REVISTA ENFERMAGEM ATUAL IN DERME

SCOPING REVIEW PROTOCOL ON THE USE OF LOW-LEVEL LASER THERAPY

PROTOCOLO DE REVISIÓN DE ALCANCE SOBRE LA UTILIZACIÓN DE LA TERAPIA LÁSER DE BAJA INTENSIDAD

PROTOLOCO DE REVISÃO DE ESCOPO SOBRE A UTILIZAÇÃO DA TERAPIA A LASER DE BAIXA INTENSIDADE

Michele da Rosa Costa[1]
Eliane Goldberg Rabin[2]
João Gabriel Toledo Medeiros[3]
Natália Marmitt[4]

[1]Enfermeira, Mestranda do Programa de Pós-Graduação em Enfermagem na Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA). Porto Alegre, Rio Grande do Sul, Brazil. E-mail: michele.lcosta@yahoo.com.br Orcid: https://orcid.org/0009-0001-3637-1749
[2]Enfermeira, Professora Dra. associada do departamento de Enfermagem Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA). Porto Alegre, Rio Grande do Sul, Brazil. E-mail: Elianer@ufspa.edu.br Orcid: https://orcid.org/0000-0003-1450-2012
[3]Enfermeiro, Professor Ms. convidado do departamento de Enfermagem Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA). Porto Alegre, Rio Grande do Sul, Brazil. E-mail: joãogt@ufscpa.edu.br Orcid: https://orcid.org/0000-0002-2789-9189
[4]Enfermeira, Mestranda do Programa de Pós-Graduação em Tecnologias da Informação e Gestão em Saúde. Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA). Porto Alegre, Rio Grande do Sul, Brazil. E-mail: natila@gmail.com Orcid: https://orcid.org/0000-0002-8935-8847

Corresponding Author
Michele da Rosa Costa Sarmento Leite Street, 245 - Historic Center, Porto Alegre, RS, Brazil. Zip Code 90050-170 - Contact: 51 992596941 Email: michele.lcosta@yahoo.com.br

Submission: 19-12-2024
Approval: 04-07-2025

ABSTRACT
Cancer is one of the main causes of global mortality, with a growing incidence, including in Brazil. The use of Low Intensity Laser Therapy (LLLT) or Photobiomodulação (FBM) in oncology still raises discussions, it is seen as an innovative technology with great potential in the care of oncological patients. Given its relevance, there is a growing need for training of nurses for its safe and effective use. This study **aims** to map the scientific evidence on the application of FBM in oncology, with the aim of basing the construction and validation of a training course for nurses. The adopted **methodology** is a scope review, guided by PCC (Population: nurses, Concept: oncology, Context: FBM). The review follows the PRISMA-ScR model and includes an analysis of relevant studies published in the main databases, apart from fifty literature. The **results** will be organized and presented in such a way as to contribute to the construction of a course aimed at training nurses not using FBM, with a view to expanding the possibilities of professional training in oncology. It is concluded that this scoping review provides a comprehensive view of the use of FBM in oncology patients, promoting innovations in clinical practice, improvements in patients' quality of life and advances in education.
Keywords: Neoplasms; Nursing; Low intensity Laser Therapy.

RESUMEN
El cáncer es una de las principales causas de mortalidad global, como una incidencia creciente, incluido Brasil. Embora o uso da Terapia com Laser de Baixa Intensidade (TLBI) ou Fotobiomodulação (FBM) em oncología y sin suscitar discusiones, ela é vista como una tecnología innovadora con gran potencial sin cuidado de pacientes oncológicos. Dada su relevancia, hay una creciente necesidad de capacitação dos enfermeiros para su uso seguro y eficaz. Este estudio tiene como **objetivo** mapear como evidencias científicas sobre la aplicación de FBM en oncología, como la intuición de embasar en la construcción y validación de un curso de capacitación para enfermeros. A **metodologia** adotada é a revisão de escopo, guiada pelo PCC (População: enfermeiros, Conceito: oncologia, Contexto: FBM). A revisão segue o model PRISMA-ScR e inclui a análise de estudos relevantes publicados nas principais bases de dados, além de literatura cinzenta. Los **resultados** serán organizados y presentados de forma a contribuir para la construcción de un curso voltado à capacitação de enfermeiros no uso da FBM, con vistas à ampliação das possibilidades de atuação profissional na oncologia. Se concluye que esta revisión de alcance proporciona una visión integral del uso de FBM en pacientes oncológicos, promoviendo innovaciones en la práctica clínica, mejoras en la calidad de vida de los pacientes y avances en la educación.
Palabras clave: Neoplasias; Enfermería; Terapia por Luz de Baja Intensidad.

RESUMO
O câncer é uma das principais causas de mortalidade global, com uma incidência crescente, inclusive no Brasil. Embora o uso da Terapia com Laser de Baixa Intensidade (TLBI) ou Fotobiomodulação (FBM) em oncologia ainda suscite discussões, ela é vista como uma tecnologia inovadora com grande potencial no cuidado de pacientes oncológicos. Dada a sua relevância, há uma crescente necessidade de capacitação dos enfermeiros para seu uso seguro e eficaz. Este estudo tem como objetivo mapear as evidências científicas sobre a aplicação da FBM em oncologia, com o intuito de embasar a construção e validação de um curso de capacitação para enfermeiros. A metodologia adotada é a revisão de escopo, guiada pelo PCC (População: enfermeiros, Conceito: oncologia, Contexto: FBM). A revisão segue o modelo PRISMA-ScR e inclui a análise de estudos relevantes publicados nas principais bases de dados, além de literatura cinzenta. Os resultados serão organizados e apresentados de forma a contribuir para a construção de um curso voltado à capacitação de enfermeiros no uso da FBM, com vistas à ampliação das possibilidades de atuação profissional na oncologia. Conclui-se que esta revisão de escopo proporciona uma visão abrangente sobre o uso da FBM em pacientes oncológicos, promovendo inovações na prática clínica, melhorias na qualidade de vida dos pacientes e avanços na educação.
Palavras-chave: Câncer; Enfermagem; Terapia a Laser de Baixa Intensidade.

REVISTA ENFERMAGEM ATUAL IN DERME

INTRODUCTION

Cancer remains one of the leading causes of mortality worldwide. Annually, the disease accounts for approximately 8.2 million deaths, with the highest proportion occurring in Asia (54.8%), followed by Europe (21.5%), the Americas (15.8%), Africa (7.2%), and Oceania (0.7%). This global pattern is mirrored in Brazil, where an estimated 704,000 new cancer cases are projected each year for the 2023–2025 triennium[1,2].

The primary approaches to cancer treatment encompass surgery, radiotherapy, and chemotherapy, which may be employed either individually or in combination. The choice of approach depends on the type of neoplasm diagnosed, the characteristics and responsiveness of the tumor to each therapy, the stage of the disease (extent of dissemination), and the patient's overall clinical condition. The main objectives of treatment are to achieve a cure, prolong survival, and enhance quality of life[3–5].

Oncology has witnessed substantial advancements in diagnostic and therapeutic technologies, contributing to increased survival rates and enhanced quality of life for individuals living with cancer. Nursing plays a critical role in the care of oncology patients, with its practices firmly rooted in scientific evidence to support the effective utilization of essential technological resources. These resources are vital not only for cancer prevention but also for managing the side effects and adverse events associated with treatment, which can significantly affect patients' quality of life[6].

Despite existing reservations about the use of laser therapy in oncology patients, photobiomodulation (PBM), which involves the application of non-ionizing light, classified by wavelength, to induce photochemical and photophysical reactions in tissues, has emerged as a promising strategy for mitigating adverse reactions and events related to cancer treatment. This is attributed to its anti-inflammatory, analgesic, and tissue-healing properties[7].

However, as an emerging technology, PBM requires ongoing scientific updates and technological proficiency to ensure its effective application in clinical care. To safely operate PBM devices and implement the therapy across its various clinical indications, nurses must be appropriately trained and qualified through continuing education, including non-degree courses or graduate programs[8].

Given the above, there is a clear need to provide training for nurses in the use of laser therapy within oncology, thereby expanding their professional opportunities in cancer treatment settings. This study is therefore justified as a contribution to the growing body of knowledge on the subject. Accordingly, the objective of this study is to map the key concepts related to the use of low-level laser therapy in oncology patients, with the aim of supporting the development and validation of a specialized training course for nurses.

METHOD

Following the search, studies will be screened and excluded if they are duplicates, published more than five years ago, not freely

REVISTA ENFERMAGEM ATUAL IN DERME

accessible, or presented as editorials, letters to the editor, opinion pieces, or animal research.

Regarding the inclusion criteria, the scoping review will consider original research articles, experience reports, narrative and integrative reviews, dissertations and theses, specialization course final papers, and manuals published by the Ministry of Health. To be eligible, documents must be available in full-text electronic format, written in English or Portuguese, and address topics related to training programs for oncology nurses and the use of low-level laser therapy.

This protocol outlines the development process of a scoping review (SR). Scoping reviews are commonly employed to identify the key concepts that underpin and inform a specific field of study, as well as to facilitate the understanding of operational definitions and the delineation of conceptual boundaries within a given topic[9].

The formulation of the guiding research question was informed by the PCC framework, where P (Population) refers to nurses, C (Concept) to oncology, and C (Context) to low-level laser therapy. Based on this framework, the guiding question was established as: What are the documented approaches and outcomes related to the application of photobiomodulation in oncology patients?

This protocol adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-ScR) checklist[10]. The study was conducted following the methodology proposed by the Joanna Briggs Institute (JBI), which includes five essential steps: (1) identification of the research question; (2) identification of relevant studies; (3) selection of studies for inclusion; (4) data mapping; and (5) collection, synthesis, and reporting of results[9].

The online search for relevant materials will be conducted using the following databases: Medical Literature Analysis and Retrieval System Online (Medline), Latin American and Caribbean Health Sciences Literature (LILACS), EMBASE, and SCOPUS. For gray literature, Google Scholar was used due to its extensive coverage, relevance to the topic, and access to full-text documents. The search was performed between September and October 2024.

The search terms were adapted for each database as outlined in Table 1.

Table 1 - Search Terms Used to Conduct the Scoping Review

Database	Search Expression
LILACS	((“Low-Level Light Therapy” OR “Laser therapy” OR Photobiomodulation OR “Laser Phototherapy”) AND (Oncology OR Neoplasms OR Neoplasm OR cancer OR "Oncology patients"))

REVISTA ENFERMAGEM ATUAL IN DERME

Medline	(("Low-Level Light Therapy"[All Fields] OR "Laser therapy"[All Fields] OR ("Low-Level Light Therapy"[MeSH Terms] OR ("low level"[All Fields] AND "light"[All Fields] AND "therapy"[All Fields]) OR "Low-Level Light Therapy"[All Fields] OR "photobiomodulation"[All Fields]) OR "Laser Phototherapy"[All Fields]) AND ("neoplasms"[MeSH Terms] OR "neoplasms"[All Fields] OR "oncology"[All Fields] OR "oncology s"[All Fields] OR ("neoplasm s"[All Fields] OR "neoplasms"[MeSH Terms] OR "neoplasms"[All Fields] OR "neoplasm"[All Fields]) OR ("neoplasm s"[All Fields] OR "neoplasms"[MeSH Terms] OR "neoplasms"[All Fields] OR "neoplasm"[All Fields]) OR ("cancer s"[All Fields] OR "cancerated"[All Fields] OR "canceration"[All Fields] OR "cancerization"[All Fields] OR "cancerized"[All Fields] OR "cancerous"[All Fields] OR "neoplasms"[MeSH Terms] OR "neoplasms"[All Fields] OR "cancer"[All Fields] OR "cancers"[All Fields]) OR "Oncology patients"[All Fields]))
Google Scholar	(("low level light therapy" OR "low level light therapy" OR "Photobiomodulation Therapy" OR "Photobiomodulation" OR "Low Level Laser Therapy" OR "Low Power Laser Irradiation" OR "Laser Phototherapy" OR "*laserterapia*" OR "*terapia a laser de baixa intensidade*" OR "*terapia a laser de baixa* potência") AND ("neoplasms" OR "Tumor" OR "Neoplasm" OR "Tumors" OR "Neoplasia" OR "*Neoplasias*" OR "Cancer" OR "Cancers" OR "Oncology patients" OR "oncology" OR "*oncologia*" OR "*pacientes oncologicos*") AND (nursing OR *enfermagem* OR *enfermeiros*)
EMBASE	((“Low-Level Light Therapy” OR “Laser therapy” OR Photobiomodulation OR “Laser Phototherapy”) AND (Oncology OR Neoplasms OR Neoplasm OR cancer OR "Oncology patients"))
SCOPUS	((“Low-Level Light Therapy” OR “Laser therapy” OR Photobiomodulation OR “Laser Phototherapy”) AND (Oncology OR Neoplasms OR Neoplasm OR cancer OR "Oncology patients"))

Source: The Author, research data, 2024

Data from the selected studies were organized in a clear and systematic manner, offering a comprehensive and up-to-date overview of the study topic. The Rayyan tool will be utilized to manage and organize the selected articles.

REVISTA ENFERMAGEM ATUAL IN DERME

The results will be presented in a table containing the following information: title, year of publication, language, professional field of the individual applying PBM, academic background of the authors, type of study, region where PBM was applied, outcome (satisfactory or not), and observed improvements. The discussion of results will be conducted descriptively, highlighting and relating the main findings to elucidate the theoretical and methodological approaches relevant to the research topic. The image below (Table 2) illustrates the template used for synthesizing the results.

Table 2 - Search Terms Used to Conduct the Scoping Review.

Title	Year	Language	Professional Field of the Practitioner	Academic Background of the Authors	Type of Study	Region of Application	Satisfactory Outcome (Yes/No)	Observed Improvements

Source: The authors, (2024)

DATA PRESENTATION

Once the searches are completed and the inclusion criteria have been applied, two independent nurse researchers will conduct the review as outlined in the previous stage. They will screen the titles and abstracts to identify the most relevant studies for full-text analysis. In cases of disagreement between the two reviewers, a third researcher will be consulted to assess the study and provide a final decision regarding the discrepancies.

Once the relevant articles and publications have been selected, a critical analysis of the findings will be conducted, followed by a theoretical discussion aligned with the research objective and guiding question. This process will also involve identifying the strengths and limitations associated with the topic. The ultimate goal is to highlight best practices and evidence-based recommendations that will inform the development and validation of a training course for nurses, with an emphasis on their continuous professional development.

Upon completion of this review protocol, the scoping review will be carried out and concluded with the development of the final product: a training course for nurses focused on the application of photobiomodulation (PBM) in oncology patients.

EXPECTED RESULTS

This scoping review is expected to identify how PBM has been utilized for the treatment and/or prevention of lesions, as well as

REVISTA ENFERMAGEM ATUAL IN DERME

to analyze best practices and recommendations for the safe and effective application of PBM.

CONCLUSION

The purpose of this scoping review is to provide a comprehensive understanding of the use of photobiomodulation (PBM) in oncology patients, promoting innovation in clinical oncology practice and enhancing patients' quality of life, while also contributing to the continuing education and professional development of nurses.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

REFERENCES

1. Santos MO, Lima FC, Martins LFL, Oliveira JFP, Almeida LM, Cancela MC. Estimativa de Incidência de Câncer no Brasil, 2023-2025. Rev. Bras. Cancerol. 2023;69(1):e-213700. doi: DOI: 10.32635/2176-9745.RBC.2023v69n1.3700
2. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA: a Cancer J Clinicians. 2021;71(3): 209–249, 2021. doi: https://doi.org/10.3322/caac.21660.
3. Instituto Nacional de Câncer (BR). Estimativa 2023: incidência de câncer no Brasil [Internet]. Instituto Nacional de Câncer. Rio de Janeiro: INCA; 2022.
4. Ministério da Saúde (BR). Manual de Bases Técnicas em Oncologia. Sistema de Informação Ambulatorial do SUS - SIA/SUS. 30. ed. Brasília-DF; 2022.
5. Instituto Nacional do Câncer (Brasil). ABC do câncer: Abordagens básicas para o controle do câncer. 6. ed. Rio de Janeiro: INCA; 2020, 114p.
6. Castro HA. Contribuições da equipe de enfermagem no tratamento de feridas neoplásicas: estudo de revisão [Trabalho de Conclusão de Curso]. Goiás: PUC Goiás, 13 dez. 2022.
7. Freitas KABS, Minicucci EM, Silva VFB, Menozzi BD, Langoni H, Popim RC. Efectos de la fotobiomodulación (láser de 660 nm) sobre la extravasación de antraciclinas: estudio experimental. Rev latino-americana de enfermagem. 2022;30:e3693. doi: 10.1590/1518-8345.5786.3693.
8. Conselho Regional de Enfermagem do Paraná. Parecer Técnico COREN/PR Nº 003/2022. Aplicação de Laserterapia de baixa frequencia por Enfermeiro
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. JBI Manual for Evidence Synthesis. Adelaide: JBI; 2020. Doi: 10.46658/JBIMES-20-1
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. Annals Internal Medicine. 2018;169(7): 467–473. doi.org/ 10.7326/M18-0850

Funding and Acknowledgments:

Nothing to declare.

Declaration of Conflict of Interest

Nothing to declare.

Author Contributions:

Contributed substantially to the conception and/or planning of the study. 2. Obtained, analyzed, and/or interpreted the data. 3. Wrote and/or critically reviewed the study, and approved the final version.

REVISTA ENFERMAGEM ATUAL IN DERME

Scientific Editor: Francisco Mayron Morais Soares. Orcid: https://orcid.org/0000-0001-7316-2519