Migration Letters

Volume: 20, No: S4(2023), pp. 1286-1296

ISSN: 1741-8984 (Print) ISSN: 1741-8992 (Online)
www.migrationletters.com

Effects of Physiotherapy in Patients with Alzheimer's Disease: Analysis of the Intervention Methodology and Determination of the most Effective Degree of Involvement

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Abstract

The World Health Organization (WHO) estimates that currently more than 55 million people are living with dementia, accounting for 8.1% of women and 5.4% of men over the age of 65. Of these, approximately 10.3 million are in the Region of the Americas. This article examines the relevance and effectiveness of physiotherapy in the treatment of Alzheimer's disease (AD), focusing on how physiotherapy can impact the quality of life of individuals affected by AD at different stages of the disease. The methodology centered on data collection through reliable and relevant databases, ensuring the integrity of the research. Studies including individuals diagnosed with AD and cognitive assessments were examined. The results highlight the importance of tailoring physiotherapy treatments to the individual needs of patients based on their disease stage. Factors such as age, gender, and disease duration that may influence the response to physiotherapy in the context of AD were also explored. The article emphasized the need for future research, public awareness, and the development of specific physiotherapy protocols to more effectively address this neurodegenerative disease. It also concludes that physiotherapy plays a fundamental role in the treatment of Alzheimer's disease, as it can help maintain and improve the quality of life of affected individuals.

Keywords: *Physiotherapy, Physical Therapy, Alzheimer's, Intervention Methodology, Techniques, Situation Diagnosis, Degree of Affection.*

Introduction

Alzheimer's disease (AD) is a progressive neurodegenerative condition that places a significant burden on patients, their families, and healthcare systems worldwide(1). As the population ages, the prevalence of AD is expected to increase, underscoring the importance of finding effective approaches to address this disease. Alzheimer's disease continues to be the fifth leading cause of death among the U.S. population 65 and older. During the period between the years 2000 and 2019, death rates from stroke, heart disease, and HIV saw a significant decrease, while reported cases of Alzheimer's increased by more than 145% (2).

On the other hand, the World Health Organization (WHO) estimates that more than 55 million people are currently living with dementia, equivalent to 8.1% of women and 5.4% of men over the age of 65. Of these, approximately 10.3 million are in the Region of the Americas. Consequently, a significant increase in these numbers is expected, with

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projections indicating that the number of people affected by dementia could reach 78 million by 2030 and 139 million by 2050(1,2).

The risk of developing the disease increases significantly as people age. Similarly, genetic predisposition plays an important role in Alzheimer's disease, women, for example, have a slightly higher risk of developing Alzheimer's compared to men, this could be due in part to hormonal differences and genetic factors (1). On the other hand, conditions that affect heart and blood vessel health, such as high blood pressure, type 2 diabetes, high cholesterol, and obesity, have been associated with an increased risk of Alzheimer's (1,2).

From another perspective, head injuries, especially if they involve loss of consciousness, have been linked to an increased risk of Alzheimer's; Just like lifestyle, that is, elements such as physical activity, eating a balanced diet, smoking and even alcohol, can mean the beginning of this painful disease. Not to mention other factors such as depression, social isolation and low level of education, which have also been associated with an increased risk of Alzheimer's (3).

In view of the above, the Alzheimer's Association (1) explains that non-pharmacological treatments with therapeutic approaches allow the preservation or improvement of cognitive function, quality of life and level of participation, as well as the ability to carry out daily activities. In this context, physiotherapy plays an important role in contributing to these goals, thanks to the fact that physiotherapy includes specific physical activities and exercises designed to maintain or improve the mobility, coordination and physical strength of Alzheimer's patients.

According to Spanakis et al (3), the progressive deterioration of the neuromuscular system with age is an intrinsic consequence of aging, which makes physiotherapy essential for older people, especially those facing neurological disorders. It should be noted that physiotherapy has been highlighted as a potentially beneficial intervention in the management of AD, this therapy can address a variety of aspects, including patients' physical function, mobility and quality of life (4). However, the effectiveness of physiotherapy in patients with AD and the identification of the most effective degree of involvement are issues that require careful evaluation.

In the current literature, studies investigating the effects of physiotherapy in patients with AD have been published, where it is stated that physiotherapy can complement pharmacological therapies, including the use of extracellular vesicles or other neuroprotective approaches, this, because the exercises and physical stimulation provided by physiotherapy can help maintain mobility. coordination and muscle strength in patients with neurodegenerative disorders(5,6).

According to Bispo (7), in the context of health systems, the aim is to expand and diversify physiotherapy practices, taking into account the levels of care, the scope of intervention and the activities carried out. These extensions are based on the following fundamental principles which imply, focusing on functionality as the main objective; adopt a broad concept of health; provide comprehensive care; and engage with health needs and their determinants. That is why this systematic review aims to "carry out a systematic review on the effects of physiotherapy in patients with Alzheimer's disease, focusing on the analysis of the intervention methodology used and the determination of the most effective degree of involvement

To achieve this goal, this systematic review will conduct a comprehensive exploration of the literature related to physiotherapy in patients with Alzheimer's disease. The purpose is to address the following research questions: What is the prevalence of physical therapy as part of the treatment of Alzheimer's disease?; How do factors such as age, gender, and duration of illness affect patients' response to physical therapy in the context of Alzheimer's disease? What are the most commonly used physiotherapy intervention methods in the treatment of patients with Alzheimer's disease? What is the most effective

degree of involvement of Physiotherapy in patients with Alzheimer's? and What are the effects of physiotherapy on patients with Alzheimer's?

This article aims to contribute to the current knowledge about physiotherapy in patients with AD, providing a synthesis of the results of previous studies and evaluating the intervention methodology used in these studies. In doing so, we hope to identify patterns and trends in the effectiveness of physiotherapy based on the degree of involvement of patients with AD.

Methods

The present work corresponds to a research design of documentary type since systematic reviews and scientific studies on the effects of physiotherapy in patients with Alzheimer's disease and the intervention methods used during physical therapies have been consulted.

Search strategies: To prepare the following literature review article, an extensive search was carried out in scientific databases such as: SCOPUS, SCIELO, PUBMED, REDALYC, PROQUEST, TAYLOR AND FRANCIS and institutional pages in the area of health. In the search equations, descriptors in Health Sciences will be used using keywords such as: Physiotherapy, Physical Therapy, Alzheimer's, Dementia, Intervention methodology, Techniques, Diagnosis of the situation, Degree of affectation, using the different Boolean operators such as "AND", "OR", "NOT".

As inclusion criteria, articles with a range of years between 2019 and 2023 were considered, in health-related journals that contain topics relevant to the effects of physiotherapy in patients with Alzheimer's disease and the intervention methods used during physical therapies, all of this Associated with health care, they were collected from reliable sources such as articles or books in different languages such as Spanish, English and Portuguese, taking into account research that answers the questions raised on the subject.

The exclusion criteria were articles that were not relevant to the topic, information extracted from scientific articles from Internet pages of unreliable sources such as blogs or research without bibliographic references, the use of undergraduate and graduate theses was discarded and research that does not present information on the topics of the subject was excluded.effects of physiotherapy in patients with Alzheimer's disease and intervention methods used during physical therapies.

Results

For the selection of articles, both the research questions and their breakdown were taken into account, along with the previously defined inclusion and exclusion criteria. Once the relevant studies were identified, information was extracted from each of them, including the year of publication, the type of study, the specific population, the characteristics of the intervention and the control group, as well as the key results related to the topic analyzed.

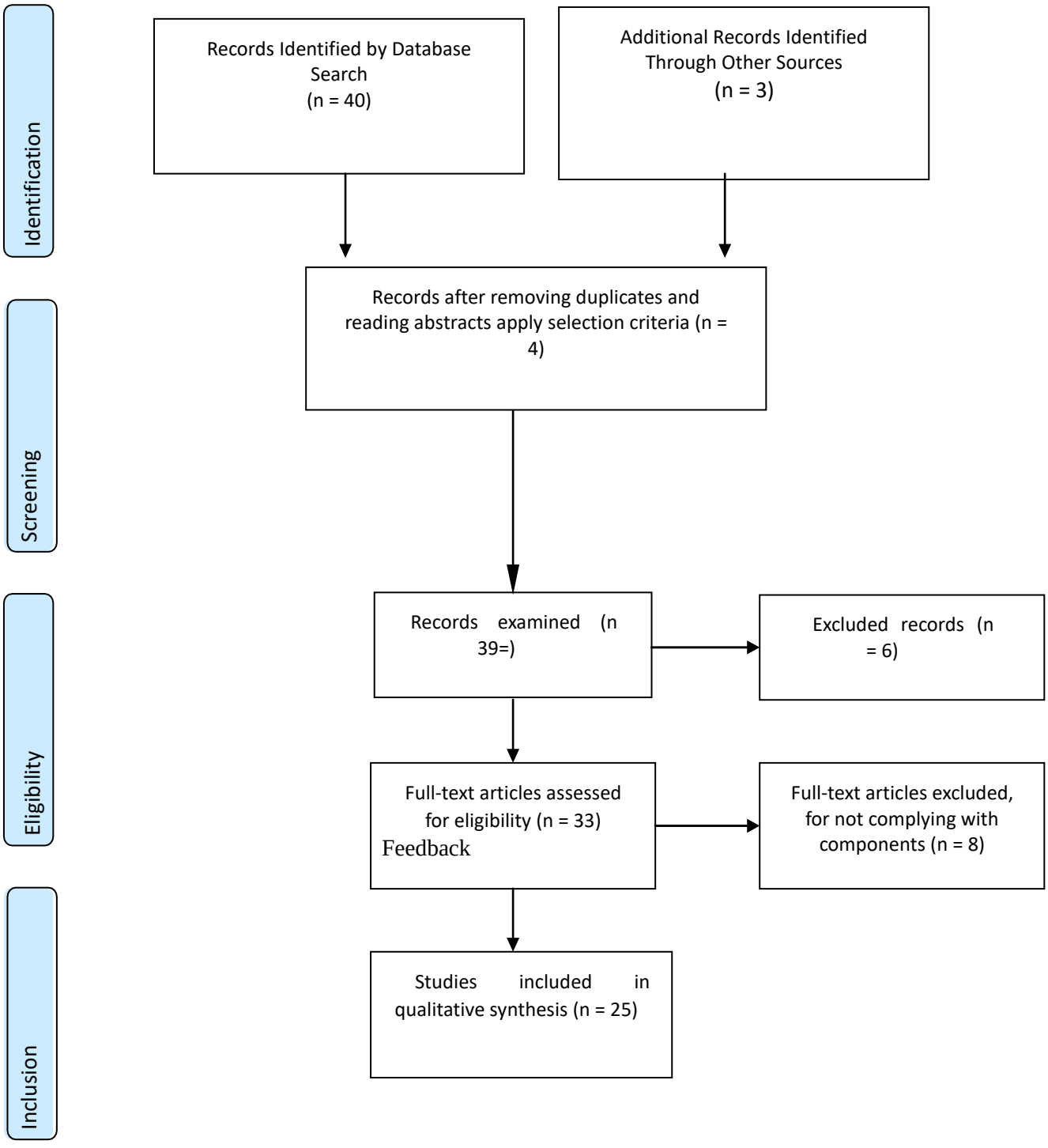
Board 1. Study Identification and Selection

Search Strategies	Pubmed	Scopus	Proquest	Scielo	Tylor And Francis	Redalyc	Total, art
Physiotherapy OR Physical Therapy AND Alzheimer's OR Dementia	5	2	3				10

Intervention methodologies AND physiotherapy AND Alzheimer's disease	1		1	1			3
Physiotherapy OR Physical Therapy AND Alzheimer's AND Degree of involvement	1	1		1	3	1	7
Physiotherapy AND Techniques OR Intervention methods And Alzheimer's	1	1	2	2	3	1	10
Physiotherapy AND Techniques OR Intervention methods And Alzheimer's	1	1	2	2	3	1	10
Total	9	5	8	6	9	3	40

To carry out the extraction, selection and inclusion of the articles, an information storage matrix was created in a Microsoft Excel sheet dedicated to each selected article. Then, a process of triangulation of the content was carried out, with the purpose of identifying duplicates and evaluating the suitability according to the established inclusion and exclusion criteria. This process is graphically represented in the PRISMA flowchart.

Illustration 1. Prism Item Selection Flowchart



This section shows the interpretation of the results obtained from the previously established research questions. Related findings on the effects of physical therapy for patients with Alzheimer's disease are presented below.

Physical therapy plays an important role in the comprehensive treatment of Alzheimer's disease, as it can help maintain and improve the quality of life of those affected (5,6). However, the prevalence of physical therapy as part of the treatment of Alzheimer's disease can vary depending on factors such as geographic location, availability of health

services, and public awareness. In recent times, there have been more opportunities for physical therapists to care for older adults with Alzheimer's, whether in long-term care settings, during acute-phase care, convalescence, or home health care (8).

Experimental research was conducted involving individuals aged 60 years or older who had received a clinical diagnosis of Alzheimer's disease (AD). Participants' cognitive function was assessed using well-established tools, such as the AD Cognitive Assessment Scale (ADAS-Cog11) or the Mini-Mental State Examination (MMSE) (8.9). All studies, regardless of their outcomes, were considered in this review. In addition, research incorporating exercises designed to improve balance, a skill that is essential in physiotherapy, were analyzed, these balance exercises were used as a therapeutic intervention and assessed using outcome measures that quantified both static and dynamic balance. It is important to note that interventions that consisted only of balance exercises and did not include a control group were excluded, allowing the effects of the therapeutic intervention to be compared in the context of physiotherapy (9).

Another study, looking at specific groups, showed a significantly positive correlation between the duration of exercise sessions and improved global cognition ($p = 0.03$). Exercise sessions lasting 30 to 45 minutes were found to have a more noticeable effect compared to exercise sessions lasting longer than 45 minutes (10). Consistent with these findings, they identified that, in patients with dementia, exercise sessions of up to 30 minutes had a more pronounced positive effect on cognition compared to sessions exceeding 30 minutes (11).

In the research by Coronado et al (12), 222 participants were reviewed in an average age range of 82.2 to 84.0 years, with a majority of women (80.2%). The selected studies obtained ratings of 4 to 8 out of 10 on the PEDro scale, indicating the quality of the trials, the interventions analysed included passive movements and massage as therapeutic approaches. The results focused on pain measurement, using tools such as the Pain Assessment Checklist for Older People with Limited Ability to Communicate (PACSLAC), Pain in Advanced Dementia (PAINAD), and Doloplus-2 Scale. The findings indicated that passive movement did not show significant improvement compared to no treatment. However, in one study, massage was found to have positive effects in reducing pain compared to no treatment (13).

However, patients' response to physiotherapy in the context of Alzheimer's disease may be influenced by a variety of factors, including age, gender, and duration of the disease (8,9). These factors play an important role in how patients experience and benefit from physical therapy, it is clear that Alzheimer's disease can be diagnosed in people of different ages, from early to late (9). People with early-onset Alzheimer's, i.e., before the age of 65, may benefit from physical therapy differently compared to those with late-onset (10).

Some studies suggest that there may be gender differences in response to physiotherapy in the context of Alzheimer's disease. For example, women may experience changes in motor function differently than men (10). In addition, gender differences in the representation of the disease in the brain may influence the response to treatment. On the other hand, gender roles and societal expectations can also influence how people respond to physical therapy. Differences in physical activities and social participation may vary by gender and affect response to treatment (11).

In the initial stages, patients may be more receptive to therapy and may be able to maintain functional skills for longer. In advanced stages, therapy may focus on maintaining comfort and quality of life (12). As Alzheimer's disease progresses, significant neurological changes occur, these changes can affect the patient's ability to participate in physical therapy effectively. For example, in advanced stages, they may experience increased difficulty understanding and following therapeutic instructions. Physiotherapists should conduct individual assessments and tailor treatment plans

according to the specific needs and characteristics of each patient, considering factors such as age, gender, and duration of illness (13,14). For the aforementioned reasons, physical therapy can play a valuable role in improving the quality of life for people with Alzheimer's disease, regardless of these factors, by addressing each patient's unique physical and functional needs.

It is known that the treatment of patients with Alzheimer's disease through physical therapy focuses on improving quality of life and maintaining physical functionality as much as possible. Based on data obtained from different investigations, it was possible to show that the most commonly used physiotherapy intervention methods in the treatment of patients with Alzheimer's disease include: muscle strengthening and resistance exercises, these muscle strengthening exercises help maintain muscle mass and strength, which is essential for mobility and functional independence (13,15).

Chen J, et al (16), claim that physiotherapists can perform gentle joint mobilizations to improve range of motion and reduce stiffness. The stretching method helps maintain muscle flexibility and can relieve muscle tension. It is important to clarify that physical therapists can work with the adult on activities of daily living, such as dressing, bathing, and eating, in order to maintain independence in these tasks for as long as possible (15,16). Physical therapists can provide guidance on how to exercise at home safely, as well as tips on preventing falls and managing mobility in everyday life.

Vinueza and Albuja (17) state that, among the methods of intervention in physiotherapy, the Alusti Test assesses the passive joint balance of the extremities, trunk control when sitting, standing ability, gait analysis and cardiorespiratory capacity of patients with Alzheimer's. In the evaluation of respiratory and cardiac functions in older adults, the use of the 6-minute walk test stands out as a commonly used tool. This test is widely used to measure exercise capacity and tolerance to exertion in patients with Alzheimer's (16,17).

Moreira's research (18) shows that, in the early phase of the disease, when the patient still retains the ability to walk, a physiotherapy intervention can be carried out aimed at strengthening the muscles, improving motor coordination and flexibility of the joints, this intervention contributes to reducing stiffness and pain. as the movement helps maintain range of motion in the joints, making it easier for the patient to coordinate and balance. Regarding the measurement of range of motion in patients with Alzheimer's, one study conducted passive evaluations to identify possible joint limitations (19). The results revealed that most of the joints had limitations in their mobility and after the intervention, an improvement in the mobility of the upper extremities was observed, but in the case of the lower extremities, a deterioration was recorded, possibly influenced by external factors not specified in the study.

As for the effectiveness of physiotherapy in patients with Alzheimer's disease, it may vary depending on the degree of involvement of the disease. Importantly, Alzheimer's disease progresses through different stages, from early to advanced stages, with each stage presenting specific challenges and needs in terms of physical therapy (18). In the early phase, patients still retain the ability to function relatively independently, so in this case physiotherapy can focus on maintaining physical function and preventing loss of strength and mobility (19). According to Atoki et al (20), during this stage memory problems deteriorate rapidly and the person may not be able to identify their close relatives, physiotherapy can help prevent these complications through passive mobilization techniques, stretching and proper positioning.

Already at an advanced degree, mobility and the ability to communicate can be significantly compromised. Patients may be confined to a wheelchair or bed (20,21). In this degree, physiotherapy focuses on the prevention of muscle contractures, joint deformities, and pressure ulcers through passive mobilizations, stretching, and proper positioning, breathing exercises can be used to maintain lung function and prevent respiratory complications (21).

In the treatment of patients with Alzheimer's disease in the early stage, where awareness of their forgetfulness and disturbances can cause anxiety and distress, various relaxation techniques such as Jacobson, Schultz, or Le Huche can be used, which have been shown to be effective (22). Massage, performed slowly and semi-deeply, can have a beneficial sedative effect. In addition, music therapy, by playing music from the patient's youth during physical therapy activities and sessions, can improve mood and alertness (19,20). Hydrotherapy, which includes pool immersion, gentle swimming, and hydrokinesitherapy, can provide a relaxing experience, external stimulation, and proprioceptive, which could help prevent or reduce problems related to body schema, balance, and spatial disorientation in this early phase of the disease (23)

A study conducted by Trevisan (24) explains that, in the intermediate stage, physiotherapy performs physical exercises to improve mobility, combined exercises to improve mobility and motor coordination. However, in the advanced stage, if these same exercises are applied, the percentages decrease significantly. These results demonstrate that all practices were statistically revealing when comparing choices between different stages of Alzheimer's disease. This reinforces the understanding that each stage of the disease involves differentiated behaviors that are related to a specific kinetic-functional assessment.

Thus, physiotherapy has beneficial effects in patients with Alzheimer's disease, these effects are based on the adaptation of physiotherapy treatments to the individual needs of patients and may vary depending on the stage of the disease and specific treatment goals (24). According to Marques et al (25), physiotherapy can help maintain and even improve motor function in Alzheimer's patients, especially in the early stages of the disease. Muscle-strengthening exercises, balance training, and coordination can help maintain mobility and prevent loss of function.

It should be noted that Alzheimer's patients may be prone to falls due to loss of balance and coordination (15,16). Physical therapy may include fall prevention programs that help reduce this risk. This may include specific exercises to improve stability and postural awareness (19). Similarly, physical therapy can use techniques such as therapeutic massage and stretching to relieve the pain and muscle stiffness that often accompany Alzheimer's disease (20). This can increase the patient's comfort and quality of life.

Some physical therapy sessions may incorporate activities that challenge cognition, such as following directions or remembering sequences of movements. This can help maintain cognitive function and mind-body connection. In addition, physical therapy can provide caregivers with the tools and techniques needed to assist their loved ones with Alzheimer's in managing physical needs, this can ease the caregiver's burden and improve the care provided to the patient (22).

In physiotherapy, assessment plays a crucial role in enabling the creation of personalised intervention plans for each patient (23) These plans are based on criteria established by tests and measures that generate performance indicators based on global clinical research standards. Importantly, there are tests and measures with significant levels of validity and reliability designed specifically for adults, facilitating the diagnosis, prognosis, and intervention process. The applicability of these tests depends on the physical and cognitive situation of each individual, and it is essential that they are practical, appropriate and accurate in measuring the functional status of each patient.

Conclusions

Through this research, it was concluded that:

Physical therapy plays a critical role in the treatment of Alzheimer's disease, as it can help maintain and improve the quality of life for those affected. Throughout the different

stages of the disease, physiotherapy is tailored to the individual needs of each patient. The prevalence of physical therapy as part of the treatment of Alzheimer's disease can vary depending on factors such as geographic location, availability of health services, and public awareness. In recent times, there have been more opportunities for physical therapists to care for older adults with Alzheimer's in various care settings.

Experimental research has shown that physical therapy can be beneficial for Alzheimer's patients, especially in the early stages of the disease. Muscle-strengthening exercises, balance and coordination training, as well as gentle joint mobilizations, can help maintain mobility and functional independence. Patients' response to physical therapy can be influenced by factors such as age, gender, and duration of illness, therefore it is important to tailor treatment plans based on these variables to provide a personalized approach. In the early stages of the disease, physical therapy may focus on improving physical function, reducing stiffness and pain, and maintaining independence in daily activities. In advanced stages, it focuses on the prevention of physical complications, such as muscle contractures and pressure ulcers. In addition to the physical benefits, physical therapy can have a positive impact on patients' emotional well-being.

This research highlighted the importance of physiotherapy in the treatment of Alzheimer's disease, future implications could include further research in this field to better understand the specific benefits of physiotherapy at different stages of the disease, as well as the identification of more effective and personalised therapeutic approaches. Since Alzheimer's disease affects people uniquely at each stage, it might be important to develop specific physical therapy protocols tailored to patients' individual needs.

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