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## Effect of aquatic exercise on the multiple sclerosis patients' quality of life

Zahra Rafeeyan, MSc,<sup>\*</sup> Mehرداد Azarbarzin, MSc,<sup>\*\*</sup> Farhad Mustafa Moosa, MD,<sup>\*\*\*</sup> and Akbar Hasanzadeh, MSc<sup>\*\*\*\*</sup>

<sup>\*</sup>Medical-Surgical of Nursing Education, School of Nursing and Midwifery, Islamic Azad University Najafabad Branch, Najafabad, Iran

<sup>\*\*</sup>Medical-Surgical of Nursing Education, Head of Nursing and Midwifery School, Najafabad Branch, Islamic Azad University, Najafabad, Iran

<sup>\*\*\*</sup>Sport Medicine Specialist, Isfahan Sport Medicine Association, Isfahan, Iran

<sup>\*\*\*\*</sup>Epidemiology and Statistics, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran

Correspondence to: Mehرداد Azarbarzin, MSc. Email: azar\_mehرداد@yahoo.com

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### Abstract

#### BACKGROUND:

The appearance of a new innovation in medical science named aquatic exercise has faded the effects of other preventive exercises in patients with multiple sclerosis to a large extent. Since exercise is one of the beneficial factors in enhancement of quality of life, researchers decided to investigate the role of aquatic exercise on the patients' quality of life.

#### METHODS:

This study is a semi experimental research that was performed on 22 patients chosen by simple random sampling. The standard SF-36 questionnaire was used and data was gathered by interview before and after aquatic exercise. Data was analyzed by paired t test via SPSS software version 10.

#### RESULTS:

The mean age of participants was 32.86 years. 68.2% of participants were married and 45.5% of them were high school graduates. The paired t test showed the significant differences between different aspects of quality of life before and after aquatic exercise.

#### CONCLUSIONS:

The findings of this research revealed that aquatic exercise has enhanced the aspects of multiple sclerosis patients' quality of life; therefore the program of this exercise is suggested to be used for the patients with multiple sclerosis along with other methods of treatment for improvement in quality of their lives.

**Keywords:** Multiple sclerosis, exercise, quality of life

Multiple sclerosis (MS) is one of the diseases of central nervous system that affects both physical and spiritual status of the patients. At the same time, among nervous diseases it has a great rate of prevalence. According to the published studies, about 1.5 to 11 individuals in every 100000 people are suffering from MS.<sup>1</sup> Studies done by World Health Organization (WHO) indicated that in Iran the ratio is 4-5 in every 100000.<sup>2</sup> Various studies have confirmed the evident

relation between geographical situations and prevalence of MS.<sup>3</sup> In countries such as the northern parts of America, south of Australia, east of Russia and Israel the prevalence of the disease is more while in some African countries it is less. In the last few years the prevalence of the disease has had increasing rate in some parts of the world.<sup>4</sup> Isfahan is one of the cities in Iran which shows the greatest rate of prevalence among other cities and this has attracted many attentions not only in Iran but also in many other parts of the world. According to the last statistics the prevalence of the disease has been informed up to 35.5 in every 100000 people.<sup>5</sup> As the disease has a progressive nature and the related treatments are usually typical and preservative, it can affect various aspects of life of the patient; in other words the quality of their lives.<sup>6</sup> In different definitions quality of life (QOL) has various aspects, but the three main dimensions, physical, mental and social aspects, are common among all other definitions, and these features usually affected by chronic diseases, especially those people who are suffering from MS. On the other hand the patient is not the only one who suffers from the disease; but also the family of the patient is affected as well.<sup>7</sup> As we know, since the QOL is formed from different factors, various aspects may influence them. Among all of the factors, exercise seems to be the most important one for enhancing the QOL and also the efficacy of physical and spiritual status. In the past it was strictly recommended that those who suffer from MS should preserve their energy as much as possible, therefore most of the patients were afraid of doing physical exercises.<sup>8</sup> But recently studies have shown that yoga and physical exercise not only has a useful and positive influence on the QOL but also reduces fatigue and intensity of the disease.<sup>9</sup> The appearance of a new innovation in medical science, aquatic exercise, is one of the new methods that recommended by some texts for MS patients. Warm water (80°-84° F, 30°-31° C) reduces the stiffness of the muscles and allows the patient to move easier.<sup>10</sup> On the other hand, as the body floats on water loss weight would be imposed on it and makes it possible for the patient to move more comfortably than on land. Since pressuring forces reduce in water, less pressure would be imposed on the joints and spinal cords; and because of the hydrostatic pressure on different parts of the body, blood circulation gets better and prevents the increase of the body temperature and fatigue.<sup>10</sup> Since the result of different researches about effect of aquatic exercise on MS patients shoed different QOLs, researchers decided to investigate the effect of aquatic exercise on the MS patients' QOL.

## Methods

The present research is a semi experimental, pre-test posttest, prospective and single group study. The study started in 2005 and ended in 2007. In the research the affect of independent variable of aquatic exercise on the dependent variable of QOL of patients suffering from MS was investigated. The including criteria were: 1) having an open file (being under treatment) in MS Society in Isfahan for at least one year, 2) not suffering from other chronic diseases, heart problems, kidney disorder, cancer, etc, 3) being aged between 20-46 years old, 4) residing in Isfahan, 5) being interested in participating in the sessions of exercise in the water, 6) having scores between 2-4 for expanded disability status scales (EDSS) according to the Krutzke standard (verified by the neurologist), and 7) having a certified approval of the specialist for taking part in exercise in water sessions. The excluding criteria were: 1) taking irregular part in the session, and 2) showing any problem for the patient during the research period and order of the specialist to stop the activities.

The samples were selected by using simple random sampling from the patients in MS Society in Isfahan. The place for identifying the patients and the sessions for completing the questionnaires was MS Society in Isfahan. Places for exercise in water were two swimming pools in Malekshahr and Shahin Jay in Isfahan. The standard SF-36 questionnaire was used which has nine parts: 1) general health (two questions), 2) health position during the period of time (one question), 3) physical efficiency (ten questions), 4) social function (two questions), 5) physical pain (two questions), 6) spiritual situations (two questions), 7) mental health (five questions), 8) limitation of the role due to physical problems (four questions), and 9) limitation of the role because of mental health (three questions). Each question was scored from 0-100 points. The validity and reliability of the translated SF-36 questionnaire has been approved by Tehran University elites and was 0.87 for validity and 0.89 for reliability.

After getting an approval from the Najafabad Branch, Islamic Azad University, the researchers referred to MS Society in

Isfahan and chose 40 files for eligibility of the patient for entering the research. Samples had signed informed consent's form. From them, 34 patients who eagerly wanted to take part were finally selected. The selected patients were visited by neurologist and after acquiring all the necessary conditions and approvals of the doctor for joining the research, the questionnaire were completed. Depending on their residents, they were divided in to two groups. They were introduced to the managers of the two swimming pools. The pools were available from 7-8 A.M only for the patients under supervision of a trained specialist. The swimming program was approved by a consultant physician in an elementary stage and given to the trainers. The temperature of water was 80°-84° F (30°-31° C) taken from scientific sources. The patients took part in one hour sessions three days a week, for one month. Out of 34 patients, 22 patients completely and regularly took part in the sessions. Those who were absent more than two sessions were excluded from the study. In the last session of exercise in water, SF-36 questionnaire were completed by the patients again. Data was analyzed by paired t test via SPSS software version 10.

## Results

The mean age of participants was 32.86 (7.25) years old. Of all, 68.2% of samples were married and 45.5% of them were high school graduates.

The paired t test showed significant differences in various aspects of QOL before and after aquatic exercise. The mean of spiritual situation, mental health, social function, physical pain, general health, physical efficiency, limitation of the role because of mental health, limitation of the role due to physical problems and health position during the period of time had a significant difference, before and after exercise in water ([Table 1](#)).

## Discussion

Discrepancy and the age of the subjects showed that most of MS patients were in the mean 32.86. Since the highest point of MS prevalence is between 20-40 years old,<sup>1</sup> the findings coordinates with other scientific researches.

The findings of the research show that aquatic exercise has enhanced all aspects of QOL of the patients to a large extent. Therefore the goal of the research, that aquatic exercise for patient suffering from MS is positive and effective, is definitely certified significantly. Roehrs et al had also done an experiment on the effects of aquatic exercise and its benefits on the MS patients' QOL. In this research 31 MS patients were studied for 12 weeks. Expanded disability status scale (EDSS) and QOL of patients were investigated before and after the exercise program. The results showed that their social efficiency, health status and spiritual position had distinctly improved to a large extent<sup>11</sup>. This experiment also confirmed the present research. Another research was done in 2000 by Kirsch on the MS patients' QOL in France, Germany and England. The QOL of MS patients was compared with control groups. The research was done with cross sectional method in three mentioned countries. The findings showed that in all three countries, physical, social and mental status of the patients suffering from MS had significantly deteriorated, compared with non affected groups. In other words, MS had affected all aspects of QOL of MS patients.<sup>12</sup> In present research comparison of the QOL of MS patients before and after exercise in water shows the significant effects on their QOL.

Keith also compared the MS patients' QOL with other chronic diseases and found out that the QOL of MS patients is lower and worse than others. He concluded that the reason is the vast effect of MS on physical, mental and social status of the patients.<sup>13</sup> Di Fabio et al also performed an experiment to compare MS patients with a control group in an exercise program, five hours a day in a week for one year. After one year Di Fabio et al found out that those who had taken part in the exercise program felt less fatigue. And their social status, their energy and health status had obviously improved.<sup>14</sup> The findings of the present research also proves that physical exercise, especially group exercise, can improve physical, social and spiritual status of MS patients. Another research had been done by Unitdehaag on exercise therapy and the increment of power and mobility of MS patients in 2005. In nine other similar researches all showed that a regular exercise program not only increases the power, mobility and MS patients' QOL, but also it has not any side

effects or negative reactions.<sup>15</sup> The findings of this research definitely approves that aquatic exercise enhances all aspects of MS patients' QOL and has useful and beneficial values in their lives. Therefore considering the findings of the present research and other similar researches done before, it is strongly recommended to neurologists and MS societies to use the program of this aquatic exercise along with other treatment programs to improve MS patients' QOL. It is also suggested that physical exercise authorities and swimming committee managers and medical exercise expertise arrange programs for training a group of swimmers so that patients referring to any swimming pool benefit from this useful and effective program.

The Authors declare that have no conflict of interest in this study and ethical committee approved the study.

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## Figures and Tables

**Table 1**

Mean and standard deviations of quality of life aspects before and after aquatic exercise

| Quality of life aspects                         | Before aquatic exercise |       | After aquatic exercise |       | T     | P value |
|---|-------------------------|-------|------------------------|-------|-------|---------|
|   | Mean                    | SD    | Mean                   | SD    |       |         |
| Spiritual situations                            | 53.12                   | 13.18 | 75.00                  | 11.41 | 7.12  | 0.013   |
| Mental health                                   | 56.81                   | 14.43 | 77.00                  | 12.12 | 5.85  | 0.000   |
| Social function                                 | 56.81                   | 19.56 | 82.38                  | 19.91 | 6.15  | 0.000   |
| Physical pain                                   | 72.00                   | 23.04 | 83.52                  | 18.17 | 2.79  | 0.000   |
| General health                                  | 45.45                   | 14.54 | 65.45                  | 18.82 | 5.41  | 0.000   |
| Physical efficiency                             | 68.18                   | 20.32 | 75.95                  | 18.81 | 2.74  | 0.000   |
| Limitation of the role due to physical problems | 46.30                   | 16.99 | 67.04                  | 17.80 | 7.25  | 0.001   |
| Limitation of the role because of mental health | 34.09                   | 21.50 | 77.27                  | 14.12 | 10.55 | 0.000   |
| Health position during the period of time       | 68.18                   | 13.76 | 74.31                  | 18.79 | 0.23  | 0.000   |

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