

COMPARISON OF THE EFFECT OF YOGA EXERCISES WITH A UF APPROACH ON FUNCTIONAL MOVEMENT IN MIDDLE-AGED WOMEN

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ABSTRACT

Introduction: Given the responsibility of women in society and the importance of their health as well as the effect of combined yoga exercises on them, the present study aims to investigate the effectiveness of combined yoga exercises with a UF approach (Ultimate Fit) on functional movement of middle-aged women. Method: The present study is a causal post-event study. The statistical population of the study consisted of all middle-aged women participating in yoga sports clubs, among whom 30 middle-aged women with a mean age of 50.26 ± 4.66 have been selected through targeted available sampling and have been placed in two groups of combined yoga exercise with a UF approach ($N=15$) and control group ($N=15$). In this study, in order to assess the endurance of central stability area, lumbar extensors and sit-up tests have been used; and the Sharpened Romberg test at open and closed eyes states and Angel test have been used to assess static balance. The data has been sorted using descriptive statistics and one-way variance analysis has been used for data analysis. Results: The study results showed that endurance of central stability area of body has improved significantly in abdominal muscles ($P=0.001$) and lumbar muscles ($P=0.014$) after yoga exercises and static balance has improved significantly after doing yoga exercises in open and closed eyes Sharpened Romberg balance test and Angel balance test ($P=0.001$). Therefore, combined yoga exercises with a UF approach, by a positive effect on central balance and stability, have positively and significantly affected the motor function of middle-aged women. Conclusion: Considering that middle-aged people experience physical failure over time due to physical weakness, and due to the limitation that they are not able to perform different programs, performing yoga exercises is useful to improve strength and endurance of central body stability area and to improve balance followed by a deep sense, reduces the risk of falling, and ultimately leads to the improvement of motor function.

Keywords: Yoga exercises with UF approach, Middle-aged women, Balance, Central body stability, Motor function

INTRODUCTION

The 2016 census in Iran indicates that 44.8% of Iran's population is the ages of 30 to 64 years old, namely middle-aged population, and 6.1% of the population is over 65 years of old, namely the elderly ones, indicating that the elderly's population is growing in the country (SCOI, 2016). In our country, with the increase in life expectancy, the population of middle-aged and elderly people is increasing (Zanjani, 2002). Given the growing community of middle-aged and elderly people, attention to and consideration of their health issues is of particular importance. The middle-age period is associated with erosive, gradual, growing and spontaneous changes in most parts and physiological functions of body, including changes in balance control, which can face the middle-aged and elderly people with serious injuries resulting from decrease in balance

including a variety of fractures and may incur many treatment costs on the society (Sadeghi et al., 2008). Falling is one of the most important worrying issues that approximately 30% of old people face at least once a year or more (Tromp et al., 1998). Among the main causes of falling risk at this age are muscle weakness (Stevens and Olson, 2000), visual weakness (Ferracini and Ramos, 2002), impaired walking patterns (Ronthal, 2019) and most importantly, weakness in maintaining balance and central stability area that all lead to limitation in function (Newton, 1995). A number of studies have shown that as age increases, balance functions decrease more severely than physiological functions (Gulka et al., 2020); so, the likelihood of falling significantly increases, and as a result, physical and psychological health of this class of society will be directly damaged (Greenspan et al., 2007). According to the above, it can be stated that balance and strengthening of the central stability area for the middle-aged is the basis of dynamic life and brings independence for the elderly. Given the relationship between loss of balance and increased falls, improving the balance state is considered an appropriate method that will lead to improved motor function (Lee and Yu, 2020). One of the exercises that, according to studies, have a significant effect on balance is yoga exercises (Irandoust and Taheri, 2016). Yoga is a set of physical positioning exercises (Asana (strength, balance, and endurance exercises)), controlled breathing exercises (Pranayama), and relaxation exercises (Shavasana) (Ghasemi and Salehi, 2018). Yoga exercises are designed to be done in a quiet and relaxed state and cause strengthening of muscles, nerves, and internal organs and people of all ages and situations can do it (Jannati et al., 2011). Yoga can have a significant impact on increased attention, muscle strength and endurance, deep sense, balance, central stability, flexibility and mobility of people (Sung, 2014). Given the above, it seems that effectiveness of combined yoga exercises with UF approach on balance, central stability and motor function of middle-aged women has not been well documented in previous studies, and in line with this, the present study has examined the effectiveness of yoga exercises on balance and motor function in middle-aged women.

RESEARCH METHOD

This is a post-event causal study with a statistical population consisting of middle-aged women participating in sports clubs providing yoga among which 30 middle-aged women have been selected through targeted available sampling. Participants have been divided into two 15-people groups of combined yoga with a UF approach and control group. The inclusion criteria for the middle-aged participating in this study have been that they have been socially active and able to perform daily tasks without the use of assistive devices, individually. Participants in the combined yoga group who during one year of exercise, there had been more than one week of interruption between their exercises, have been excluded from the study. Subjects who were injured during the exercise have also been excluded from the study. Yoga exercises have been performed in two 60-minute sessions per week. To evaluate motor performance in this study, endurance and strength tests of central stability area, as well as static and dynamic balance tests, have been used.

Sit-up test with a reliability of 84% has been used to measure central stability area endurance. In this test, the testee lies on her back and while her knees are bent, her soles are on the floor, her hands are next to the ears, and with contraction of abdomen, raises her head and trunk such



that the elbows touch the knees and then returns to initial position; the number of correct tests per minute is considered the score (Hadavi et al., 2012).

Another test used in this study has been lumbar extensors test, in which the testee lies on her abdomen on the bed such that from the knee to the ankle is out of the bed, and the tester takes the participant's ankle at the bottom of the bed, and the participant tries to raise her trunk upwards; the amount of time the person can stay in this position is considered as her score.

Sharpened Romberg test with open eye reliability of 0.90- 0.91 and closed eye reliability of 0.76- 0.77 have been used to measure static balance. In this test, the testee stands barefoot such that one leg is in front of the other and the arms are on the chest as a crisscross; the time that each subject is able to maintain this position with open or closed eyes is considered as her score. If the testee moved on the blade of the foot or went out of balance position to high vibration, time was stopped and the passed time was recorded (Sadeghi et al., 2008).

Another test that has been done for static balance has been Angel test, which is performed on a stable surface such that the trunk is bent forward; the person stays on one leg; the other leg is bent from the back, and the knee is completely straight. The trunk and leg are along each other, and the hands are positioned with 90 degrees abduction on both sides of the body. The amount of time the testee can perform this test is considered as her score. Errors in this test include excessive hand swings (Nelson, 1979; Reiman, 1965), taking steps, much hiping or shaking, and raising toe or heel. The training program used in this study has been based on the training model designed by Best Martini and Jones Dignova for the elderly with an Ultimate Fit (UF) style_ **one session consists of several training sections, and each training section is a combination of several types of exercises with varying intensity based on ability of each individual (strength and endurance, cardiovascular endurance, balance, and range of motion)** (Babaei Khorzoghi et al., 2018). Before performing the tests, all three groups performed warm upstage and the tests were done for each person in three phases and their best record was registered. All the tests have been done and monitored by a formal and experienced yoga coach, and all participants have had full satisfaction with the tests. Descriptive statistics have been used to sort the data, and one-way variance analysis method has been used to analyze the data. SPSS software version 24 has been used for all the analyses.



RESULTS

Individual characteristics of the subjects, including mean and standard deviation of height, weight, age, and body mass index are presented in Table 1.

Table 1: Demographic information of participants in the study

Group	Number	Age		Weight		Height		BMI	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Combined yoga	15	49.40	3.15	70.32	4.17	165.36	4.67	25.71	2.14
Control	15	50.00	4.67	85.46	4.74	166.42	4.93	30.85	2.36
Total	30	49.71	3.91	59.08	4.45	165.84	4.81	28.28	2.25

As can be seen in Table 2, yoga exercises have had a significant effect on central body stability in abdominal (P= 0.001) and waist (P= 0.014) areas of middle-aged women.

Table 2: Comparison of research variables in two combined yoga and control groups

Variables	Degree of freedom	F	Significance level
Spinal extensors test	2	4.725	0.014
Sit-up test	2	33.819	0.001

As can be seen in Table 2, yoga exercises have had a significant effect on static balance in all research variables (P= 0.001).

Table 3: Comparison of research variables in two combined yoga and control groups

Variables	Degree of freedom	F	Significance level
Berg balance test	2	43.330	0.001
Closed eye Berg balance test	2	15.716	0.001
Angel balance test	2	12.376	0.001

DISCUSSION AND CONCLUSION:

The present study aimed to investigate the effectiveness of combined yoga exercises with the UF (Ultimate Fit) approach on middle-aged women's motor function. The results showed that yoga exercise can improve motor function by its beneficial and effective effects on central stability and balanced area. The results of the study by Mohseni Mehran et al. are consistent with the results of this study and have shown that sit-up exercise with bent knees is the best test for abdominal muscle endurance. Since the muscles of central stability area influence activation of muscles of other organs, weakness in these muscles results in delayed activation of lower limb muscles and the occurrence of injury. These muscles are also responsible for maintaining the status of the pelvic area. When these muscles become weak, they lead to loss of proper pelvic alignment, and as a result, the performance of lower limb muscles that are connected to this area is reduced due to disruption in the relationship between length and tension and they become prone to damage (Mohseni Mehran and Hajizadeh, 2009). Inappropriate functioning of central stabilizing muscles also leads to impaired ideal neuromuscular control of the body, which can be a cause of injury. For example, transverse abdominal muscle causes belt pressure in the spine and lumbar areas; weakness in this muscle and emergence of instability causes a lack of effective functioning of muscles of lower limbs. According to the results of the study by Seydi et al., which are consistent with the present study, strengthening of all central stability muscles must be emphasized in order to prevent injury. This study also mentions that in addition to abdominal muscles, pelvic floor muscles and lumbar muscles should also be paid attention and then, appropriate corrective movements should be considered for this injury (Seydi et al., 2007). Ghane et al. also in their study examined abdominal exercises in three different modes of one 18-minute session per week, two 9-minute sessions per week, and three 6-minute sessions per week, for six weeks and found that abdominal muscles endurance has significantly changed only in the group with three times of exercise per week, which is consistent with the present study



(Ghane and Amidi, 2015). Results of the study by Ebrahimi et al. which are also consistent with the present study show that regular central stability exercises can contribute to the disability of central stability area muscles (Ebrahimi et al., 2015).

Also, according to studies by Khalkhali Zavieh et al. which are consistent with the present study, abdominal strengthening exercises lead to the thickness of oblique and transverse abdominal muscles, indicating the strengthening of muscles of the area; however, in the present study, yoga strengthening exercises have been used (Izadi et al., 2018). Shahrokhi et al. in their study which is consistent with the present study have found that regular exercises lead to reduced disability and significant increase of abdominal and back muscles' strengths in the experimental group compared to the control group; this group has examined regular Pilates exercises (Shahrokhi et al., 2015). The study by Hesari et al. was also consistent with the present study and showed that central stability exercises can improve static and dynamic balance in people with impaired hearing (Farzaneh Hessari et al., 2011). The study by Shahrjerdi et al. which was consistent with the present study showed that central stability and yoga exercises can improve balance in people with multiple sclerosis (Shahrjerdi et al., 2016). According to studies by Taheri et al., the dynamic and static balance of the elderly improved significantly after the intervention of yoga exercises (Taheri et al., 2018). Finally, Qasempour et al.'s study, which is consistent with the present study, shows that physical fitness exercises, mindfulness exercises, and mental exercises are effective in improving balance (static and dynamic) in old women, which also suggests that combination of cognitive exercises (mental exercises and mindfulness exercises) with motor exercises (physical fitness exercises) cause a lasting impact (Ghasempour et al., 2017). A review of the studies by Moradi et al. who have performed regular water training shows that the static balance of one-side amputee veterans has improved (Moradi et al., 2014). The results of this study are consistent with the results by Taheri et al., who found that balance patterns can be enhanced by exercises such as yoga (Koochboomi et al., 2015). The results are also consistent with those of KoochBoomi, Jannati, Tiedemann, et al., which show that regular yoga exercise has a positive effect on balance (Koochboomi et al., 2015; Jannati et al., 2011; Tiedemann et al., 2013). On the other hand, the study by YousefiAfrashteh et al., in which yoga and water exercise have been compared, shows that yoga provides a better balance than an exercise in water (YosefiAfrashteh et al., 2016). Various studies of yoga suggest that many yoga poses such as locust pose that strengthens the sides, "Sahachubay Padang Utkatasana" pose which strengthens and removes fat from the middle and upper abdomen, "Sampurnabay Padang Utkatasana" pose that strengthens abdominal muscles, "Naukasana" pose that helps strengthening of abdominal area from the upper abdomen to the lower abdomen, and poses such as bow, camel, bridge, cobra, and Soriana Mascara that strengthens muscles of central stability area by creating tension on these muscles, as well as many other yoga exercises have a significant effect on central stability area (Tagore, 2007; Saraswati, 2017). Even in yoga, breathing type, in addition to its positive effect on other factors, also leads to the strengthening of the central stability area. In yoga, poses such as one-legged prayer, Krishna, eagle, and many other poses have a direct effect on balance. These sets of poses in yoga, which are called balance asana poses, deal with spinal cord limbs and control the brain that works with excitement. These asana poses to strengthen the central part of the cerebellum and control of voluntary movements, and thus, the best and most result is obtained by spending the least amount of force. The coordination created by these movements in body increases physical and psychological powers so that the forces that support




the body increase and release emotions from body structure; body tries to maintain energy and eliminates excitement; these exercises, as well as creating balance in physical structure, also develops mental balance, that its highest impact is on life (Saraswati, 2017). Finally, it can be concluded from this study that combined yoga exercises with the UF approach have a significant impact on the muscles of the central stability area and increase the endurance and strength of the area. Also, yoga exercises are so useful for middle-aged people who may be physiologically, physically and kinematically unable to do all kinds of activities, and it seems that combined yoga exercises with the UF approach have a positive effect on balance in the elderly. It is recommended that middle-aged women regularly perform yoga exercises throughout the year to maintain their fitness. Coaches are also recommended to encourage middle-aged women to perform regular exercise, especially yoga. In addition, it is suggested to researchers to conduct the present study with more accurate research tools and methods and a higher number of participants.

ACKNOWLEDGMENTS

Thanks to all the dear ones who helped the researchers in this study.

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