborns' suffering, through pain recognition, when using their knowledge and assessing it, as well as using non-pharmacological measures⁽⁴⁾. When not treated during hospitalization, repeated painful neonatal experiences can have consequences for neurodevelopment and behavior, with harmful consequences in the short and long term⁽⁸⁾.

This scoping review is justified by its contribution to health care, by describing, through updated scientific evidence, the application of massage, the assessment scales and the outcomes presented by patients when submitted to this intervention. It becomes positive for newborns to have their care more humanized, based on evidence, enabling the use of an alternative or complementary method to the pharmacological one, of low cost, for the relief of pain, stress and in the promotion of improvements in their physiological parameters. It provides data for the scientific community, and is useful for knowledge related to identifying the best application technique, time and moment of therapeutic massage.

This research aims to map the use of massage to relieve neonatal pain during procedures performed in Intensive Care Units.

Methods

This is a scoping review that aims to investigate the main concepts in the literature about an area of knowledge, in order to organize and categorize the data obtained, identify gaps and possible speculative failures. As research instruments, data sources on the theme addressed were used, carried out in line with the research question, from reading and selecting articles⁽⁹⁾.

As a first step in preparing this review, a scientific literature screening was previously carried out in order to identify similar reviews, avoid duplicate studies and reduce bias. For this purpose, the collections of the following international scientific study registration platforms were consulted: International Prospective Register of Systematic Reviews (PROSPERO), Open Science Framework (OSF), The Cochrane Library, JBI Clinical Online Network of Evidence for Care and Therapeutics (CONNECT+) and Database of Abstracts of Reviews of Effects (DARE). The results showed the absence of publications with a similar scope to the objective in this research. The review was developed according to the Joanna Briggs Institute recommendations⁽⁹⁾, the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) protocol⁽¹⁰⁾ was used

and was registered on the OSF platform.

As a research strategy, the methodological instrument provided by the Joanna Briggs Institute⁽⁹⁾ Population, Concept and Context was used. Population: newborns; Concept: massage used as a strategy for neonatal pain relief; Context: Neonatal Intensive Care Unit. Thus, the following research question was elaborated: what is the knowledge about massage to relieve pain in newborns during painful procedures in Neonatal Intensive Care Units?

After carrying out the previous steps, the process of paired search for the selection of studies began, performed in August 2020, in the following data sources: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medical Literature Analysis and Retrieval System Online (MEDLINE), Latin American & Caribbean Literature in Health Sciences (LILACS), Web of Science, Cochrane Library, Scopus, Wiley Online Library, Scientific Electronic Library Online (SciELO), Gale Academic OneFile, Embase, and Google Scholar. The controlled descriptors of Medical Subject Headings (MeSH) used were “Reflexotherapy”, “Massage”, “Infant, Newborn”, “Pain”, “Intensive Care Units, Neonatal”, using the Boolean operators AND and OR. Figure 1 shows the search syntax adopted according to the data sources used.

Data sources	Search syntax
LILACS	(tw:("Intensive Care Units, Neonatal" OR "Infant, Newborn")) AND (tw:(reflexotherapy OR massage)) AND (tw:(pain))
SCOPUS	(TITLE-ABS-KEY ("Intensive Care Units, Neonatal" OR "Infant, Newborn") AND TITLE-ABS-KEY (reflexotherapy OR massage) AND TITLE-ABS-KEY (pain))
MEDLINE	("Intensive Care Units, Neonatal" OR "Infant, Newborn") AND (Reflexotherapy OR Massage) AND (Pain)
CINAHL	(SU ("Intensive Care Units, Neonatal" OR "Infant, Newborn")) AND (SU (Reflexotherapy OR Massage)) AND (SU (Pain))
Web of Science	TS=("Intensive Care Units, Neonatal" OR "Infant, Newborn") AND TS=(Reflexotherapy OR Massage) AND TS=(Pain)
SCIELO	("Intensive Care Units, Neonatal" OR "Infant, Newborn") AND (Reflexotherapy OR Massage) AND (Pain)
Cochrane Library	"Intensive Care Units, Neonatal" OR "Infant, Newborn" in Title Abstract Keyword AND Reflexotherapy OR Massage in Title Abstract Keyword AND Pain in Title Abstract Keyword - (Word variations have been searched)
Wiley	"Intensive Care Units, Neonatal" OR "Infant, Newborn" anywhere and "Reflexotherapy OR Massage" anywhere and "Pain" anywhere
Gale Academic OneFile	("Intensive Care Units, Neonatal" OR "Infant, Newborn") AND (Reflexotherapy OR Massage) AND (Pain)
EMBASE	('intensive care units, neonatal'/exp OR 'intensive care units, neonatal' OR 'infant, newborn'/exp OR 'infant, newborn') AND ('reflexotherapy'/exp OR reflexotherapy OR 'massage'/exp OR massage) AND ('pain'/exp OR pain)
Google Scholar	"Intensive Care Units, Neonatal" AND "Infant, Newborn" AND "Reflexotherapy OR Massage" AND "Pain"

Figure 1 – Article search syntax. Natal, RN, Brazil, 2020

The search for the articles was carried out through the Journals Portal of the Coordination for the Improvement of Higher Education Personnel (CAPES - *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior*) through remote access to the Federated Academic Community (CAFe - *Comunidade Acadêmica Federada*) content, a resource signed by *Universidade Federal do Rio Grande do Norte*. Scientific articles available through open access in full, in any language, in the time frame from 2011 to 2020, regardless of the method used were included. This time period was selected considering that the scientific evidence on reflexotherapy/massage in newborns over the past ten years guarantees quality, timeliness and use of data, as well as a high level of evidence and degree of recommendation. Articles that did not answer the research question and duplicate studies in data sources were excluded.

Data collection was carried out simultaneously and independently, by two of the authors, where all data sources were reviewed on the same day and time, using different electronic devices, based on the information available in titles and abstracts. The final sample selection was carried out by the same pair of independent reviewers, and the entire text was read. In case of disagreement about the insertion of an article in the final list, a third author was consulted to analyze the complete version of all works, in order to maintain the integrity of this review.

The initial search carried out in the eleven data sources resulted in a total of 1,049 studies and four additional records were identified using a reverse search. After excluding duplicate citations, the titles of 567 papers were read to see if they met the inclusion criteria. Of these, 29 were fully assessed for eligibility. Thus, the final selection was composed of 12 articles, as shown in Figure 2.

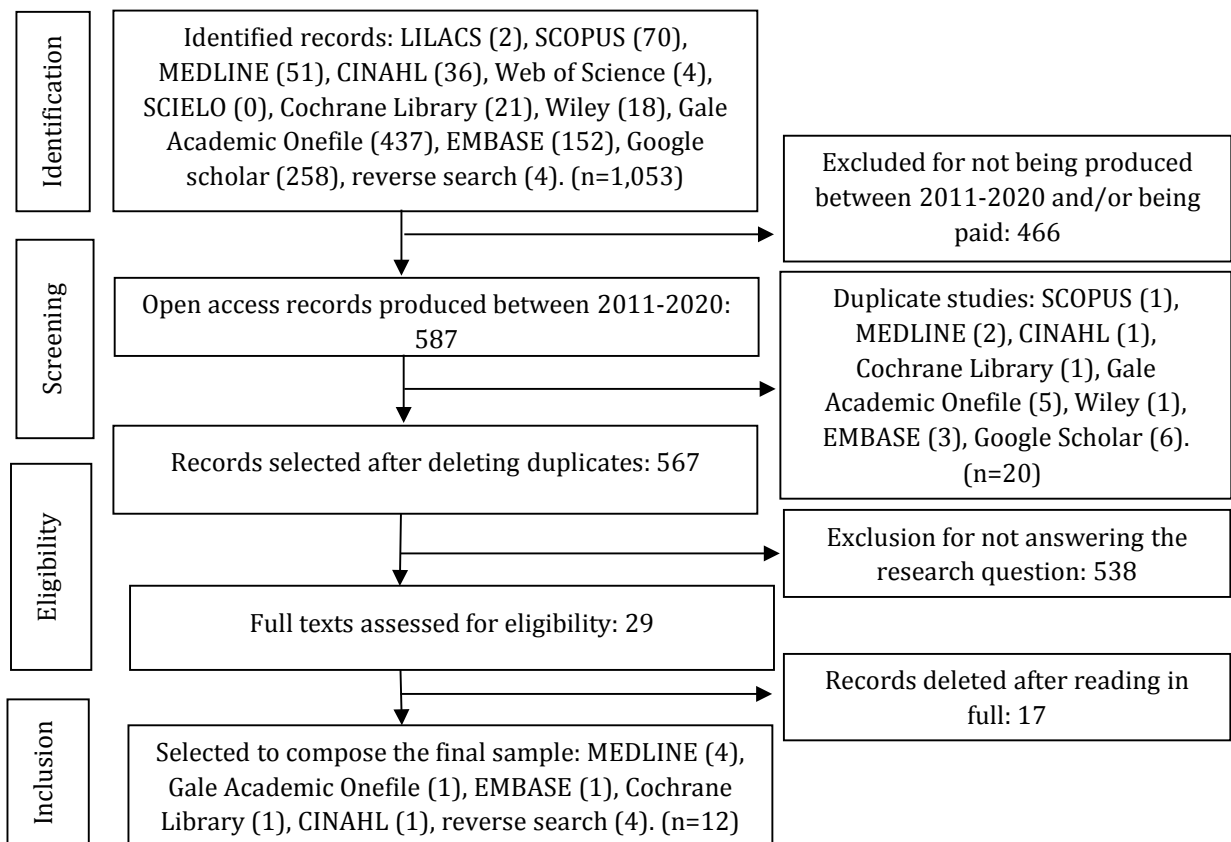


Figure 2 – PRISMA flow diagram (adapted) of the search used to select the studies found. Natal, RN, Brazil

Results

In the 12 studies included in this review, there was a prevalence of publications made in the United States of America (25.0%), followed by publications from Lebanon, Turkey, Iran (16.6% each). They were

published from 2012 to 2019. Figure 3 characterizes the sample included in this review regarding the country, year of publication, reference, population, procedure, intervention/assessment instrument and the main outcomes.

Year/Country/Reference	Population/Procedure	Intervention/Assessment instrument	Outcomes
2012 United States ⁽¹¹⁾	10 premature newborns admitted to Neonatal Intensive Care Units/ unspecified	Technique in M, for five minutes, in a rhythmic, slow and constant way on newborns' back in a ventral position, level three pressure/ABSS behavioral state	Decreased heart and respiratory rate and crying and stress times; improvement in SaO ₂
2013 Lebanon ⁽¹²⁾	66 newborns divided into an experimental group and painful heel control/procedure	Moderate pressure massage performed with the digital pulp of the fingers of both hands/scale for the assessment of PIPP pain and Bayley Score	Pain reduction, weight gain and neurological development
2013 Iran ⁽¹³⁾	90 newborns divided into three groups: massage, NNS and heel control/puncture	Leg massage and NNS provided two minutes before the procedure and until its completion/scale for the assessment of PIPP pain	SaO ₂ improvement; pain reduction
2015 Lebanon ⁽¹⁴⁾	34 studies analyzed/painful heel procedure	Unspecified therapeutic massage/PIPP pain assessment scale	Decreased heart rate and pain; weight gain
2015 United States ⁽¹⁵⁾	186 unspecified newborns/painful procedures	Therapeutic massage by gentle touch and joint movement/scale for PIPP pain assessment	Decreased heart rate and pain; improvement in SaO ₂
2015 Turkey ⁽¹⁶⁾	32 premature infants divided into acupressure and heel control/puncture groups	Before puncture, acupressure was applied for three minutes at points UB60 and K3/scale for pain assessment PIPP	Shorter duration of the procedure and crying
2016 Egypt ⁽¹⁷⁾	60 premature infants divided into a group without massage before puncture and a massage/heel puncture group	Five minutes before the heel puncture, the side of the chosen leg was massaged (toes to the middle of the thigh)/scale for the assessment of PIPP pain	Neonatal weight gain; reduced PIPP score, heart rate and pain
2017 United States ⁽¹⁸⁾	Unspecified/painful heel procedures	Light to moderate pressure massage/unspecified	Decreased heart rate and pain
2017 China ⁽¹⁹⁾	80 infants divided into a control group and a test/venipuncture	Upper limb massage/PIPP pain assessment scale	Pain reduction
2017 Iran ⁽²⁰⁾	75 newborns (breastfeeding, massage and control groups)/venipuncture	Therapeutic massage at the puncture site for three minutes/scale for NIPS pain assessment	Pain reduction
2018 Canada ⁽²¹⁾	26 studies analyzed/venipuncture	Upper and lower limb massage/scales for pain assessment PIPP and NIPS	Decreased heart rate and pain
2019 Turkey ⁽²²⁾	139 newborns divided into three groups (acupressure, massage and control)/heel puncture	Acupressure and massage performed two minutes before the procedure/scale for assessing NIPS pain	Score reduction on NIPS, crying time, duration of the procedure and heart rate; improvement in SaO ₂

ABSS: Anderson Behavioral State Scale; PIPP: Premature Infant Pain Profile; NIPS: Neonatal Infant Pain Scale; SaO₂: Saturation of oxygen; NNS: Non-nutritive sucking

Figure 3 – Description of studies included in the review, according to data from year of publication, country, reference, population, procedure, intervention/assessment instrument and outcomes. Natal, RN, Brazil

A portion of the sample did not make clear specific information such as: age of newborns, type of invasive procedure that the participant underwent after the massage, or the precise points of stimulation. Moreover, several publications did not use the term reflexotherapy, but massage, as a non-pharmacological technique for pain relief, referring to this technique as therapeutic massage.

With regard to the population, it was possible to identify, in part of the studies, that the participants were between 26 and 38 weeks of gestational age. Concerning intervention, the studies carried out predominantly light and moderate pressure massage. The most prevalent outcomes were reduced heart and respiratory rate as well as decreased crying time.

The massage techniques used in the studies analyzed demonstrated to have important and positive results in pain relief in newborns, based on pain score reduction on the Premature Infant Pain Profile scale, present in 25.0% of the sample^(12,14,19), as well as the Neonatal Infant Pain Scale, used in 33.3%^(13,15,17,22). Regarding the period in which the intervention was performed, 58.3% applied the massage before the painful procedure^(11,13,16-17,19-22), 8.3% during the procedure⁽¹¹⁾ and 25.0 % used the intervention after performing the painful procedure^(11,13,19).

Discussion

Massage/reflexotherapy for neonatal pain relief in Neonatal Intensive Care Units is characterized as a theme that is still expanding in scientific production, which is characterized as the limitation of this study. Part of the selected studies only addressed the benefits of massage application and assessment. It should be added that the articles included in the results did not provide any type of protocol for performing the massage, leaving open the aspects about the best type of technique, the frequency, the method of application or the type of oil used, among other objections. Finally, the literature refers to massage as reflexotherapy, tactile massage and therapeutic massage. These associations were due to the similarities of the methodologies used in the application of massage te-

chniques in pain relief.

It should be added that the results of this work are relevant to offer neonatologists a informative scientific framework, to add their wisdom and applicability in daily life. Thus, this review will contribute to the development of comprehensive health care for newborns hospitalized in Neonatal Intensive Care Units; despite the qualified care, they are submitted to constant painful procedures, in addition to actively strengthening nursing in the multiplication of knowledge and humanized practices to newborns.

In this sense, it is necessary to use effective instruments for pain assessment, since there is no verbalization of newborns. Thus, training and updating the health staff is essential for the correct assessment of patients' physical and behavioral parameters. Among the most widely used validated scales for identifying pain in this target audience, there is the Neonatal Infant Pain Scale and Premature Infant Pain Profile⁽²³⁾.

The interventions identified in this scope review demonstrated benefits in pain management, reduced heart and respiratory rate, improvements in oxygen saturation levels and duration of crying. Similarly, a systematic review⁽²⁴⁾ agrees with the above and adds the benefits of massage, when compared to music therapy, in reducing stress, cortisol levels in saliva, length of hospital stay and neonatal weight gain. Moreover, in relation to the duration of massage application, there was a disagreement with the results of this review, as the study highlights that the intervention presents better results in the relief of neonatal pain when applied with a duration of 10 to 15 minutes, on average three times a day⁽²⁴⁾.

In line with the results obtained in this study, a systematic review aimed to identify, assess, and summarize the studies on the administration of massage therapy in premature newborns during their hospitalization in Neonatal Intensive Care Units and to assess their methodological quality. The main benefits of massage therapy in newborns became evident: the improvement in neurological development, motor function, stress reduction, heart rate and hospital stay⁽²⁵⁾.

In addition to the methods previously descri-

bed, the literature also reveals another relaxation technique responsible for promoting the same benefits mentioned above through massage. This method was described by a quasi-experimental research carried out in the United States of America, which describes a relaxation method called M technique, which was applied to premature newborns in Intensive Care Units. This method reflects the behavioral parameters of newborns before, during and after painful procedures, reducing heart and respiratory rate, improving oxygen saturation⁽¹¹⁾.

There was also a high application of tactile massage between studies. In this context, literature emphasizes the effectiveness of a combination of tactile and kinesthetic massage in neonatology, since this association allows benefits such as pain and stress reduction, vagal activity improvement and the greater probability of early hospital discharge⁽²⁶⁾.

One strategy used by a randomized clinical trial conducted in Iran was to evaluate the effectiveness of the effects of massage by comparing it with breast milk in relieving neonatal pain during heel puncture. Experts assessed neonatal pain using the Neonatal Pain Assessment Scale Infant Pain Scale. The study showed that massage presents itself as an effective method to relieve neonatal pain⁽²⁷⁾.

Some studies have shown the presence of massage therapy with the application of pressure^(11,12,18). This method is configured as a highly effective instrument in pain reduction, since stimulation of pressure receptors enables vagal action expansion, and increases serum levels of serotonin, a neurotransmitter responsible for suppressing pain⁽²⁶⁾.

A quasi-experimental survey conducted in Indonesia with a sample of 40 preterm infants compared the use of breastfeeding and massage in relation to a control group and the interference of these techniques in reducing neonatal pain during the collection of venous blood samples. Breastfeeding was performed two minutes before the procedure, while the massage was performed for two minutes at the time and after collection. For neonatal pain assessment during the procedure, the Neonatal Pain Assessment Scale Infant Pain Scale was used, which showed a lo-

wer score in the intervention group, compared to the control group, indicating less pain in the group that received breastfeeding and massage. It is noteworthy that the method used for the massage intervention was similar to some of the findings in this study, as the massage was applied slowly and smoothly, running from the back to the lower extremities⁽²⁸⁾.

Although the literature addresses several positive points in the use of Integrative and Complementary Practices in health, in particular, therapeutic massage in the relief of neonatal pain, few health professionals know reflexology, as presented by a field research carried out with 508 nurses. It was identified that about 91.0% of professionals knew Integrative and Complementary Practices in Health, of which approximately 96.3% stated that they believe that these practices can be implemented in all health systems. However, it was observed that only 38.0% of these health professionals have some understanding about reflexology, showing the lack of access to information regarding knowledge and use of this technique⁽²⁹⁾.

In this context, massage is not always used by professionals. These recognize neonatal suffering from their physiological changes, but few use massage as a non-pharmacological method⁽²³⁾.

An experimental research, carried out in São José do Rio Preto, São Paulo, showed that professionals were concerned with the comfort of hospitalized newborns and that they often act out of intuition or experience to recognize pain in newborns. In line with the results presented, this research also identified that the stimulus generated by touch, such as therapeutic massage and skin-to-skin contact, is capable of promoting relaxation and physiological stability in premature infants⁽³⁰⁾.

Conclusion

The analyzed evidence reveals that massage/reflexotherapy performed before or after painful procedures is shown as a non-pharmacological alternative for pain relief in newborns admitted to Neonatal Intensive Care Units. Applying a massage to the lower limbs, heel, dorsal region or at the site of the painful

procedure, with an average duration of two to three minutes can provide a reduction in the score of Neonatal Pain Infant Pain Scale and the Premature Infant Pain Profile, heart and respiratory rate, crying time and painful procedure performance, improved oxygen saturation, improvements in behavioral status, weight gain, and neurological development.

Collaborations

Costa TMS, Oliveira ES, Rocha RRA, Santos KVG, Dantas JKS, Dantas RAN and Dantas DV contributed with conception, design, data analysis and interpretation, writing and critical review of intellectual content and the final approval of the version to be published.

References

1. Gomes PPS, Lopes APA, Santos MSN, Façanha SMA, Silva AVS, Chaves EMC. Medidas não farmacológicas para alívio da dor na punção venosa em recém-nascidos: descrição das respostas comportamentais e fisiológicas. *Br JP*. 2019; 2(2):142-6. doi: <http://dx.doi.org/10.5935/2595-0118.20190026>
2. Maciel HIA, Costa MF, Costa ACL, Marcatto JO, Manzo BF, Bueno M. Pharmacological and non-pharmacological measures of pain management and treatment among neonates. *Rev Bras Ter Intensiva*. 2019; 31(1):21-6. doi: <https://doi.org/10.5935/0103-507x.20190007>
3. Sposito NPB, Rossato LM, Bueno M, Kimura AF, Costa T, Guedes DMB. Assessment and management of pain in newborns hospitalized in a Neonatal Intensive Care Unit: a cross-sectional study. *Rev Latino-Am Enfermagem*. 2017; 25:e2931. doi: <http://dx.doi.org/10.1590/1518-8345.1665.2931>
4. Costa LC, Souza MG, Sena EMAB, Mascarenhas MLVC, Moreira RTF, Lúcio IML. The use of non-pharmacological measures by the nursing team for neonatal pain relief. *Rev Enferm UFPE on line [Internet]*. 2016 [cited Aug 13, 2020]; 10(7):2395-403. Available from: <https://periodicos.ufpe.br/revistas/revistaenfermagem/article/view/11295>
5. Balda RCX, Guinsburg R. A linguagem da dor no recém-nascido. *Sociedade Brasileira de Pediatria [Internet]*. 2018 [cited July 30, 2020]. Available from: https://www.sbp.com.br/fileadmin/user_upload/DocCient-Neonatal-Linguagem_da_Dor_atualizDEz18.pdf
6. Mendes DS, Moraes FS, Lima GO, Silva PR, Cunha TA, Crossetti MGO, et al. Benefícios das práticas integrativas e complementares no cuidado de enfermagem. *J Health NPEPS*. 2019; 4(1):302-18. doi: <http://dx.doi.org/10.30681/252610103452>
7. Isik B, Aydin D, Arslan M, Dane S. Reflexological therapy induces a state of balance in autonomic nervous system. *Clin Invest Med [Internet]*. 2015 [cited Aug 21, 2020]; 38(4):244-8. Available from: <https://www.scopus.com/record/display.uri?eid=2-s2.0-84939176281&origin=inward&txGid=4cff3cc302334f7e78cef58b86be5ef4>
8. Gasparido CM, Cassiano RG, Graciolo SM, Furini GC, Linhares MB. Effects of neonatal pain and temperament on attention problems in toddlers born preterm. *J Pediatr Psychol*. 2018; 43(3):342-51. doi: <http://dx.doi.org/10.1093/jpepsy/jsx140>
9. Peters MDJ, Godfrey C, McInerney P, Munn Z, Tricco AC, Khalil, H. Chapter 11: Scoping Reviews (2020 version). In: Aromataris E, Munn Z (Editors). *Joanna Briggs Institute Reviewer's Manual*, JBI [Internet]. 2020 [cited May 2, 2020]. Available from: <https://reviewersmanual.joannabriggs.org/>
10. Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med*. 2018; 169(7):467-73. doi: <https://doi.org/10.7326/M18-0850>
11. Smith JR, Raney M, Conner S, Coffelt P, McGrath J, Brotto M, et al. Application of the M technique in hospitalized very preterm infants a feasibility study. *Adv Neonatal Care*. 2012; 12(Suppl 5):10-7. doi: <http://dx.doi.org/10.1097/ANC.0b013e31826743ea>
12. Abdallah B, Badr LK, Hawwari M. The efficacy of massage on short and long term outcomes in preterm infants. *Infant Behav Dev*. 2013; 36(4):662-9. doi: <http://dx.doi.org/10.1016/j.infbeh.2013.06.009>
13. Mirzarahim M, Mehrnoush N, Shahizadeh S, Samadi N, Amani F. Effect of non-nutritive sucking and leg massage on physiological and behavioral indicators of pain following heel blood sampling in term neonates. *Int J Adv Nurs Stud*. 2013; 2(2):74-9. doi: <https://dx.doi.org/10.14419/ijans.v2i2.578>

14. Badr LK, Abdallah B, Kahale L. A meta-analysis of preterm infant massage: an ancient practice with contemporary applications. *MCN Am J Matern Child Nurs.* 2015; 40(6):344-58. doi: <http://dx.doi.org/10.1097/nmc.0000000000000177>
15. Hathaway EE, Luberto CM, Bogenschutz LH, Geiss S, Wasson RS, Cotton S. Integrative care therapies and physiological and pain-related outcomes in hospitalized infants. *Glob Adv Health Med.* 2015; 4(4):32-7. doi: <http://dx.doi.org/10.7453/gahmj.2015.029>
16. Abbasoğlu A, Cabioğlu MT, Tuğcu AU, İnce DA, Tekindal MA, Ecevit A, et al. Acupressure at BL60 and K3 points before heel lancing in preterm infants. *Explore.* 2015; 11(5):363-6. doi: <https://dx.doi.org/10.1016/j.explore.2015.07.005>
17. Ibrahim EM, El-giundy SR, Rashad HM, Mebed MH. Effect of foot massage on pain responses to heel stick in preterm infant. *Med J Cairo Univ [Internet].* 2016 [cited Aug 20, 2020];84(2):25-31. Available from: <http://pdfs.semanticscholar.org/c3/780a593bb16747cb7b7e9bc41c022fafed3d>
18. Field T. Preterm newborn pain research review. *Infant Behav Dev.* 2017; 49:141-50. doi: <https://dx.doi.org/10.1016/j.infbeh.2017.09.002>
19. Chik Y-M, Ip W-Y, Choi K-C. The effect of upper limb massage on infants' venipuncture pain. *Pain Manag Nurs.* 2017; 18(1):50-7. doi: <http://dx.doi.org/10.1016/j.pmn.2016.10.001>
20. Zargham-Boroujen A, Elsagh A, Mohammadzadeh M. The effects of massage and breastfeeding on response to venipuncture pain among hospitalized neonates. *Iran J Nurs Midwifery Res.* 2017; 22(4):308-12. doi: https://dx.doi.org/10.4103/ijnmr.IJNMR_119_13
21. Mangat AK, Oei J-L, Chen K, Quah-Smith I, Schmöler GM. A review of non-pharmacological treatments for pain management in newborn infants. *Children (Basel).* 2018; 5(10):130. doi: <https://dx.doi.org/10.3390/children5100130>
22. Özkan TK, Küçükkeleşçe DS, Özkan SA. The effects of acupressure and foot massage on pain during heel lancing in neonates: A randomized controlled trial. *Complement Ther Med.* 2019; 46:103-8. doi: <https://dx.doi.org/10.1016/j.ctim.2019.08.004>
23. Moretto LCA, Perondi ER, Trevisan MG, Teixeira GT, Hoesel TC, Costa LD. Dor no recém-nascido: perspectivas da equipe multiprofissional na unidade de terapia intensiva neonatal. *Arq Ciênc Saúde UNIPAR.* 2019; 23(1):29-34. doi: <https://doi.org/10.25110/arqsaude.v23i1.2019.6580>
24. Torres-Ake EA, Lugo-Ake GR, Matos-Villanueva JA, Puch-Kú EBS. Masaje frente a musicoterapia para reducir el estrés en prematuros de una unidad crítica neonatal, una revisión sistemática. *Rev Enferm Inst Mex Seguro Soc [Internet].* 2020 [cited Oct 20, 2020]; 28(1):49-57. Available from: <https://www.medigraphic.com/pdfs/enfermeriamss/eim-2020/eim201f.pdf>
25. Álvarez MJ, Fernández D, Gómez-Salgado J, Rodríguez-González D, Rosón M, Lapeña S. The effects of massage therapy in hospitalized preterm neonates: a systematic review. *Int J Nurs Stud.* 2017; 69:119-36. doi: <https://doi.org/10.1016/j.ijnurstu.2017.02.009>
26. Niemi A-K. Review of randomized controlled trials of massage in preterm infants. *Children (Basel).* 2017; 4(4):21. doi: <https://doi.org/10.3390/children4040021>
27. Salimi T, Dehghani K, Afkhami A, Karjoo Z, Shadkam MN, Zadeh HF. Comparing the effect of breast-milk and leg massage on neonate's pain intensity during heel-blood sampling in neonatal care unit. *J Shahid Sadoughi University Med Sci.* 2020; 27(12):2192-202. doi: <https://doi.org/10.18502/ssu.v27i12.2835>
28. Nurbayanti MS. The effects of breast feeding and massage on neonatus pain during intravenous blood sampling procedures. *J Neonatal Nurs.* 2020. doi: <http://dx.doi.org/10.1016/j.jnn.2020.05.005>
29. Andres FC, Andres SC, Moreschi C, Rodrigues SO, Badke MR. Conhecimento de enfermeiros acerca das práticas integrativas e complementares em saúde. *Res Soc Dev.* 2020; 9(7):1-15. doi: <http://dx.doi.org/10.33448/rsd-v9i7.5171>
30. Rodrigues JB, Souza DSB, Werneck AL. Identificação e avaliação da percepção dos profissionais de enfermagem em relação a dor/desconforto do recém-nascido. *Arq Ciênc Saúde [Internet].* 2016 [cited Aug 21, 2020];23(1):27-31. Available from: <http://www.cienciasdasaude.famerp.br/index.php/racs/article/view/108/173>



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