

Research Article

The Effects of Aquatic Exercise on Low Back Pain as for Herniated Disc in Elderly Men

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Abstract

Purpose: The purpose of this study was to investigate the effects of aquatic exercise on low back pain as for herniated disc in elderly men.

Subjects and Methods: Ours sample were randomly assigned to one of two groups: aquatic exercises group (10) and control group (10). Patients were evaluated for functional disability with Roland Morris Disability Questionnaire.

The results: The statistical analysis of data shows a significant difference between mean of RMDQ in the post test in Hydro exercise and control group. P= (0.010).

Conclusion: The results showed that aquatic exercise program can be considered as an effective and reliable method to decrease chronic low back pain related herniated disc.

Keywords: Low Back Pain; Herniated Disc; Aquatic Exercises; Elderly Men

1. Introduction

Low back pain (LBP) is one of the most common and important clinical, social, economic, and public health problems affecting the human population worldwide [1]. Low back pain, caused by a number of reasons, including stiff or sore muscles, diseases, disorders or injuries of the vertebrae and connective tissue, and

pinched nerves, is one of the occasions in which people visit doctors in the United States [2]. Low back pain is experienced in 60%–80% of adults at some point in their lifetime. Andersson [3] estimated the annual worldwide LBP incidence in adults to be 15% and the point prevalence to be 30%. Martin et al. [4], in the assessment of health care expenditures in managing back and neck problems, found that expenditures totaled approximately \$86 billion. Around 70% of adults suffer from LBP at some point in their lifetime with various degrees of symptom severity. Additionally, 1.6% to 43% of these patients have LBP associated with sciatic symptoms [5]. Most back pain has no recognizable cause on imaging studies and is usually attributed to muscle strain or ligament injuries (65%-70%). In 5% to 15% of cases, the source of LBP is related to degenerative joints and disc disease [6]. Disc herniation is general manifestation of disc degeneration and disc aging [7]. The management of LBP comprises a range of different intervention strategies, including surgery, drug therapy and non-medical interventions. Exercise therapy is probably the most widely used type of conservative treatment worldwide [8]. In addition to escalating use of surgical interventions [9, 10] various non-surgical interventions extensively utilized with variable and often discordant conclusions of safety and effectiveness [11-13]. Researchers has suggested that exercise is effective in the treatment of chronic low back pain, regardless the characteristics of the exercise selected [14, 15]. So far many therapeutic methods have been applied for the treatment of this syndrome, and it has been shown that movement therapy in patients with low back pain relieves back pain in them[16]. Even though exercise is recommended as the first choice to cope with pain and loss of strength in the recent European guidelines for the management of LBP, there is no consensus about the type of exercises[17]. Some

studies shows that hydrotherapy exercise had more significant effect than land stretching exercises on patients' low back pain [18-21].

According to several studies conducted over the past decade, there has been a significant pain reduction in people with low back pain who use hydrotherapy, compared to those who do not use hydrotherapy [22]. According this study researcher believes that we can find the best way to reduce pain and improve function and remove pain, because hydrotherapy exercises are safe, simple to do, and inexpensively. These exercises are very simple to do, that any person can do, regardless of age, sex, weight, and height. There is no previous study reporting the effects of aquatic exercise program with particular devices on chronic low back pain related herniated disc, so this researcher has decided to find out the influence of aquatic exercise program with particular devices on chronic low back pain related herniated disc in elderly men.

2. Subjects and Methods

The nature of this study is applied and semi-experimental in pre-test and post-test research. The study population consisted of all elderly male that referred to the Niyayesh Health Center in Shiraz, Iran. At first the form of collecting data by which the age, weight, height, physical activity, history of illness or medication was determined by holding interviews and controlled the individual health or illness conditions and injuries. Patients were randomly assigned to: 1) hydrotherapy exercise group (N=10) and 2) control group (N=10). Evaluation parameters included the result of modified Roland-Morris Disability Questionnaire (RMDQ) was used to measure back-related patient dysfunction [23]. This instrument, which asks 24 yes/no questions selected because of their relevance for

patients with back problems, takes approximately five minutes to complete [24]. The RMDQ is one of the two most popular instruments used by low back pain researchers for measuring function. A score of 14 or more was considered as poor result [25].

The materials consisted of the following: modified Roland-Morris Disability Questionnaire (RMDQ), swimming pool measuring 6.5 by 13.5 meters, with a sloping bottom with the depth going from .9 to 1.7 meters, existence of devices in pool, and with a mean temperature 34C. The hydro Exercise Protocol by means of aquatic devices: The 8-week training consisted of three weekly sessions, each lasting 50 to 80 minutes progressively and increasingly with 40 to 60% of the maximum heart rate reserve. Water exercise session included of three parts warm up, main part of exercise, and cool down. Fifteen minutes of warm-up activities

included walking in the water and doing stretching exercises. The main part of exercise included backstroke only with legs, using water treatment devices in the water, including hang cycling, floating, hang of horizontal bar for traction of spinal column and skiing for strengthening the back muscles of the subjects. It should be noted that all the devices are embedded into the water and the subjects did exercise training on each device for 4 to 5 minutes and then rest for 2 minute with walking in water. Subjects were asked to do the exercises to the severity of the pain threshold. Finally, at the end of each session subjects did some stretching and flexibility activities to come back the initial status for 5 minutes. It would be noted that all participants had signed the consent for performing this study. After the initial evaluation, subjects carried out 8-week water exercise under the supervision of a hydrotherapy instructor, at the end the final evaluation was done.



Figure1: The Pictures Were Taken During Exercise.

3. Results

The average and standard deviation, demographic and physical characteristics of people in research is shown in table 1. The statistical analysis of data in the table 2 shows no significant difference between mean of

RMDQ in the pre- test in Hydro exercise and control group. $P= (0.425)$. but it shows significant difference between mean of RMDQ in the post test in Hydro exercise and control group. $P= (0.010)$. Therefore, it is concluding that Hydro exercises program could decrease chronic low back pain level.

Physical Qualities	Standard Deviation ± Mean
Age (year)	50 ± 4.5
Length (centimeter)	170.10 ± 5.25
Weight (kg)	77.64 ± 6.64

Table 1: Mean and standard deviation of the physical qualities of the subjects.

Groups		Men	S.D	P-value
Hydro exercise (N=10)	Pre test	15.35	1.35	0.425
Control (N=10)		16.84	1.52	
Hydro exercise (N=10)	Post test			0.010
Control (N=10)		17.45	1.21	

Table 2: Mean of RMDQ scores in the pre and post-test in Hydro exercises and control group.

4. Discussion

As there occurred significant difference between control group and aquatic group concluded that aquatic exercise has a positive effect for increase strength of spine muscles and reduce of chronic low back pain related herniated disc in the elderly men. In a recent review about aquatic exercises in LBP, Waller et al. reported that aquatic exercises are effective approaches to decrease pain [18-21, 26]. We think, strengthening and creating muscle balance in deeper muscles of lower back could be one reason for the reduction in pain intensity in people with low back pain related herniated disc after a term exercise in water. Yaghoubi, et al, noted that short term Abdominal Hollowing exercises have affected local and deep muscles of lower back in patients with low back pain in terms of electrical activity, whereas no change has been observed in the global muscle activity [27]. Bayraktar D and et al (2016) in a study shows that core stabilization exercise training performed on land or in water both could be beneficial in disc herniation patients [28]. Heywood and Heinmann (2007) demonstrated that water-based

exercise proves effective in alleviating the pain and improving the quality of life for the elderly with chronic illnesses through strengthening the muscles around the joints and lifting off the pressure on them [29]. Another one cause that we think have effected on reduction low back pain is decrease of amount inflammation in disc intervertebral and thereby diminish of pressure on nerves roots that create through reduce in tens (contraction) and weight. Masumoto and Mercer compared the EMG activity of the lower limb muscles during walking on land and in water and concluded that activity of the muscles is lower while walking and creating maximum voluntary contraction in the water compared with land. It is possible that both buoyancy and hydrostatic pressure of water may remove the pressure on the muscles and joints in patients with low back pain and prevent a significant change in the level of muscle activity, especially Erector Spinae muscles, after a period of Hydrotherapy [30]. These results were related with hydrostatic pressure and buoyancy. Trunk muscles play less of a stabilizing role in the aquatic environment in static positions which minimizes their

EMG activity levels [31]. Therefore, we think, the water has supported the trunk muscles and maybe disc inflammation has been decreased.

Another probable reason for reduction of pain in elderly men could be disc introversion when aqua group had dislocation in their disc intervertebral. According to that, we had hang of horizontal bar for traction of spinal column in our program and loss the weight on joints spine in water, therefore, maybe this process had been happened. Some of the studies have evaluated the morphology of the disc by MRI or CT scan during follow-up. Buric et al [32] evaluated the clinical and morphological results of patients with disc disease and observed that 15 of the 30 patients showed clinical improvement, performing post-operative MRI imaging. Eight of these patients had a substantial reduction of over 50% in herniation volume. Two patients had a volume reduction of less than 50%, whereas 5 patients had no substantial variation in herniation volume. Also, we think that the trunk muscles get out of spasms according to properties of water for instance warmth, lose weight, increase blood circulation and easy mobilization. According to Biscarini, & Cerulli, (2007) water buoyancy reduces the weight that joints, bones, and muscles have to bear. The pressure of the water also reduces swelling and increase blood circulation. Consequently, an underwater environment allows early active mobilization, endurance and dynamic strengthening, thus, hydrotherapy can reduce pain [33]. In our study, patients received 8 weeks (3 days per week) of aqua exercise it seems that one another possible mechanism effect of hydrotherapy in chronic low back pain is related to using aqua exercises over a longer period. Furthermore, it seems that to achieve the best result in treatment of chronic low back pain in this study is design an aqua program exercises for improving

function ability of muscles group that are related with chronic low back pain. As to our knowledge the present study is the first study investigating the effects of aquatic exercise program with particular devices on chronic low back pain related herniated disc and According to the benefits of aqua exercise including easy training, cost effectiveness and the results of the current study, it is suggested that the authorities seize the opportunity to improve the physical health condition, and consequently improve the quality of life for the elderly people by providing proper facilities and exercise environments, particularly, hydrotherapy clinics specifically designated for performing easy and exhilarating exercise for the senile people.

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