

Pain relief and psychological distress in pediatric oncology: a systematic review

RESUMO | Objetivo: identificar intervenções para reduzir dor e sofrimento psicológico nas oncologias pediátricas durante procedimentos com agulhas. Método: Conduziu-se uma revisão sistemática entre novembro de 2020 e maio de 2021 nas bases MEDLINE e PsycINFO. Foram incluídos: estudos primários com intervenções comportamentais e/ou farmacológicas sem restringir idioma ou ano de publicação e excluídos: secundários e duplicatas. Resultados: Após a elegibilidade, 26 estudos formaram a síntese. O contato familiar, palhaçadas médicas, desviar o olhar, musicoterapia, realidade virtual e hipnose foram as principais técnicas psicológicas. Foram considerados eficazes os métodos farmacológicos: fentanil com etomidato, dose baixa oral ou spray nasal de midazolam e xarope de acetaminofeno. A associação de lidocaína e prilocaína com hipnose mostrou-se efetiva, assim como, midazolam associado com jogos de vídeo ou livros musicais. Conclusão: O caminho para a redução de dor e sofrimento psicológico é um processo complexo e pode haver um sinergismo entre intervenções psicológicas e farmacológicas.

Palavras-chaves: Assistentes de Pediatria"; Pediatria; Câncer

ABSTRACT | Objective: to identify interventions to reduce pain and psychological distress in pediatric oncology patients during needle procedures. Method: A systematic review was conducted between November 11, 2020 and May 17, 2021 in MEDLINE and PsycINFO. We included: primary studies with behavioral and/or pharmacological interventions without restricting language or year of publication and excluded: secondary and duplicates. Results: After eligibility, 26 studies formed the synthesis. Family contact, medical clowning, looking away, music therapy, virtual reality and hypnosis were the main psychological techniques. Pharmacological methods were considered effective: fentanyl with etomidate, low dose oral or nasal spray of midazolam, and acetaminophen syrup. The combination of lidocaine and prilocaine with hypnosis was shown to be effective in reducing fear and pain, as well as midazolam associated with video games or music books. Conclusion: The way to reduce psychological pain and suffering is a complex process and there may be a synergism between psychological and pharmacological interventions.

Keywords: Pediatric Assistants", Pediatrics; Cancer.

RESUMEN | Objetivo: Identificar intervenciones para reducir el dolor y la angustia psicológica en los pacientes de oncología pediátrica durante los procedimientos con agujas. Método: Se realizó una revisión sistemática entre el 11 de noviembre de 2020 y el 17 de mayo de 2021 en MEDLINE y PsycINFO. Se incluyeron: estudios primarios con intervenciones conductuales y/o farmacológicas sin restringir el idioma o el año de publicación y se excluyeron: secundarios y duplicados. Resultados: Tras la elegibilidad, 26 estudios formaron la síntesis. El contacto con la familia, la payasada médica, la mirada ausente, la musicoterapia, la realidad virtual y la hipnosis fueron las principales técnicas psicológicas. Se consideraron eficaces los métodos farmacológicos: fentanilo con etomidato, dosis bajas de midazolam por vía oral o nasal y jarabe de paracetamol. La unión de lidocaína y prilocaína con hipnosis resultó eficaz para reducir el miedo y el dolor, así como el midazolam asociado a videojuegos o libros musicales. Conclusión: La forma de reducir el dolor y el sufrimiento psicológico es un proceso complejo y puede haber un sinergismo entre las intervenciones psicológicas y farmacológicas.

Palabras claves: Asistentes de Pediatría", Pediatría; Cáncer

Regina Petrola Bastos Rocha

Nurse, Post Graduate in Public Health and in Management of Health Systems and Services (SUS Management), Master in Sustainable Regional Development and Doctoral Student in Health Sciences. Currently acting as a Professor in the Nursing and Medicine courses at the Estácio de Juazeiro do Norte Faculty of Medicine - Estácio FMJ.

ORCID: 0000-0003-0626-232X

Raimundo Monteiro da Silva Neto

Nursing graduation in progress at the University Center of Juazeiro do Norte (UNI-JUAZEIRO), Juazeiro do Norte (CE), Brazil. ORCID: 0000-0001-9949-1740

Camila Bezerra Silva

Nurse, graduated from the Faculty of Medicine Estácio de Juazeiro do Norte. Postgraduate student in Urgency and Emergency at the Regional University of Cariri. Emergency Duty at Unimed Cariri Hospital ORCID: 0000-0003-0070-9434

Vanessa Ruth Ferreira da Silva

Student of the nursing course at the University Center of Juazeiro do Norte-UNI-JUAZEIRO.

ORCID: 0000-0002-7388-3102

Maria Daniely da Silva Santos Souza

Nursing graduation in progress at the University Center of Juazeiro do Norte (UNI-JUAZEIRO), Juazeiro do Norte (CE), Brazil. ORCID: 0000-0003-1416-2900

Cíntia de Lima Garcia

Nurse. Doctorate in Sciences with emphasis on Public Health (2019) ABC Health University Center, FMABC, Santo André (SP), Brazil. Professor of Medicine and Nursing courses at the Estácio de Juazeiro do Norte Faculty of Medicine (ESTACIO FMJ). Coordinator of the Realistic Simulation and Skills Laboratory (LHS) at ESTACIO FMJ. Period coordinator of the Medicine course at ESTACIO FM Juazeiro do Norte (CE). ORCID: 0000-0003-2673-7003

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INTRODUCTION

A neoplastic diagnosis can represent a major disturbance in everyday life, especially for children.¹ The incidence of cancer in children over the next three years in Brazil is 4.310 new cases for male children and 4.150 for females². They find themselves in a world where adults, known or not, perform practically all decisions taken.¹

Most of these children who receive treatments in pediatric oncology need some procedure that can generate fear or pain.³ They typically experience increasing levels of anxiety and do not easily adapt to the discomfort caused by invasive needle procedures.¹

METHOD

A systematic review was conducted in accordance with the methodological recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).¹²

The starting question was made through the PVO search strategy, that is, P (Population), V (Variable) and O (Outcome/Outcome).¹³ In the study: P= Patients in pediatric oncology, V= Behavioral and pharmacological interventions and O= Reduction of pain and/or psychological distress. The inclusion criteria established were: a) To be a primary study, b) To show results of behavioral and pharmacological interventions, and c) without restriction of language or year of publication. The following were excluded: I) Secondary studies, II) duplicates, checked through the reference manager EndNote version X5.

The searches took place between November 11, 2020 and May 17, 2021 and in the MEDLINE and PsycINFO databases with the MeSH terms: "Nurses, Pediatric", "Pediatric Assistants", Pediatrics and Cancer. The main search strategy used was: "Pediatric AND cancer AND nurse". The eligibility pro-



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cess took place through two individual reviewers and began by reading titles, later abstracts and the third step in full. After reading in full, some studies were excluded because they did not address the theme: "oncology and/or pediatrics". When there is any doubt about inclusion/exclusion, the advisor was consulted to contribute to the resolution of the doubt, whether or not the study would be included in the review.

Data extraction took place with the help of a matrix to expose the main results and create a summary table, where the data were extracted: Author, year, country, methods and outcomes. The results were divided into three categories: Psychological Interventions, Pharmacological Interventions and Psychological and Pharmacological Interventions.

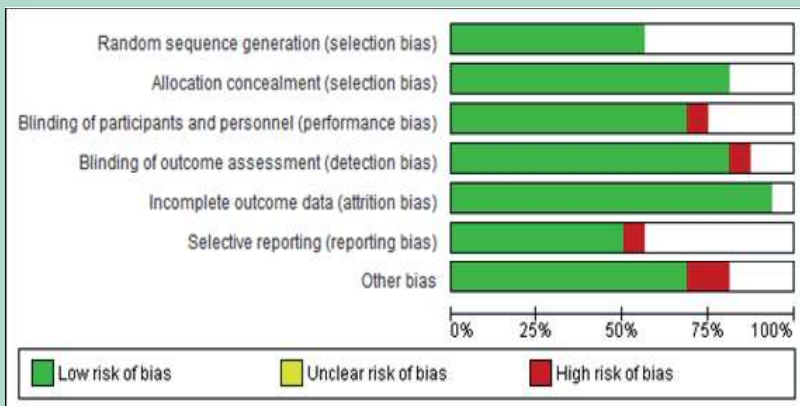
Evidence was assessed using the Grading of Recommendations Development and Assessment (GRADE) system and the study focused primarily on psychological and pharmacological interventions. The GRADE system's Assessment approach provides a system for ranking the quality of evidence. Quality is classified into four: high, moderate, low and very low. The strength of the recommendations that is explicit, comprehensive, transparent and pragmatic, classified into: strong and weak. And it is increasingly being adopted by organizations around the world.¹⁴

The risk of bias was assessed using the Risk of Bias tool figure 1 and figure 2 from the Cochrane Collaboration.¹⁵ This tool assesses the risk of selection bias, performance bias, detection bias, attrition bias, reporting bias, and other biases. Each clinical trial was evaluated on these seven criteria, they were classified as "Low risk", "High risk", or "Unclear risk".

RESULTS

After performing the searches in the databases, 1.429 studies were ini-

Figura 1: julgamentos para cada domínio de risco de viés (risk of bias)



Fonte: Autora, 2021

tially found and, in the eligibility stage, 135 manuscripts were read in full. Of these, 26 studies were included in the final synthesis of this study and are displayed in the Prisma 2009 flowchart Figure 3. 12

It was shown that music therapy, virtual reality glasses, hypnosis, and medical clowning can contribute to pain reduction. Local anesthetics such

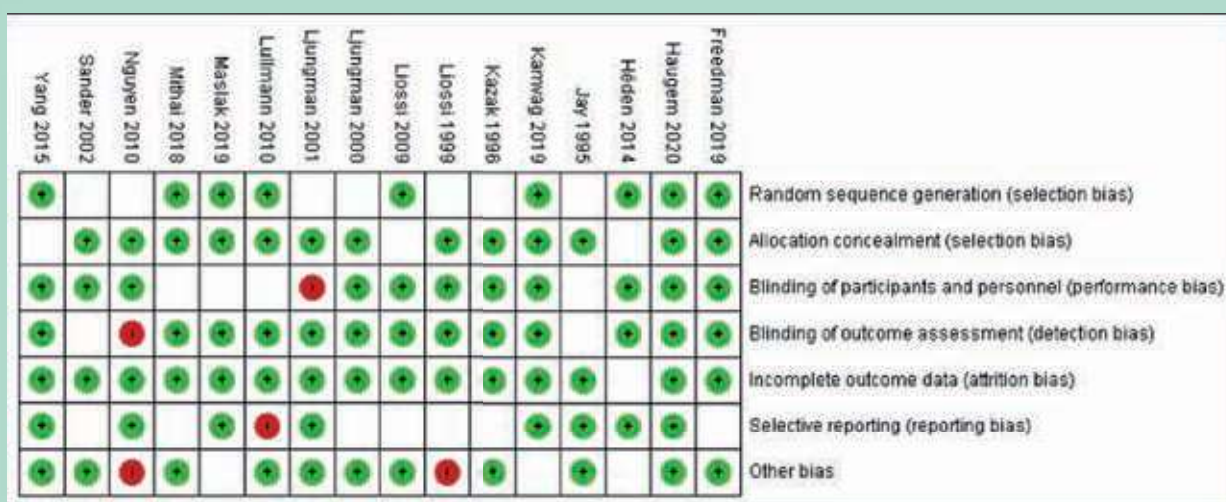
as fentanyl combined with etomidate and midazolam nasal spray are helpful in providing relief in needle procedures. Lidocaine associated with prilocaline and hypnosis proved to be effective, as well as midazolam with video games and music books.

DISCUSSION

The research evidenced from observational and clinical studies that behavioral and pharmacological methods can help to relieve pain in needle procedures in pediatric oncology. Non-pharmacological methods can be an alternative or a complement to analgesics. Music therapy can contribute to pain reduction, participants in the study by Nguyen et al. (2010) were randomly assigned to a musical group and a control group and children in the musical group showed lower levels of pain and anxiety during and after the lumbar puncture. 23

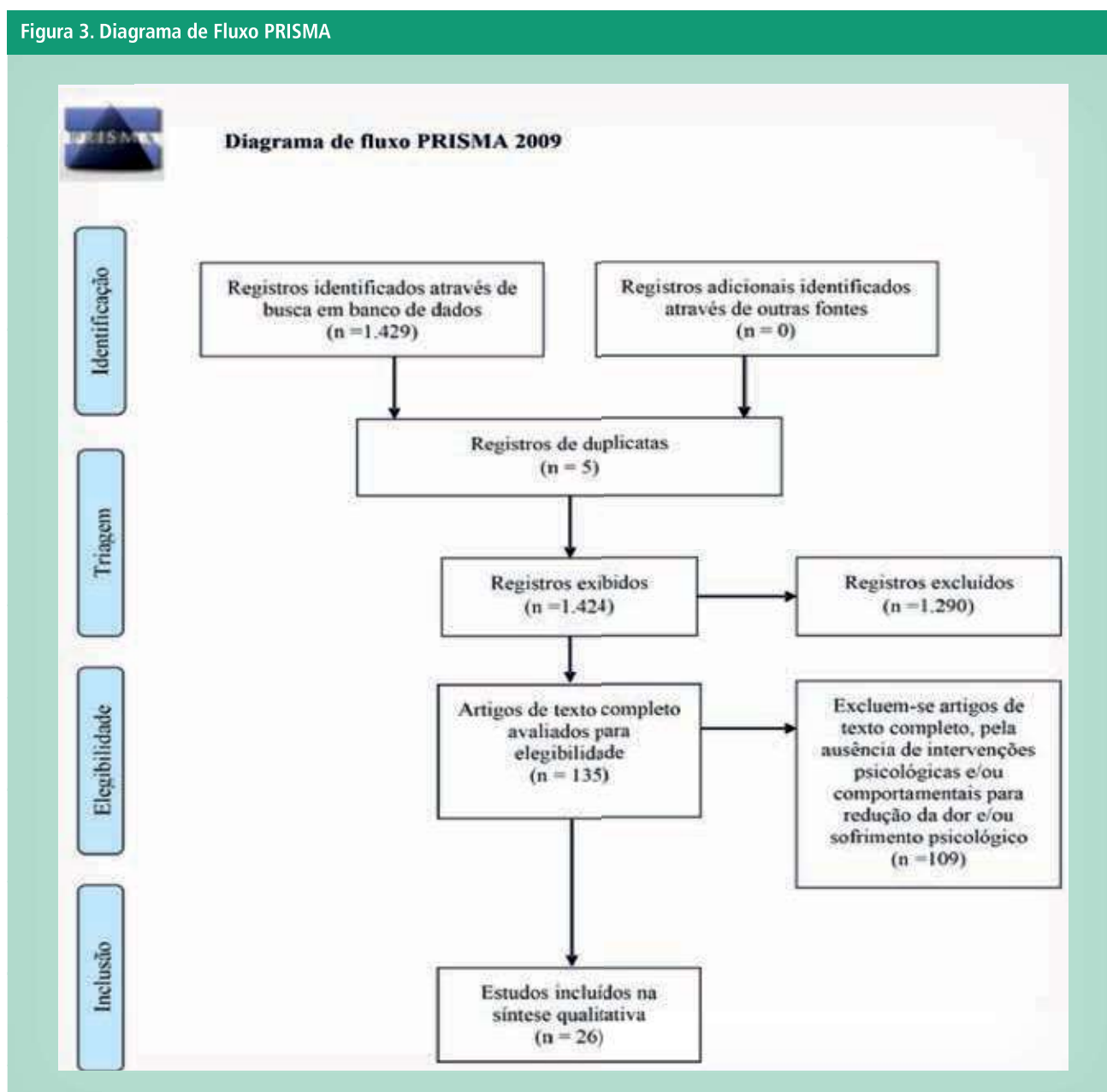
Sander et al (2020) studied another non-pharmacological intervention in children with cancer undergoing lumbar puncture. He performed standard intervention during the puncture, but the experimental group also wore virtual reality glasses and watched a video and all scores were lower in the group that used virtual reality glasses. 27 A little over two decades ago, Liossi conducted a study to compare the

Figura 2: A qualidade metodológica dos estudos incluídos com base nos julgamentos dos autores da revisão sobre cada item de risco de viés apresentado como porcentagens em todos os estudos incluídos (risk of bias)



Fonte: Autora, 2021

Figura 3. Diagrama de Fluxo PRISMA



Fonte: Autora, 2021

effectiveness of clinical hypnosis with the training of cognitive behavioral skills to alleviate the pain and suffering of pediatric cancer patients. The results showed that hypnosis can be a good choice to reduce psychological distress.³⁰

Topical local anesthetics provide

effective analgesia for patients undergoing numerous procedures. 43 To Lullmann et al. (2010) pain relief can be synonymous with quality of life for children with cancer who need needle procedures. He carried out a research where, after the application of lidocaine-prilocaine cream (EMLA), children

in the intervention group obtained a significant reduction in pain after 60 min of application time. He showed that local anesthetics can help with pain relief during needle procedures.²²

The study by Hedén et al. (2009), children were being treated in a pediatric oncology and hematology set-

Table 1. Description of selected results: Author, year, country, outcomes and classification of the level of evidence of randomized clinical trials.

AUTHOR, YEAR, COUNTRY	OUTCOMES	CLE
KAMSVÅG et al., 2020 ¹⁶ Sweden	Ibuprofen has been shown to be of little use in reducing fear and pain with needle procedures. We cannot say that ibuprofen is not useful in needle procedures, but that it seems unlikely.	⊕
HAUGEN et al., 2020 ¹⁷ USA	The team's commitment to the well-being of patients, the practice is improved when nurses.	⊕ ⊕
FREEDMAN et al., 2019 ¹⁸ Canada	The intervention group (coping) had greater knowledge, less fear and greater willingness to accept procedures involving needles after the classroom education session.	⊕ ⊕ ⊕
MASLAK et al., 2019 ¹ China	Offering children the choice of medical support during invasive procedures allows for personalized support based on individual needs and is an effective modality to return active control to young patients, limiting the emotional trauma of cancer and treatment.	⊕ ⊕ ⊕
MITHAL et al., 2018 ¹⁹ Canada	Advising people to look away from the needle reduces fear and taking time with the child.	⊕ ⊕ ⊕
YANG et al., 2015 ²⁰ China	Alt is safe and effective to apply fentanyl combined with etomidate for sedation and analgesia.	⊕ ⊕ ⊕
HEDÉN; VON ESSEN; LJUNGMAN, 2014 ²¹ Sweden	Acetaminophen reduced self-rated distress and behavioral distress. Paracetamol offered no additive effect in reducing pain, fear and distress when combined with topical anesthesia in children undergoing needle insertion.	⊕ ⊕
LÜLLMANN et al., 2010 ²² Germany	Using local anesthesia can help relieve pain during needle procedures.	⊕ ⊕ ⊕
NGUYEN et al., 2010 ²³ Vietnã	The results showed lower rates of pain and heart and respiratory rate in the music group during and after the lumbar puncture.	⊕ ⊕
(HEDÉN et al., 2009 ²⁴ Sweden	Low dose oral midazolam was effective in reducing fear and distress in pediatric cancer patients. Especially in younger children undergoing subcutaneous needle insertion.	⊕ ⊕
LIOSSI; WHITE; HATIRA, 2009 ²⁵ United Kingdom	Patients in the local anesthetic plus hypnosis group reported less anticipatory anxiety, and less procedure-related pain and anxiety.	⊕ ⊕
ANNALFI et al., 2005 ²⁶ USA	The effects of non-pharmacological techniques on anxiety were perceived very positively by both children and parents. The study suggests that moderate sedation compares favorably to general anesthesia with regard to both safety and efficacy.	⊕ ⊕
SANDER WINT et al., 2002 ²⁷ USA	Virtual reality glasses are a viable, age-appropriate, and non-pharmacological adjunct to conventional care in managing pain associated with lumbar puncture in adolescents.	⊕
LJUNGMAN et al., 2001 ²⁸ USA	Results for conscious sedation and general anesthesia in conscious sedation were similar. Although there were flaws with the conscious sedation model, most preferred it over general anesthesia.	⊕ ⊕ ⊕
LJUNGMAN et al., 2000 ²⁹ USA	Conscious sedation is indicated when other means of overcoming a child's fear fail. Parents and nurses reported reduced anxiety, discomfort and procedural problems for children in the midazolam group and would prefer the same medication in the next procedure. They also reported pain reduction. Nasal discomfort was the most common side effect.	⊕ ⊕ ⊕
LIOSSI; HATIRA, 1999 ³⁰ United Kingdom	Patients who received either hypnosis reported less pain and pain-related anxiety than controlled patients and less pain and anxiety than at their own baseline. Hypnosis and behavioral training are effective in preparing pediatric cancer patients for needle procedures.	⊕ ⊕ ⊕
KAZAK et al., 1996 ³¹ EUA	Mothers' and nurses' ratings of child distress indicated less child distress in the pharmacological intervention group associated with psychological intervention.	⊕ ⊕ ⊕
JAY et al., 1995 ³² USA	Parents rated significantly more behavioral adjustment symptoms 24h after undergoing bone marrow aspirations when their children received anesthesia.	⊕ ⊕ ⊕

CLE = CLASSIFICATION OF THE LEVEL OF EVIDENCE
 ++++ = High
 +++ = Moderated
 ++ = Low
 + = Very Low
 Source: Author, 2021

Table 2. Description of selected results: Author, year, country, outcomes and classification of the level of evidence of cross-sectional studies

AUTHOR, YEAR, COUNTRY	OUTCOMES	CLE
GRAETZ et al., 2020a ¹⁰ USA	Technology and automation have resulted in a lack of communication and understanding is critical to optimizing and improving care outcomes in pediatric oncology.	⊕
MEKONNEN; GEBREYOHANNIS; CHE- RIE, 2020 ³³ Ethiopia	Nurses must detect it early to reduce the risk of psychological distress.	⊕
KOSIR et al., 2020 ⁶ Reino Unido	Adaptation and psychological recovery of young people can result in optimization of patient care in pediatric oncology.	⊕
GOMBERG et al., 2020 ³⁴ United Kingdom	Many previously unheard benefits of medical clowns have been described. These reported benefits included cost-cutting measures for the hospital, increased staff efficiency, better patient outcomes and less stress on staff, and reduced grief.	⊕
CHEN et al., 2020 ³⁵ China	Building the trust and support of nurses, doctors, psychologists and social workers will drive mothers' readiness to handle the care of their sick child. It is also suggested to increase the visiting time for the support of parents to hospitalized children.	⊕
MEKONNEN; GEBREYOHANNIS; CHE- RIE, 2020 ³³ Ethiopia	Nurses must detect depression early in pediatric cancer patients.	⊕
SULLIVAN et al., 2020 ³⁶ Canada	Meet the visible needs of children in pediatric oncology.	⊕
GRAETZ et al., 2020b ³⁷ USA	Teamwork was a contributing factor in reducing pain and psychological problems.	⊕

Source: Author, 2021.

Table 3. Psychological interventions identified in the studies

INTERVENTIONS	RS
Frequent contact with family members ³⁵	Strong
Decrease hospital stay ⁷	Strong
Pay attention to symptoms of mental suffering ³³	Weak
Medical Clownings ³⁴	Strong
Union of psychological interventions ⁶	Strong
Improve interdisciplinary communication ¹⁰	Weak
Teamwork ³⁷	Weak
Look away from the needle to reduce fear ¹⁹	Strong
Use of active distraction for all needle procedures ³⁸	Weak
Music therapy during and after the needle procedure ²³	Strong
Self-Hypnosis/Hypnosis to Reduce Pain ^{25, 39, 40, 30}	Strong
Distract the child in oncology to reduce fear ^{39, 41}	Strong
Using Virtual Reality Glasses ²⁷	Weak
Combine psychological interventions with pharmacological interventions throughout the needle procedure ³¹	Strong

Source: Author, 2021 RS = Recommendation Strength

ting. All children underwent a needle insertion in the study and were given midazolam and the other group recei-

ved placebo and fear was significantly less in the midazolam group. In another study with midazolam, this time with

nasal spray administration. Children, parents and nurses completed a visual analogue scale questionnaire to assess effectiveness and a significant reduction in anxiety and pain was noted.²⁹

Morphine was tested and placebo controlled in children in pediatric oncology, the results showed that oral morphine did not provide additional reduction of fear, distress or pain compared to placebo in pediatric patients undergoing needle insertion.⁴² A prospective controlled study was conducted to compare the effectiveness of an EMLA local anesthetic with a combination of EMLA with self-hypnosis. Patients in the local anesthetic group associated with hypnosis reported less anticipatory anxiety, and less pain and anxiety related to the procedure.²⁵

A prospective randomized controlled trial of a psychological and pharmacological intervention protocol for the treatment of pediatric leukemia evaluated the distress during invasi-

Tabela 4. intervenções farmacológicas identificadas nos estudos

INTERVENÇÕES	FR
Anestesia local para ajudar no alívio da dor durante procedimentos com agulhas ²²	Forte
Sedação moderada ²⁶	Forte
Administração de fentanil combinado com etomidato para sedação e analgesia ²⁰	Fraca
Sedação consciente ²⁸	Forte
A dose baixa de midazolam oral para reduzir o medo e a angústia durante os procedimentos com agulhas em crianças com câncer ²⁴	Fraca
Spray nasal midazolam para oferecer alívio nos procedimentos com agulha ²⁹	Fraca
O acetaminofeno para reduzir sofrimento comportamental ²¹	Fraca
Não utilizar morfina oral para proporcionar redução adicional de medo ⁴²	Forte

Fonte: Autora, 2021
FR= Força de recomendação

Tabela 5. intervenções psicológicas e farmacológicas identificadas nos estudos

INTERVENÇÕES	NÍVEL DA EVIDÊNCIA	FORÇA DE RECOMENDAÇÃO
Lidocaína + prilocaína com hipnose ²⁵	⊕⊕	Forte
Midazolam associado com jogos de vídeo e livros musicais ³¹	⊕⊕⊕	Forte

Fonte: Autora, 2021
FR= Força de recomendação

ve procedures in childhood leukemia. They showed decreases in distress over time and simultaneous improvements in parental quality of life and stress, and supported an inverse association between distress and child age with the combination of psychological and pharmacological interventions. ³¹

CONCLUSION

The research answered the guiding question and objectives, after showing that care in pediatric oncology can rely on pharmacological and/or behavioral interventions to reduce psychological distress and pain. The path to reducing psychological pain and suffering is a complex process and there may be a synergism between psychological and pharmacological interventions. 🐦

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