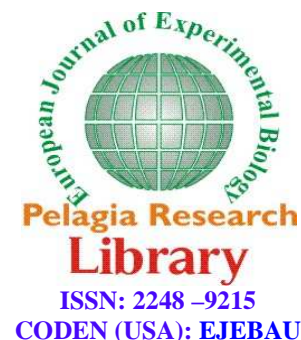




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## The effect of aquatic aerobic training on quality of work life in multiple sclerosis (MS) patients

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### ABSTRACT

*Multiple Sclerosis or MS is a chronic disease debilitating nervous system and damaging the myelin of central system nerves (brain and spinal cord). The most common symptoms of this disease are fatigue, muscle cramps and vibration, diplopia, and unsteadiness and disorder in walking. The present study investigated the effects of a training program for 8 weeks in water to improve quality of work life of MS patients. The type of research is applied and the research methodology is semi-experimental, so out of 110 female MS patients, 54 were selected as sample of patients with disease intensity of grade 1 to 5, and means disease duration of 4 +/- 1 and age range of 20 to 50 and were randomly divided into experimental group (25) and control groups (20). Training programs for experimental group consisted of 3 sessions per week for 8 weeks with the intensity of 50-60 percent of maximum heart rate. The qualities of lives of patients were measured by FAMS.Version2 questionnaire (before and after exercise). Data analysis was performed by descriptive statistics and correlated t. There was a significantly difference observed between pretest and posttest quality of work life and in the experimental ( $P = 0.001$ .) Doing water aerobic exercise significantly improved quality of work life and in the experimental group and improved the mean score of quality of work life in MS patients on the average of 9.28 per cent. Doing selected water aerobic exercise improves the quality of work life and in MS patients. According to these results, the respective experts can use such training as a complementary therapy alongside pharmaceutical treatments for MS patients.*

**Keywords:** Multiple Sclerosis, Aerobic Exercise in Water, Quality of work life.

### INTRODUCTION

Multiple Sclerosis is a chronic and progressive autoimmune disease of central nervous system that affects the brain and spinal cord and marked with destruction of myelin sheath of nerve cells and formation of scars causing disorder in the flow direction of action potentials. The main cause of this disease is unknown. At present the disease has reached ages of less than 20 years with an escalating trend among women being twice more prevalent in woman than in men. The prevalence of MS is different in terms of geographical location and increases from the equator towards the hemispheres. Since there is no definitive cure for this disease, patients must rely on some treatments that only reduce the symptoms of the disease. The symptoms of this disease appear between the ages of 20 to 40. In the study of Taraghi et al in 2007 the mean age of onset of this disease has been reported 27.12 +/- 8.03 (Traghi-2007). Through the world, about 3.5 million people suffer from this disease. The prevalence of MS in Iran is estimated 57 in 100,000 (Traghi-2007). According to Iranian MS Society, there are about 40 thousand patients in the country and

the number is growing. Khorasan Razavi MS Society has identified about 1400 MS patients of whom 900 are covered by this Society. At the present multiple sclerosis which develops a motor poverty and physical disabilities in patients is spreading throughout the world and it is referred to as the century's disease. Among various disciplines Physical Education has a special status as a science turning it into an undeniable and essential science which helps many patients with diabetes, cardiovascular, MS, arthritis, etc. as an alternative treatment. For many years MS patients had been advised against participating in physical exercise. Because some patients had reported instability of symptoms during exercise due to increased body temperature. In addition avoiding exercise would save energy resulting in reduced fatigue sparing energy for daily life activities. But in the last decade, the role of exercise has been confirmed because of its beneficial effects in MS patients. It has recently been proved that the intensification of the number and severity of sensory symptoms occurring following exercise in more than 40% of patients are temporary and in half an hour after exercise, they will return to normalcy in 85% of patients (Dalgas-2008). Also controlling the symptoms during the physical activity program can increase participation in exercise programs (Motle-2008), and it will be useful for the patient's physical health, functional status, emotions and quality of work life and job satisfaction in patients. The benefits of regular aerobic exercise in MS patients include increased capacity, elevated mood (mental state) and the ability to perform daily life tasks (White-2004). Stretching exercises and yoga are recommended for MS patients (Soltani-1388). Exercise therapy can be used as a complementary treatment alongside drug treatment to reduce signs of disease (Atashzadeh-2003). Despite the advances of medical science in recent years there is currently no eradicated cure and most existing treatments only decrease or slow disease progression of the disease, therefore early diagnosis and identification and control of this disease largely prevents development of severe and uncontrollable complications (Abedini-1387). This disease is more prevalent in Indo-European races than in any other races, however, it is not very much prevalent in black and yellow races (Soltani-1388). Therefore, down to the fact that the race in our country is a branch of Indo-European it is necessary to investigate more about the disease and strategies for coping with its complications (Soltani&Nornematolahi-2009). (Atash Zadeh et al-2003) quoting United States National Center for Multiple Sclerosis disability and activity state. Although MS is in struggle with physical and mental condition it has been proved that regular exercise as well as stretching and flexibility exercises can enhance the level of physical and mental health. Contribution to the advancement of science and research in the field of physical education and its coming to spotlight as a complementary treatment (in addition to drug treatment) to enhance the level of physical health, to improve the quality of work life of MS patients in fighting multiple sclerosis and to tackle the variable nature of this disease to control its uncalled for side effects such as tremor and unsteadiness, dizziness, muscle cramps and defects, as well as to modulate the immune system to stop destroying the myelin and central nervous system white matter before it damages the axons of nerve cells are considered essential grounds of research. Following researches conducted overseas it is necessary to conduct research in the country to enable MS patients to benefit from the exercise as a complementary treatment is a relief to alleviate physical and mental pains of MS patients. Today, in modern management, work life quality has become a social subject in the world. (Luthan-1998). (but in past decades focus on life quality for accessing new systems for helping employees to have balance between life quality and private life (Akdere 2006). (life quality programs include every improvement in organization culture that cause improvement employees in organization, (Fillippo-1998). So, the costing quality of life focus on people as a main variable in strategic management equation (Shareef -1990). The following research shows that doing this program can decrease the rate of employees' compliance and the rate of their absence from job, decreasing disciplinary rules in programs (Gordon - 1993). In other words, meeting their needs leads to improvement and activity of organizations (Shareef -1998). Today empirical research shows job satisfaction and concepts depend on job acceptance (Cheroseet et al -2003). Quality of work life and job satisfaction are synonymous concepts. But some experts in management and industrial psychology believe that quality of work life and job satisfaction are different from each other. Their main difference is because of job satisfaction is one of the results of quality of work life. (Sirgy et al-2001). Dana and Grifet believe quality of work life is like a pyramid that its concept includes, satisfaction from life (in Top of pyramid) job satisfaction from other aspects like satisfaction from rate of their rights, coworkers and managers. The main purpose of this research is the effect of quality aerobic training on quality of work life in MS patients, having a meaningful effect on quality of their life.

Given the increasing number of MS patients, increased costs resulting from treatment, its very destructive effects on work life quality of MS patients, the role of exercise in controlling the symptoms of the disease, including fatigue and to promote health and quality of work life of MS patients is very important. To deal with such ambiguities whether physical activity and exercise in water would be effective on their motor poverty and physical strength; also against the recommendations made in the earlier literature regarding the effect of hydrotherapy in improvement of quality of work life research in this field seems to be of particular importance. Given the positive effect of physical

activity on MS patients the researcher's attention has been attracted to performing certain aerobic exercises in the water for eight weeks for signs of disease and enhances patients' quality of work life besides medications. The researcher expects to reach significant results on patients' quality of work life that after selected aerobic exercises in water. Finally, to answer the question whether or not selected exercise in water would have a significant effect on the quality of work life of MS patients

### MATERIALS AND METHODOS

The present study aims to explore the effect of aerobic exercise in the water for a period of eight weeks on the quality of work life in female MS patients. The type of research is applied research, and the methodology is semi-experimental, which due to the limitations, the research plan included testing the experimental and control groups before and after the tests the results of which were analyzed. The statistical population consists of 100 MS patients whose MS has been confirmed by a neurologist. (Those suffering from the multiple sclerosis of CNS white matter in the brain, spinal cord and myelin sheath (Armstrong-1983) and all of them are treated with medication and have medical records in one of the accredited private medical centers. Clinically speaking those who have the following symptoms suffer from MS Multiple Sclerosis: A) Have a history of heart disease. B) Have positive neurological examination confirming Multiple Sclerosis C) their MRI contains signs of demyelinated plaques at various times and places and have positive laboratory evidence in favor of multiple sclerosis (Atashzadeh-2003) From among the population Of 54 persons were selected randomly as research sample and were divided into two groups based on inclusion criteria. Experimental group consisted of 25 and the control group consisted of 20 people with ages ranging from 20 to 50 and the weight of  $67.6 \pm 7.3$  kg - Height of  $155.5 \pm 13/4$  cm, and based on the inclusion and exclusion criteria the sample was selected and output participated in water exercises: the inclusion criteria include being Iranian and living in Mashhad – absence of Cardiovascular disease history- final diagnosis of MS confirmed by a neurologist - no history of epilepsy - no history of metabolic diseases - aged between 18 and 55, having experienced at least three periods of relapse and remission - willing to participate in research project - not pregnant - no history of regular exercise during the past three months - All participants must have a physical disability scale between 1-5 (must have the latest MS attack at least two months before; Exclusion criteria: failure to perform at least two-thirds of exercise sessions - have relapsed during the intervention; become pregnant; the pharmaceutical interventions of the patients change during the six-week program. One day before starting the exercise program the patients involved in the study came together in the desired location and were briefed on how to do the exercise – the intensity of exercise - the number of repetitions in each session and then the experimental and control groups participated in the pretest and at this stage, physical disability scale test developed by a specialist neurologist using Croft Disability Questionnaire which was measured and recorded and the quality of work life and was measured at this stage using a questionnaire.

Training program for the experimental group was implemented in form of a period of aerobic exercise for 8 weeks and 3 sessions a week with intensity of 50 to 60 percent of maximum heart rate. Exercise intensity was controlled real-time by means of a Polar Heart rate meter. Patients had an exercise program of three days a week and all of them attended the selected swimming pool at the appointed time and cooperated with the respective trainers. Exercise program was set three days a week. Each session started by doing stretching exercises for 10 minutes in the water. The main exercises took 20 minutes and according to the principle of overload after eight sessions it increased by 10 minutes. This added time was in consideration of the patients' progress and their practical abilities of their and in the last 10 minutes fun games was performed to relieve patients' fatigue. After completing the training the program both groups were given quality of work life test and the results were analyzed. It must be mentioned that both groups were on drugs. The questionnaire was the developed form of Croft's physical disability that would determine the degree of disease. This questionnaire measures the various conditions and functions of central nervous system 1- Functioning of pyramidal routes system; 2 - Cerebellar system routes function; 3- brainstem routes system; 4- sensory routes system function; 5 - Bowel and bladder routes system function; 6 - visual routes system function; 7- brain routes system function. This comparison provides a score between 0-10 MS disease (depending on the amount of degree of impairment of central nervous system). The more extreme is the impairment; the higher will be the score. Test the validity of physical disability test developed by Crofts has also become a norm in Iran (Soltani-2008),(Petajan-1999).

**questionnaire was used to assess quality of work life.** standard questionnaire was used. The reliability was examined using internal consistency method using Cronbach's alpha coefficient in an initial sample and the questions causing low reliability of the final coefficient were corrected so that the ultimate reliability of

measurement tools in Cronbach's alpha method would be bigger than 0.8. For data analysis and comparison of pretest and posttest of the two groups, independent t-test and descriptive statistics are used to show the percentages, the means and standard deviation and drawing diagrams.

## RESULTS

The main purpose of this research The effect of quality aerobic training on quality of work life in MS patient, have meaningful effect on quality of their life.( p: 0/001).The results of testing the first hypothesis, in line with the first objective of the research, showed the effect of 8 weeks of aerobic training in water on the job satisfaction of MS patients. This study found that eight weeks of aerobic training in water had a significant impact on the variable of job satisfaction among M.S patients. According to the descriptive statistics, presented in Table 4.9, both study groups appeared to be normal, both at the time of pre-test and post-test, in terms of the rate of job satisfaction. The table also shows the differences between the control and experimental groups, in this respect. The hypothesis was tested by using Student t-test.

**Table 4.9: Descriptive statistics of quality of work life as well as the differences among the control and experimental groups at the time of Pre-test and Post-test**

Group	Rate of <i>quality of work life</i> (mean $\pm$ SD)		
	Pre-test	Post-test	Difference between pre-test & post-test
Control	38.65 $\pm$ 10.761	38.60 $\pm$ 10.480	-0.05 $\pm$ 1.394
Experimental	38.90 $\pm$ 10.707	33.60 $\pm$ 11.704	-5.30 $\pm$ 2.735

In the Pre-test, the comparison between the control group and experimental showed a significance level of 0.942, indicating no significant difference between the two groups in terms of their level of job satisfaction. However, such a difference was 0.163 at the time of Post-test which suggests a significant difference between the two groups after the intervention (See Table 4.10 and 4.11)

**Table 4.10: Differences of the level of quality of work life between the control and experimental groups before the intervention**

f value	P value (test of variance)	Division of averages	t value	Degree of freedom	p value	Sample size
0.008	0.928	-0.25	-0.074	38	0.942	20

**Table 4.11: Differences of the level of quality of work life between the control and experimental groups after the intervention**

f value	P value (test of variance)	Division of averages	t value	Degree of freedom	p value	Sample size
0.519	0.476	5	1.423	38	0.163	20

A comparison of the participants' level of job satisfaction in both group studies shows a significant difference between the pre-test and post-test results (p=0.001) for the experimental group whereas such a difference is not significant for the control group (p=0.874). Table 4.12 shows the details.

**Table 4.12: Differences of the level of quality of work life in control and experimental groups from the pre-test to the post-test**

Group	The mean of differences	Standard deviation of differences	t. Statistic	Degree of freedom	P value	Sample size
Control	0.05	1.394	0.16	19	0.874	20
Experimental	5.3	2.735	8.664	19	0.001	20

## DISCUSSION AND CONCLUSION

Physicians classify MS symptoms in three group classes: 1 - primary symptoms: are those symptoms directly caused by demyelination of certain nerves "visual disturbances"; 2: secondary symptoms: are those caused by primary symptoms for example; an early form of paralysis can bring about the secondary problem of muscle atrophy resulting in inactivity; 3 – tertiary symptoms or problems: are mental, psychological and social complications caused by primary and secondary symptoms (Armstrong-1983).

Since this disease definite has no treatment, patients have to rely on treatments that only alleviate the symptoms of this disease.(Fox&Mthuse-1378). Exercise can be useful for physical health, functional status, emotions and quality

of work life of MS Patients. (Soltani&Nornematolahi-2009). Mottel et al concluded that worsening of symptoms by exercise has rarely been associated with MS patients.

In the research the relationship between deterioration of symptoms in 3 to 4 year period and activity physical report by the patients themselves was studied in a sample of 51 MS patients. Out of the 51 participants, 35 reported deterioration of their symptoms. Deterioration of symptoms was significantly associated with low levels of physical activity. This study provided fresh testimony for the correlation between deterioration of symptoms and less physical activity. Exercise therapy can be used as a complementary treatment alongside drug to reduce symptoms of the disease (Reieberg-2005). Meanwhile hydrotherapy is of remarkable significance as exercise in water increases physical fitness.

Since patients' weights considerably reduce in water and the circumferential water resistance brings about balance in the patient and also as one of the most essential problems of these patients during exercise is increased body temperature which disturbs neural messages and increases disability. Water prevents increase of body temperature. It also brings about increased maintenance and strength of muscles, brain oxygen supply, promotion and maintenance of range of motion, development of muscle control, reduction of muscle rigidity, increased quality of work life and wellbeing, promotion and development of balance and amplified vitality (Wiles-2009). Obviously any program to be effective must be based on patients' needs. Exercise programs are valuable once they can fulfill the needs of MS patients. Taking into consideration the nature and the relapse period of this disease, MS is associated with severe muscle spasms and cramps, if the exercise programs are not appropriate they may result in intensification of MS symptoms (Woods-1992). Therefore, doing laborious physical exercise is not recommended because intense exercise can increase body temperature and worsen the symptoms. Intense fatigue can contribute to aggravating factors of the disease (Soltani-1388). In view of the said points, various therapeutic exercises are recommended: "Aerobic exercise, yoga and swimming" to alleviate fatigue; improve the quality of work life, increase walking speed and endurance and to enable the patients to overcome the disease and increase the level of balance and to control it." McCullaghet al studied the effect of aerobic exercise on quality of work life and depression in MS patients with mild disability.

The patients were given exercise for a period of three months, twice at week. The control group was examined on a monthly basis and their program remained unchanged. 24 persons finished the program and given the three-month changes, the exercising group experienced more improved quality of work life and the result was that a three-month exercise program would improve the quality of work life and fatigue in MS patients. Mottel et al (2008) studied physical activity and quality of work life in MS patients. According to this group, physical activity was associated with little improvement in quality of work life in MS patients and this association might be indirect and caused by such factors as disability, fatigue, temper and social support. The present research studied the parameters that are probably common between quality of work life and physical activity in a sample of 292 persons. In other research, Rum rill and et al(2004) found M.S patients are disable in main functions of their jobs nor physical achievement and communication with their managers. Also, They found physical activity have main role in increasing job satisfaction that created with using rehabilitation of job services (employer created for these people to decrease job pressure and change their activity proportionate to their abilities for doing their jobs and haven't to leave their jobs and become active in society.(Raduan-2006). In this research, 8 week of aquatic aerobic exercise (aerobic exercise in water) With observing overloading and observing their doing is very necessary for these patient for quality of their work life.

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