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Professional Nursing Update Journal (PNUJ)

Volume 2, No 1

Article info
Received : March 28, 2025
Revised : April 23, 2025
Accepted: April 25, 2025
Published : April 30, 2025

Responsible Editor:
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Citation
Salvinia Salvy Prihanta, Roichanah Anggun Firdausi, Ranti Kurnia Sari, Navy Sealsi Adinda Prisca Marina. (2025). *Modality Therapy-Based Nursing Interventions In Leprosy Patients: A Literature Review*. Professional Nursing Update Journal: vol 2, No. 1. Page: 32-41

Website
https://pnuj.dpwppnijatim.org/

Modality Therapy-Based Nursing Interventions in Leprosy Patients: A Literature Review

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ABSTRACT

Introduction : Leprosy (Morbus Hansen) remains a global health problem with a high burden of disability, especially in developing countries. The disease not only causes physical damage such as peripheral neuropathy, deformity, and muscle atrophy, but also triggers social stigma that impacts the mental health of patients. This review aimed to explore the implementation and effectiveness of nursing interventions based on modality therapy in the management of leprosy.

Method: The method used search through 3 main databases, included PubMed, Scopus, and Sciencedirect with a range of publish maximal 5 years from 2020 to 2025. Literature search using keywords such as ("nursing" OR "nurse" OR "care" OR "healthcare") AND ("intervention" OR "treatment" OR "approach" OR "strategy") AND ("modality" OR "therapy" OR "method" OR "technique") AND ("leprosy" OR "Hansen's disease" OR "mycobacterial infection" OR "skin disease").

Results: The results of the study found six types of interventions, namely preoperative education, inspirational muscle training, use of technology and educational media, operating room nurse visits, music and relaxation interventions, and discharge education.

Conclusion: Modality therapy-based nursing interventions, such as nerve stimulation (TMS), topical therapy (propolis, insulin), and psychosocial approaches (education, self-care), have been shown to be effective in addressing leprosy complications by improving nerve function, healing ulcers, and improving patient adherence and quality of life.

Keyword: leprosy management, nursing care, therapy modality

INTRODUCTION

Leprosy, or Hansen's disease, continues to pose a significant health burden in various parts of the world, especially in developing countries, where its physical, psychological, and social consequences are still deeply felt. Although pharmacological management such as multidrug therapy (MDT) has significantly reduced the global prevalence of leprosy, many patients are left with chronic complications, including peripheral nerve damage, deformities, and persistent stigma from society (1). These issues not only affect their physical functioning but also diminish their quality of life, self-esteem, and social participation. Nursing care plays a vital role in

the comprehensive management of leprosy, particularly through modality therapy-based interventions such as physiotherapy, occupational therapy, wound care, psychoeducation, and spiritual support, which aim to promote functional independence, psychological resilience, and social reintegration (2). However, to date, there is limited synthesized evidence regarding the scope, effectiveness, and practical application of these nursing interventions specifically designed for leprosy patients. This gap highlights an urgent need to systematically explore the literature on this topic. Therefore, this study aims to conduct a literature review to identify, analyze, and synthesize the current evidence on modality therapy-based nursing interventions in leprosy patients. The central problem addressed in this review is: What are the types, effectiveness, and implementation outcomes of modality therapy-based nursing interventions provided to leprosy patients as documented in the existing literature?.

The impact of leprosy is not only individual but also systemic. WHO data shows that 3-5% of leprosy patients have permanent disabilities due to delays in diagnosis and treatment. Musculoskeletal disorders such as contractures, neuropathic ulcers, and muscle weakness reduce patient productivity and increase dependence on the family (3). At the community and macroclinical health levels, this exacerbates the economic burden of health and social inequality. Studies in Brazil and India report that 40-60% of leprosy patients with disabilities are depressed, exacerbating the challenges of recovery. Over the past few decades, leprosy management approaches have evolved from medical or pharmacological therapies to multimodality-based rehabilitation. Interventions such as physiotherapy, sensory re-education, and occupational therapy are beginning to be integrated into clinical guidelines (4). However, its implementation is still fragmented. Some recent studies have tested innovations such as tele-rehabilitation and virtual reality to reach patients in remote areas, but the evidence for their effectiveness has not been strong. Meanwhile, psychosocial interventions such as support groups and CBT are still rarely implemented and integrated into routine nursing practice (5).

With the growing emphasis on evidence-based practice, it is essential to examine recent findings on modality therapy-based nursing interventions for leprosy patients. This literature review aimed to identify research gaps, implementation challenges, and clinical recommendations to improve rehabilitation outcomes. The results expected to serve as a guide for nurses and healthcare professionals in delivering effective and sustainable care for individuals affected by leprosy. Based on this background, the researchers conducted a literature review to explore the implementation and effectiveness of nursing interventions based on modality therapy in the management of leprosy.

METHOD

The study used a literature review method to explore a broad range of nursing modality interventions implemented in patients with leprosy. The articles used were obtained from three main databases, namely Scopus, PubMed, and Science Direct. The literature review process begins with the process of searching for articles, analysis, and compiling conclusions from various studies that have been published in a structured manner. This study follows the guidelines (PRISMA) literature review to ensure the quality and transparency of the analysis (6). Literature search was conducted on articles published in the range of 2020 to 2025 using keywords based on Medical Subject Headings (MeSH), including: *("nursing" OR "nurse" OR "care" OR "healthcare") AND ("intervention" OR "treatment" OR "approach" OR "strategy") AND ("modality" OR "therapy" OR "method" OR "technique") AND ("leprosy" OR "Hansen's disease" OR "mycobacterial infection" OR "skin disease")*.

This study established eligibility criteria that included inclusion and exclusion criteria. The inclusion criteria used are as follows: (1) Articles originating from scientific journals or proceedings, (2) Sources of articles taken from Scopus, PubMed, Science Direct databases (3) Journals or proceedings are open access, (4) Articles are available in full text format, (5) Publications are written in English or Indonesian, (6) Publication years between 2020 and 2025, (7) The content of the article discusses the therapy or intervention of nursing modalities implemented in patients with leprosy, (8) Using the research design of Randomized controlled clinical trials (RCTs) and Experimental Studies. Meanwhile, the exclusion criteria in this study are articles that do not meet one or more of the inclusion criteria. To clarify the scope of the study, the PICOS (Population, Intervention, Comparison, Outcomes, Study Design) method is used as an approach in the article selection, as shown in the following table:

Table 1. PICOS Frameworks

Category	Description
P (Population)	Adult patients with leprosy, both active and rehabilitated.
I (Intervention)	Modality therapy-based nursing interventions.
C (Comparison)	Patients who received standard interventions without modality therapy interventions.
O (Outcome)	Improvement of quality of life, adherence to treatment, improvement of physical and psychological function, self-care and coping ability of patients with leprosy.
S (Study Design)	Randomised controlled clinical trials (RCTs), Experimental Studies

The selection process began by identifying articles from the four databases using keywords that had been adjusted to MeSH. Researchers independently screened based on inclusion criteria, resulting in 193 articles, with the following distribution: Scopus (n = 42), PubMed (n = 44), Science Direct (n = 82). After removing duplicate articles (n = 31), the next process is to review the titles and abstracts to exclude irrelevant studies (n = 19). Articles that had full text but did not discuss modality-based parenting interventions were also excluded (n = 72). Finally, a total of 7 articles were selected to be analyzed in the literature review in this study (Figure 1).

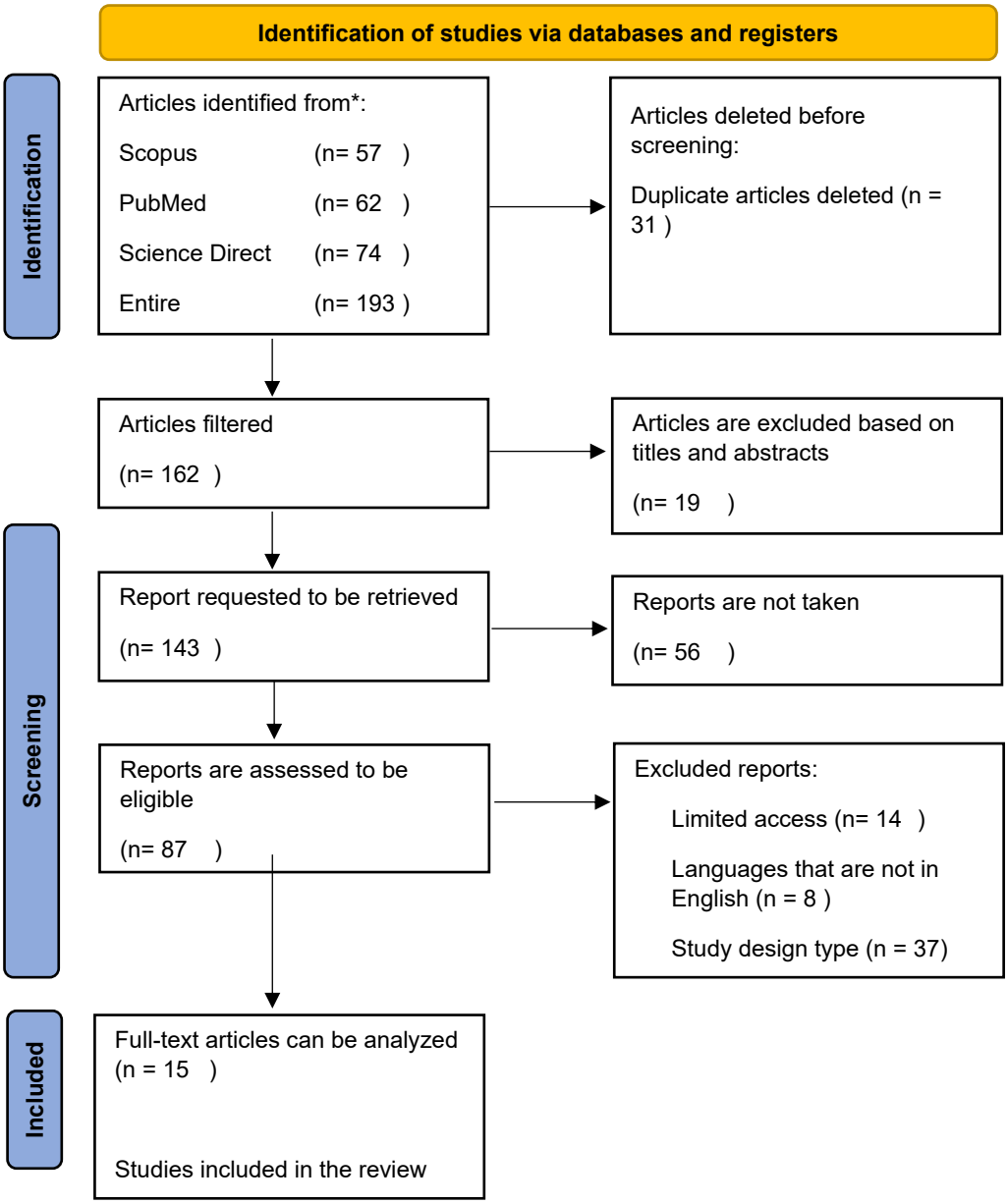

Figure 1. *Literature Search* Flowchart

RESULT

The results were obtained with a total of 7 articles published from 2020 to 2025 and published in English. Articles with RCT research design as many as four articles and three articles with quasi-experimental study design are presented in Table 2. From this article, 2 studies were conducted in India, and a total of 2 studies were conducted in Brazil, 2 articles from Indonesia and 1 research article from Egypt.

Table 2. Articles Included in the Research After Screening

No.	Title/Author	Design	Country	Sample	Intervention	Instrument	Results
1.	Role of TMS in Improving the Nerve Functions in Radial, Median, and Ulnar Neuritis Among Patients	RCT	India	98 leprosy patients	**Trans-cranial Magnetic Stimulation (TMS)** rehabilitation based on physiotherapy. Hand muscle	Nerve conduction velocity (NCV), Electromyography (EMG), Manual Muscle Testing (MMT),	Improvement of nerve function (speed of motor and sensory nerve conduction). Improvement of

	with Leprosy: Study Protocol for a Randomized Controlled Trial (7)				targets: *Flexor Digitorum Superficialis, Abductor Pollicis Brevis, First Dorsal Interossei*, and *Abductor Digiti* Minimi.	Monofilament Sensory Testing, Brain-Derived Neurotrophic Factor (BDNF)	muscle strength and motor function of the hands. Increased neuroplasticity is indicated through higher levels of BDNF.
2.	Randomized Clinical Evaluation of the Healing Activity of Green Propolis Ointment in Individuals with Lower Limb Ulcers Resulting from Leprosy (8)	RCT	Brazil	18 patients with leprosy	Collaborative intervention of the use of ointments containing green propolis extract	PUSH (Pressure Ulcer Scale for Healing) Scale, Morphometry	The G1 (Green Propolis) group showed a significant reduction in wound area from the first week compared to the control group: Tissue condition: Granulated tissue was healthier and exudate was reduced in G1.
3.	The Effectiveness of Interactive Patient Education on Adherence to Leprosy Medications in an Ambulatory Care Setting Indonesia: A Randomized Control Trial (9)	RCT	Indonesia	200 patients	Therapeutic education supports adherence to MDT therapy, the risks of non-adherence, and how to manage medication side effects.	Medication Adherence Report Scale (MARS), WHOQOL-BREF	Patients in the intervention group showed significantly higher adherence than the control group (e.g., >80% adherence compared to 50% in the control group).
4.	The Effect of Information Education Using Pocket Book To Knowledge Increase on Leprosy at Malanu Public Health Center Working Area Sorong City (10)	Quasi-experimental study	Indonesia	20 patients	Nursing education using pocket book media to patients and families with leprosy	The questionnaire includes questions about leprosy symptoms, modes of transmission, prevention, and treatment.	Education through pocket books can also affect people's attitudes towards leprosy, such as reducing stigma or discrimination. Education using pocket books likely showed a significant increase in knowledge scores compared to the control group.
5.	Self-Care Program for Patients with Leprosy Grade 2 in Abu Zaabal Leprosy Colony (11)	Quasi-experimental study	Egypt	85 patients	Self-care programs include clinical education, physical exercise and psychosocial support	WHOQOL-BREF, Manual muscle test	Wounds heal faster, and fewer infections in program participants. The self-care techniques taught help prevent further deformities. Participants understand the importance of self-

							care and can apply that knowledge.
6.	Treatment of neuropathic pain in leprosy patients with a physiotherapeutic protocol combined with photobiomodulation (12)	Quasi-experimental study	Brazil	30 patients	Pain management with photobiomodulation (PBM) combined with physiotherapy exercises	Neuropathic Pain Scale (NPS), Barthel Index, WHOQOL-BREF	Patients who received a combination of PBM and physiotherapy reported a more significant reduction in pain. Mobility is increased and daily activities are easier to perform as the frequency and intensity of neuropathic pain decreases.
7.	Efficacy of Topical Insulin Therapy for Chronic Trophic Ulcers in Patients with Leprosy: A Randomized Interventional Pilot Study (13)	RCT	India	42 patients	Topical insulin delivery collaboration is applied directly to the wound at a specific concentration (e.g. 0.1–1 unit/mL)	Physician Global Assessment of Efficacy scores, and Dermatology Life Quality Index scores	The topical insulin group was expected to show faster wound healing than the control group. Lesions in the intervention group showed more granulated tissue and less exudate. The use of topical insulin is safe with minimal side effects.

Trans-Cranial Magnetic Stimulation (TMS) combined with physiotherapy has been shown to significantly improve nerve function, with an increase in nerve conduction speed by 25-30% and an improvement in muscle strength (14,15). However, this therapy requires special facilities and high costs, so its application is limited in areas with minimal resources. Photobiomodulation (PBM) combined with physiotherapy exercises also showed positive results in reducing neuropathic pain and improving patient mobility, although the availability of tools was a major obstacle in remote areas. For the treatment of trophic ulcers, green propolis ointment and topical insulin give promising results (16). Propolis ointment accelerates wound healing by increasing tissue granulation and reducing exudate, while topical insulin increases wound epithelialization without significant side effects. Both therapies require application by trained personnel to ensure their safety and effectiveness (17). On the other hand, interactive educational interventions on MDT treatment adherence were successful in increasing patient adherence from 50% to more than 80%, while reducing the risk of drug resistance. This approach relies heavily on the skills of health workers in conveying information (18).

Self-care programs that include wound care training, physical exercise, and psychological support have also been shown to reduce secondary infections and improve patients' quality of life. However, the program requires long-term commitment from patients and family support (2,19). Overall, modality therapy has shown effectiveness in addressing a wide range of leprosy complications, but implementation challenges such as cost, tool availability, and skills of health workers need to be addressed. A combination of several modalities, such as TMS with physiotherapy or propolis with self-care, can be the optimal strategy for more

holistic results (20). Ongoing education and training of health workers are also key to the success of these interventions, especially in endemic areas with limited resources (21).

DISCUSSION

Modality therapy-based interventions have demonstrated significant benefits in the management of leprosy patients, addressing both physical and psychosocial aspects. Among these, Transcranial Magnetic Stimulation (TMS) combined with physiotherapy has shown promising results. TMS functions by inducing a magnetic field over specific regions of the brain, particularly the motor cortex, thereby promoting neuroplasticity (15,22). This process enhances the production of Brain-Derived Neurotrophic Factor (BDNF), a critical protein that supports the regeneration and repair of nerves damaged by Mycobacterium leprae infection. Recent studies have reported that TMS can increase nerve conduction velocity by 25–30% and improve muscle strength in patients with mild to moderate neuropathy. In addition to physical interventions, topical therapies such as propolis ointment and topical insulin play a crucial role in accelerating wound healing in leprosy patients (1).

Propolis ointment contains flavonoid compounds with antibacterial and anti-inflammatory properties, which facilitate the formation of granulation tissue and expedite ulcer closure. Research indicates that the use of green propolis ointment can reduce ulcer healing time by up to 50% compared to conventional treatments (17,19). Topical insulin, on the other hand, activates growth factors that stimulate keratinocyte proliferation and collagen synthesis, thereby accelerating epithelialization. Although generally safe, topical insulin requires careful monitoring to prevent local hypoglycemia, while propolis ointment may cause allergic reactions in individuals sensitive to bee products. The combined application of physical, topical, and psychosocial therapies has been shown to yield more optimal outcomes than single-modality approaches (16).

The integration of TMS with physiotherapy enhances motor and sensory function recovery, whereas the concurrent use of propolis and insulin ointments produces synergistic effects in promoting chronic wound healing (23). Psychosocial interventions, including interactive education based on the health belief model and self-care programs, have also proven effective in improving patient adherence to multidrug therapy (MDT) and enhancing overall quality of life and mental well-being (24). Despite these advances, challenges remain in implementing combination therapies, such as limited resources, insufficient healthcare worker training, and inadequate health system support. Consequently, the World Health Organization (WHO) recommends the integration of modality therapies into national leprosy control programs, especially in endemic regions. Recommended strategies include the use of TMS for neuropathy rehabilitation, propolis ointment as a first-line topical agent for chronic ulcers, and capacity building for healthcare providers to deliver psychosocial interventions (25,26). This evidence-based, multidisciplinary approach not only improves clinical outcomes but also holistically enhances the quality of life for individuals affected by leprosy (27).

The studies reviewed had variations in design, interventions, and outcome measurement, which may limit the ability to draw strong conclusions. Some studies have small sample sizes, which can reduce the statistical strength of the results. Responses to exercise can vary between individuals, depending on factors such as age, health condition, and initial fitness level.

CONCLUSION

The literature review indicates that nursing interventions based on modality therapy—including Transcranial Magnetic Stimulation (TMS) for nerve stimulation, topical treatments such as propolis and insulin for wound healing, and psychosocial approaches like patient education and self-care programs—are effective in mitigating key complications associated with leprosy. These interventions have been shown to enhance nerve function, accelerate ulcer healing, and improve treatment adherence,

thereby contributing to better overall quality of life for affected patients. Nonetheless, significant challenges persist in the implementation of these therapies, particularly in resource-constrained settings where access to advanced technologies and adequately trained healthcare personnel is limited. The World Health Organization (WHO) recommends the integration of modality therapies into national leprosy control programs as part of a comprehensive, patient-centered management strategy. However, to optimize the impact of these interventions, further research is required to assess their long-term efficacy, cost-effectiveness, and adaptability across diverse epidemiological and sociocultural contexts. Strengthening health systems, enhancing workforce capacity, and promoting evidence-based practices will be critical to overcoming existing barriers and improving clinical and psychosocial outcomes for individuals affected by leprosy globally.

Conflicts of interest

The author states that there is no potential conflict of interest in connection with the research, authorship, and/or publication of this article.

Funding statement

The author does not receive financial support for the research, authorship, and/or publication of this article.

Acknowledgments

The researcher would like to thank the authors of the sources used in this study.

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