

Research Article

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Application of an Adapted Physical Exercise Program in an Individual with Multiple Sclerosis

Chantzi E*, Baxevani C and Gioftsidou A

Democritus University of Thrace, School of Physical Education and Sport Science, Komotini, Greece

ABSTRACT

Multiple sclerosis is an autoimmune disease that affects the body's central nervous system and significantly affects the balance and control of the muscular system. The purpose of this work was to implement an interventional water exercise program in a 60-year-old woman with relapsing multiple sclerosis, with mild symptoms, to improve her physical and psychological condition as well as her general well-being, through the reduction of the effects of the disease. The exercise program lasted 2 weeks, for a total of 10 sessions, lasting 45 minutes each, mainly in the morning hours. The intervention took place during the patient's summer vacation and all sessions took place in a heated indoor pool, 1.50 m deep, of a hotel unit. In the first and last session, assessment tests were applied to determine the physical condition and wellbeing of the patient. The assessment of flexibility was done with the Sit and Reach test, then the Chair Rise Test was used to determine the strength of the lower limbs as well as the Single Leg Stance Test for static balance. The evaluation of the psychological state was done with a questionnaire of subjective perception consisting of 20 questions. The sessions included exercise in the water, with or without the use of special equipment, such as noodles, planks and water dumbbells, while the intervention included stability, strengthening, mobility, agility and trunk and upper-lower limb control exercises.

According to the results, the fitness tests showed no significant changes in the functionality of the trainee. However, there has been a positive change in her mental health and quality of life, with an improvement in the synesthetic limitations caused by the condition. In conclusion, the positive effects of exercise on the psychological parameters of the multiple sclerosis patient were confirmed. In order to improve the physical parameters, a longer time of implementation of the intervention program is suggested.

*Corresponding author

Chantzi E, Democritus University of Thrace, School of Physical Education and Sport Science, Komotini, Greece.

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Introduction

Adapted physical education involves exercise with modified basic characteristics to suit the needs and requirements of trainees with disabilities. A variety of methods, techniques, and special equipment allow for the modification of activities so that they can be performed by any person to the extent of their abilities [1].

One of the pathological conditions that require adapted physical treatment is multiple sclerosis (MS). MS is a chronic neurological condition that affects the nerves of the brain and spinal cord, causing damage to myelin, the protective sheath around nerve fibers. It is one of the most widespread autoimmune problems worldwide, with symptoms that are both psychological and physical. Although the cause of MS is not clear, it is believed that the underlying mechanism involves either the destruction of the immune system or the failure of cells to produce myelin. Currently, there is no known cure for MS, and medication is not always effective [2].

The purpose of this study was to examine the effect of an interventional exercise program on reducing pain symptoms and improving the quality of life of patients with multiple sclerosis.

Method Sample

The sample of the study was a 60-year-old woman diagnosed with relapsing-remitting multiple sclerosis with mild symptoms. According to her, she refrained from any form of physical activity and led a relatively sedentary life due to the nature of her profession.

Additionally, over the years, she faced mental health problems as a result of the disease's effects.

Experimental Design

Morning hours were preferred for the sessions, as her pharmaceutical care helped reduce pain and symptoms during those times of the day. All sessions were held in a heated indoor swimming pool, with the temperature set at 28-31°C. In the first and last sessions, measurements were taken to assess the participant's physical condition and to determine any improvement in her somatometric indicators before and after the exercise program.

Initially, the Sit and Reach Test was performed to assess the flexibility of the hamstrings, gastrocnemius, hip extensors, and back muscles (1st measurement: -8cm, 2nd measurement: -5.5cm). Then, the Chair Rise Test was conducted, where the participant was asked to sit and stand up from a chair repeatedly for 30 seconds

(without using her hands), to examine the strength and endurance of the lower limbs (1st measurement: 12, 2nd measurement: 15). Finally, the Single Leg Stance Test was performed to check static balance, where the participant was asked to maintain her balance on one leg for as long as possible (1st measurement: R:32s L:33s, 2nd measurement: R:31.5s L:34s). The Goniometry method was used to assess the range of motion of the knee, hip, and shoulder joints using a manual goniometer.

Intervention Program

The intervention program lasted two weeks and consisted of a total of 10 sessions of 45 minutes each. The program aimed to improve the physical condition of the participant by increasing muscle strength, reducing fatigue tolerance, and enhancing functionality. Additionally, it sought to offer general well-being and a better psychological state.

Each session focused on practicing a different skill. Specifically, to improve proprioception, static and dynamic balance, and coordination exercises were applied (balancing on one leg, walking forward, backward, sideways, and crosswise, and exercises involving the simultaneous activation of two different limbs). Furthermore, exercises related to walking (at a slow or faster pace), getting up from half-kneeling, and climbing stairs in the pool were preferred. For muscular strengthening, emphasis was placed on exercises using equipment in the water (noodles, boards, and pool dumbbells) and exercises involving body weight transfer with support on the pool wall. The intensity of the exercises was low to moderate, with time allocated for learning the technique of the exercises.

Results

The results showed that the patient had a small improvement in her static and dynamic balance. The strength measurements taken at the end of the program did not show significant differences compared to those taken before its implementation. Nevertheless, through this brief contact with exercise, it seemed that as the days passed, she had a better response to the exercises. The psychological benefits of the program became evident from the very first sessions, with a noticeable change in her mood and the eagerness she displayed before each meeting.

Test	AM (Active Movement)	TM (Total Movement)
Sit and Reach	-8 cm	-6.5 cm
Chair Rise (reps)	12	15
Single Leg Stance (s)	Right: 32, Left: 33	Right: 31.5, Left: 34

Discussion and Conclusions

The exercise program effectively informed the trainee about adapted exercise and its benefits for her lifestyle. She became aware of her physical condition and how to improve it. Upon returning to her permanent residence, she decided to include exercise in her daily routine, showing a preference for water-based activities. Due to her two-week stay at the hotel, significant differences in measurements were not observed, as the time was insufficient for substantial changes. A longer implementation period is suggested to improve physical parameters. This study confirms previous research on the benefits of well-structured functional training for patients with multiple sclerosis [3-6].

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