

Examining the Impact of Hydraulic Fitness Exercises on the Body Perception and Some Physical Parameters of Middle Aged Women

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ABSTRACT The purpose of this research is to examine the impact of hydraulic fitness exercises on some physical parameters and body perception of the middle aged sedentary women. A total of 60 women participated in the study voluntarily. Hydraulic station fitness exercises were administered for a duration of 12 weeks. Body weight, body mass index, body flexibility of the women and their body perception levels were determined. Statistically significant differences were found in the variable as follows, the weight ($t=11.4$, $p<0.05$), BMI (Body Mass Index) ($t=3.29$, $p<0.05$), BFP (Body Fat Percentage) ($t=10.8$, $p<0.05$), flexibility ($t=-11.6$, $p<0.05$), sit ups ($t=-16.7$, $p<0.05$), and body perception ($t=-12.3$, $p<0.05$). Weight gain was observed for women in the control group and decrease in flexibility and ability to do sit ups. However, a weight loss was observed for the women in the experimental group and it was determined and found that their BMI, flexibility and ability to do sit ups and even satisfaction of physical space improved positively.

INTRODUCTION

Physical health refers to the health of physical development, that is, without any diseases or an individual being able to practice activities and take care of himself (Lee and Shih 2012; Su et al. 2014). Mental health shows good life adjustment or an individual without any trouble hindering the psychological efficacy (Su et al. 2014). Physical inactivity has been increased due to the modern life and it causes many illnesses and decreases in daily activity performance of humans (Williams and Wood 2006; Porcari et al. 2015). The ancient people were mainly dependent upon their individual strength, vigor and vitality for physical survival. This involved mastery of some basic skills like strength, speed, endurance, agility for running, jumping, climbing and other skills employed in hunting for their livings (Gill 2010). Development of the modern society is one of the three biggest health risk factors of today. Smoking, a poor diet and physical inactivity represent risk factors that often underlie today's leading chronic disease killers like, heart disease, cancer, stroke and diabetes, and they are the root cause of around one-third of the deaths in developed countries (Hardman and Stensel 2009). Physical fitness is the ability to perform recreational and daily activities and

at the same time not to experience any undesired or excessive fatigue. Although researches show that a physical activity habit plays an important role in keeping healthy and increasing life quality, rapidly developing technology has caused the physical activity level to decrease in daily life. A decrease in physical activity levels causes obesity and many resultant health problems (Ball et al. 2001). Physical fitness is a highly complex phenomenon and it consists of the following components, namely, cardio respiratory endurance, muscle skeletal fitness, body composition and weight, flexibility and balance (Gaknar and Malik 1999; Heyward 2010). The long-term fitness and health effects of the performance of appropriate physical activities include the reduction of risk factors of the most significant health problems, the improvement of cardio respiratory functions, muscle strength and endurance, flexibility and body composition (Howley and Franks 2007). Moreover, it increases bone mass, aids digestion and bowel functions, promotes sound sleep and prevents depression (Shehu et al. 2010). In addition to the physical benefits, physical exercise also has psychological benefits, particularly in women. However, while fitness and health motivations may be associated with positive consequences of physical exercise for individuals with low body

dissatisfaction, greater endorsement of fitness and health motivations, as well as appearance and weight motivations, are associated with even greater state body dissatisfaction in women categorized as high body dissatisfied (Lepage and Crowther 2010). In general body, weight and shape satisfaction decreases with increasing BMI and the search for desired physical form involves a wide range of behaviors and activities such as dieting and physical exercise (Schuler et al. 2004).

Women who lose weight by dieting and aerobic exercises only have some deformities in their body that become more visible as they grow older. They have sagging skin and cellulites and fat deposits in the legs. Hydraulic resistance exercises are very important in this regard. Hydraulic resistance exercises use dual hydraulic cylinders. This system does not impose an excessive burden on muscles. In other words, it tightens up the muscles without blowing them. There are different exercising methods in the literature to increase physical fitness levels of women (BabayigitIrez 2014; Colakoglu 2003; Akdur 2007; Ceylan 2014). However, the number of studies using hydraulic resistance exercises is very low. This paper aims to examine the impact of a 12-week hydraulic resistance station exercises administered to sedentary women on certain physical fitness and psychological parameters.

METHODOLOGY

Research Group

Sixty middle-aged women who had been randomly selected in October 2014 from Mugla province participated in the research. Information on the study was provided to the participants and all necessary permits were obtained. They were asked if they had any health problems and no problems were found, which might create a limitation for the study. The average age was found to be 39.9 ± 11.12 and average height was found to be 160.3 ± 5.34 cm for the study population. The fitness program was administered to 30 women in the experimental group while the other 30 women in the control group had no exercise program.

Data Collection

The participants were made to perform hydraulic station fitness exercise at sixty to seven-

ty percent of their target heart rate for 30-35 minutes a day, 3 days a week for twelve weeks. They were made to do warm up exercises for 15-20 minutes before the exercise, and cool down exercises for 5-10 minutes after the exercise. Exercise intensity was determined by the Karvonen method (Fox 1999).

The basic principle of a 30-minute station exercise is providing both cardiovascular and weight training at the same time. Each equipment trains different muscle groups. The system works using the recovery and overloading method, and is controlled by whether or not one exercises at a proper target training heart rate by checking the pulse every eight minutes (www.hidrolikfitness.com).

Equipment works using the push and pull principle, rather than the weight principle. In other words, it has a similar principle with underwater principles. The system is composed of 8 fitness equipment called main station and 12 equipment called intermediate station. The signal sent by music every 35 seconds signifies an equipment change instruction.

The height of the subjects was measured using a milimetric height scale and their weight was measured using the F. Bosch Medizintechnik electronic weighing machines. The flexibility was measured by the sit and reach test. Body fat and muscle percentage was measured by Tanita.

Body Mass Index (BMI) was calculated using the weight/height^2 (kg m^2) formula. The flexibility of the subjects was measured in accordance with the sit and reach test protocol. The measurement was performed on a test bench with the following dimensions: length 35 cm, width 45 cm, and height 32 cm. The upper surface dimensions of the bench are as follows: length 55 cm and width 45 cm. The top surface stands 15cm outward the surface where the foot leans. The measurement grid of 0-50 cm is located on the upper surface by parallel lines with spacing of 5 cm each (Tamer 2000). The test was administered two times and the higher scores were taken into consideration.

In addition to weight, body mass index and flexibility sit and reach tests, the "Multidimensional Body-Self Relations Questionnaire (MB-SRQ) - Body Areas Satisfaction Scale", which was developed by Winstead and Cash (1984) and of which reliability and validity studies were carried out by Dogan and Dogan (1992) was used to determine the level of body self perception of the women in the pretest-posttest measurements.

The Multidimensional Body-Self Relations Questionnaire has 7 scales:

1. Appearance Evaluation,
2. Appearance Orientation,
3. Fitness Evaluation,
4. Fitness Orientation,
5. Health Evaluation,
6. Health Orientation,
7. Body Areas Satisfaction.

The reverse expressed items are as follows: 12, 13, 14, 25, 26, 27, 29, 30, 31, 33, 35, 37, 39, 40, and 41. The total score of a subject in the items of the questionnaire shows his total questionnaire score. The minimum score is 57 and the maximum score is 285 in the Turkish version of the questionnaire. Alpha internal consistency coefficients of sub-groups vary between 0.72 and 0.81 for all subjects (Dogan and Dogan 1992).

Data Analysis

All measurements and tests for the subjects were administered twice first before the administration of the training program (pretest) and then after the administration of the training program (posttest). Demographics were calculated by frequency and percentage (%) distribution in terms of evaluation of data. Comparison of pretest and posttest values of the sample was performed with paired samples t-test. The error performance was set as 0.05.

RESULTS

Statistically significant differences were found in the variables of the weight (t=11.4,

p<0.05), BMI (t=3.29, p<0.05), BFP (t=10.8, p<0.05), flexibility (t=-11.6, p<0.05), sit ups (t=-16.7, p<0.05), and body perception (t=-12.3, p<0.05) according to the pretest and posttest analyses of the experimental group, which performed the hydraulic resistance station exercise (Table 1). The pretest average weight value was 74.5±14.1 for women in the experimental group and a weight loss was observed for these women due to exercise, and the posttest average weight value was found to be 70.0±13.0. It was found that those women’s averages of flexibility, number of sit ups and satisfaction levels of physical space have been increased inversely proportional to the weight loss for those women in the experimental group. While the pretest average satisfaction levels of physical space of those women was 26.1±4.9, it increased to 38.6±4.2 after the exercise and the posttest average value was found to be higher than the previous one.

Statistical significance was found in all variables according to the comparison of pretest and posttest values of the control group. The pretest average weight value of women in the control group who did not participate in the exercise program was found to be 61.9±9.4 but an increase was observed at that value and posttest average weight value of them was found to be 64.0±9.3. The pretest flexibility average of the control group was found 29.2±4.6, but a decrease was observed at that value contrary to average weight value and posttest flexibility average of those women was found to be 28.4±4.8. Weight gain was observed for women in the control group during the study and a significant decrease in flexibility and numbers of sit ups for

Table 1: Body weight, BMI, body fat percentage, flexibility, sit up, satisfaction levels of body areas pretest and posttest results of the exercise and control group

Variables	Exercise group			t	P	Control group			t	p
	Pre-test X±SD	Post-test X±SD				Pre-test X±SD	Post-test X±SD			
Weight (kg)	74.5± 14.1	70.0±13.0		11.4	0.00*	61.9± 9.4	64.0± 9.3		-5.8	0.00*
BMI (H ² /kg)	28.2± 6.0	27.2± 5.7		3.29	0.03*	25.9± 4.4	26.4± 4.3		-3.2	0.03*
Body fat percentage (BFP) (%)	38.2± 5.1	34.7± 4.7		10.8	0.00*	32.5± 5.7	33.3± 5.5		-3.6	0.01*
Flexibility (cm)	25.2± 6.9	28.9± 7.2		-11.6	0.00*	29.2± 4.6	28.4± 4.8		3.18	0.03*
sit ups (number)	45.9± 18.3	51.7±18.0		-16.7	0.00*	49.5± 18.5	47.3± 19.0		6.27	0.00*
Body perception (Total Score)	26.1± 4.9	38.6± 4.2		-12.3	0.00*	21.4± 8.6	24.8± 9.5		-10.6	0.00*

*p<0.05

those women were observed for the same group contrary to that weight gain. Whether women in the control group use a diet program for their eating habits was not checked.

DISCUSSION

The following was found according to the results of the study wherein the impact of hydraulic fitness station exercise was examined on some physical and psychological parameters of sedentary women.

Statistically significant differences were found in the variables of weight ($t=11.4$, $p<0.05$), BMI ($t=3.29$, $p<0.05$), BFP ($t=10.8$, $p<0.05$), flexibility ($t=-11.6$, $p<0.05$), sit ups ($t=-16.7$, $p<0.05$), and body perception ($t=-12.3$, $p<0.05$) according to the pretest and posttest analyses of the experimental group, which performed the hydraulic resistance station exercise. The pretest average weight value was 74.5 ± 14.1 for women in the experimental group and a weight loss was observed for these women due to exercise, and the posttest average weight value was found to be 70.0 ± 13.0 . It was found that those women's averages of flexibility, number of sit ups and satisfaction levels of physical space have been increased inversely proportional to the weight loss for those women in the experimental group. While the pretest average satisfaction levels of body areas those women was 26.1 ± 4.9 , it increased to 38.6 ± 4.2 after the exercise and the posttest average value was found to be higher than the previous one.

According to the findings of the research conducted on a group of 41 obese women with an average age of 37.70 ± 2.75 , height of 158.64 ± 5.59 cm and weight of 83.12 ± 11.56 , Yaprak (2004) has found a significant decrease in the body weight of the group who was on a diet as the result of 8-week aerobic exercises done for 45-60 minutes a day, 3 days a week. Similarly, the body fat percentage of the group who did exercise was determined to decrease at a statistically significant level in this research. For another study conducted by Karacan et al. (2003) women in menopausal age were made to complete a 12-week aerobic exercise program and similar findings were determined concerning body fat rate. Besides, there are certain studies showing that aerobic exercises decrease body fat percentage and increase flexibility level (Babayigit et al. 2002; Ceylan et al. 2014). On the other hand, Velasqu-

ez and Wilmore (1991) conducted a 12-week step work out on women aged between 18 and 33 years, and determined that their maximal oxygen uptake and resting pulse had decreased although there had been no change in their body fat percentage. This proves that hydraulic resistance exercises are more effective in decreasing the body fat percentage rather than step work out only.

On their research on body self-perception levels and gender roles of female athletes, Bastug et al. (2009) included 180 female competitor elite athletes and 180 female sedentary university students selected by random sampling from Gazi University and Selcuk University. The "Multidimensional Body-Self Relations Questionnaire" was used in order to determine the body perception levels of women, the "BEM Gender Role Inventory" to determine the gender roles of women and the "Personal Information Form" to determine the personality traits of students as the data collection tools of the study. As a result, a significant relationship was found between the body perception and gender roles of women participating in the study. Significance was found between hydraulic resistance exercises and body perception as the result of the study that the researchers conducted, which has similarities with that study.

Alagul (2004) includes the findings obtained from scale and inventory prepared in order to calculate the assertiveness levels and body perception scores of athletes in different sports branches in the third section of his study that he conducted on the relationship between assertiveness and body perception of athletes in different sports branches. The relationship between assertiveness level and body perception was researched and analyzed and the relationship between satisfaction of athletes that they got from the body perception and assertiveness level of them were found to be significantly positively. Although the assertiveness level has not been measured in the study that the researchers conducted, a significant increase in body perceptions of women who perform hydraulic resistance exercise was found as one of the findings of the study.

Dissatisfaction with one's body size is influenced by the sociocultural environment, contributing to stresses of modern life, and it is associated with the current morbi-mortality (Kakeshita and DeSousa 2011). Body image dis-

satisfaction affects both sexes and is influenced by both culture and society, including mass media images often favoring models close to those of people suffering from anorexia (Ratanasiripong and Burkey 2011).

Zarshenas et al. (2013) studied a study to determine the effect of short-term aerobic exercise on body image and depression. 82 females participated in their study. They concluded as significant improvement was found and also there was a decrease in depression level. In this study, the researchers found a similar result regarding body image of women who participated in regular hydrostatic resistance exercises. De Mendonca (2015) studied a study to examine the effects of different exercise programs on psychological parameters of women. They concluded that 16 weeks of practical exercise had significant improvements on physical appearance, health perception and self-esteem and strength training. Grogan (2014) investigated body image and exercise participation of both males and females. They found that body image related with exercise participation. Another study was conducted by Burgess et al. (2006) to investigate the impact of physical activity on body image and physical self-perceptions at 13-14-year-old schoolgirls. They concluded that 6 weeks of aerobic dance activity decreased body image dissatisfaction. These studies are related with this research.

CONCLUSION

As a result, significant differences were found in the variables of weight, BMI, BFP, flexibility, sit ups, and satisfaction of physical space as the result of the pretest and posttest analyses of the experimental group, which performed the hydraulic resistance station exercise. Weight gain was observed for the women in the control group with whom no exercise program was administered, and a decrease was observed in their ability and characteristics of flexibility and doing sit ups contrary to that weight gain of those women.

However, it was observed that BMI, flexibility and ability to do sit ups and even satisfaction of physical space characteristics of the women in the experimental group who perform the exercise, were improved positively due to the weight loss.

RECOMMENDATIONS

The researchers should note that the findings obtained in the study have some limitations in terms of the generalization of all the middle-aged women. Studies with a bigger sample group or different sample groups can provide the opportunity to reach more reliable results.

Hydraulic fitness exercises were administered only to middle aged sedentary women in the research. These exercises can also be administered to women over the age of 65 or groups formed of younger women. Besides, the literature can be contributed by adding balance and muscle strength measurements along with the flexibility and body mass index measurements.

The study can be extended by dealing with personality traits and some other psychological factors besides satisfaction of physical space.

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