



A comparison of the effects of hatha yoga and resistance exercise on mental health and well-being in sedentary adults: A pilot study



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KEYWORDS

Exercise program;
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Life quality;
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Summary

Objectives: Physical activity has a positive effect on people's mental health and well-being. The aim of this study was to compare the effects of hatha yoga and resistance exercises on mental health and well-being in sedentary adults.

Design: Randomized controlled study.

Methods: Fifty-one participants aged mean (SD) 25.6 (5.7) years were randomly divided into three groups: Hatha Yoga Group, Resistance Exercise Group and Control Group. The Hatha Yoga Group and Resistance Exercise Group participated in sessions three days per week for 7 weeks and the Control Group did not participate in any sessions. All the subjects were evaluated through the Rosenberg Self-Esteem Scale, Beck Depression Inventory, Body Cathexis Scale, Nottingham Health Profile and Visual Analog Scale for fatigue pre-and post-session.

Results: Significant improvements were found in terms of all outcome measures in the Hatha Yoga Group and the resistance exercise group. No improvements were found in the Control Group. Hatha yoga more improved the dimensions fatigue, self-esteem, and quality of life, whilst resistance exercise training more improved body image. Hatha yoga and resistance exercise decreased depression symptoms at a similar level.

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Conclusion: The results indicated that hatha yoga and resistance exercise had positive effects on mental health and well-being in sedentary adults. Hatha yoga and resistance exercise may affect different aspects of mental health and well-being.

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Introduction

Numerous physical and psychological benefits of exercise have been well reported.¹ The benefits are not limited to physical health as the psychological aspect of health is also affected.² Individuals who take exercise frequently claim a feeling of “well-being” from physical activity. In the modern world with high stress and inactivity, there is an ever-increasing necessity to evaluate the potential benefits of physical activity on mental health.³ There are an increasing number of studies examining the effects of physical exercise on the psychological health of individuals both with and without psychological disorders.^{4–8} However, there is still a need for evidence in some issues related with the effects of exercise on psychological health. For example, how do the type of exercise, the difficulty of the performed exercise, and the exercising frequency (sedentariness or regular exercising) affect the mental health benefits of exercise? Although the effects of aerobic exercise on healthy individuals have been confirmed, the number of studies about anaerobic exercises such as resistance exercise is limited.⁹

Resistance exercise, also known as power-weight training, is one of the most popular types of exercise used to increase the physical fitness of individuals and the condition of athletes.¹⁰ Resistance exercise training develops an individual’s maximum activity and body functions, can produce high power, and help build the body image.^{11,12} Traditionally, resistance training has been accepted as the physical activities used to increase muscle power, endurance, and muscle mass and the effects on the improvement of general health have been ignored.¹³

Another approach is that of yoga, which has become increasingly popular in Western cultures as a means of exercise and fitness training.¹⁴ Yoga is an approach that originated in India and has been used since ancient times. It has many types, which include physical postures (asanas), controlled respiration (pranayama), deep relaxation, and meditation.¹⁵ There is powerful scientific evidence demonstrating its positive effects on the mind.^{16,17} To the best of our knowledge, there are no studies comparing the effectiveness of Hatha Yoga and Resistance Exercise on mental health. The objective of this study was to investigate and compare the effects the two different approaches of hatha yoga and resistance exercise on mental health and well-being in sedentary adults.

Materials and methods

This study was conducted at the Sports Science and Technology Application Center of Pamukkale University and the Physical Treatment and Rehabilitation Institution of Higher Education of Pamukkale University. Informed consent was obtained from all the study participants and approval for

the study was granted by the Ethics Committee of Denizli Clinical Research.

Participants

The study sample consisted of individuals living in the city who were students and employees of the University. Before the study, announcements were placed in different departments of the University. Cases between the ages of 20–40 years without any musculoskeletal or neurological problems, heart disease, lung disease, or systemic disease, and with no prior surgery of the musculoskeletal system were included in the study. Individuals who had participated in a regular exercise program over the previous six months or who had regularly participated in sports, who had chronic diseases, had received psychiatric medical treatment, or had a body mass index of more than 29 kg/m² were excluded from the study. A waiting list was established for appropriate, willing participants in the study. Since this was a pilot study, no sample size calculations were performed. A total of 80 cases were selected to participate in the study and, taking gender into consideration, were randomly assigned (via sealed envelope method) to one of three groups; the Hatha Yoga Group (HYG) ($n=27$), Resistance Exercise Group (REG) ($n=25$), and the Control Group (CG) ($n=28$).

Interventions

Participants in the HYG and REG trained for a mean 50 min, three times a week for seven weeks, the first of which was an adaptation week. A protocol was determined for HYG and REG. The programs of the groups were applied as follows:

Hatha Yoga Group

The HYG training program was applied by two certified yoga instructors. Taking into account the sedentary nature of the individuals in the groups, postures were modified when necessary using yoga apparatus (blocks, belts, pillows, etc...) in order for the selected postures to be performed correctly by the individuals without impairing body mechanics. The duration of the yoga postures was increased each week and the individuals passed to a more difficult asana. In addition, individuals focused on breathing when passing from one asana to another and during relaxation. After warm-up workouts, ardha navasana, marichyasana, shalabhasana, balasana, chaturanga dandasana, adho mukho svanasana, tadasana, vrksasana, uttanasana, utkatasana, utthita trikonasana, parivitta trikonasana, utthita parsvakonasana, salamba sarvangasana, viparita karani, sarvangasana, and shavasana were performed (Fig. 1).

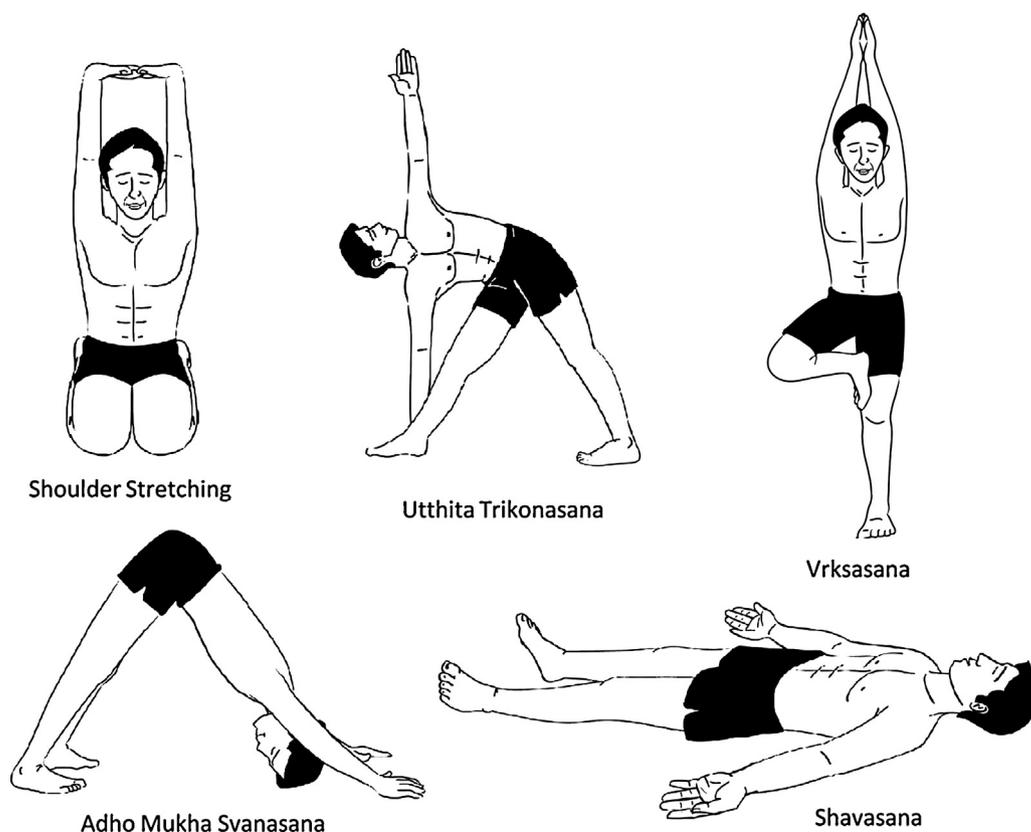


Figure 1 Samples of yoga asanas.

Resistance Exercise Group

A treadmill/bicycle and some stretching exercises were used for warm-up before starting the exercises. After the exercises, stretching exercises from the warm-up program were repeated for the cooling-down period. The exercises used in the REG were defined as chest press, shoulder press, lat pull down, cable biceps curl, triceps push down, leg extension, leg curl, sit-ups, and reverse sit-ups. Training of agonist-antagonist muscles back-to-back was avoided. Exercises directed at more than one joint were performed before those directed at only one joint. Exercises directed to the upper or lower extremities were not performed back-to-back. The order of the exercises was planned so that they were directed at major muscle groups first and then minor muscle groups (ACSM 2002) and at least 1–2 min of rest was required between the sets of repetitions. At least 2–3 min of rest was required when passing between the exercise stations and at least one day of rest was required between exercise sessions. After the end of the adaptation period, a number of maximum repetitions (MR) was determined for each participant and the study weights were defined by calculating 65% of the MR.¹⁸

Control Group

No exercise training was performed by the CG participants.

Measurements

The demographic data of the participants were recorded on a pre-prepared form. The body weight and height of the participants were measured with a medical scale and a height scale. The following scales were applied in all cases before and after the study.

Quality of life

The Turkish version of the Nottingham Health Profile (NHP) was used to evaluate quality of life.¹⁹ This survey consists of 38 questions in six sections including pain, physical activity, sleep, social isolation, and emotional reaction. Questions are answered with “yes” or “no”. Each section is graded between 0 and 100 points with a value of 0 for the best health condition and 100 for the worst health condition.²⁰

Depression Symptoms

The Beck Depression Inventory (BDI) was used to evaluate depression symptoms. BDI was developed by bringing together the most frequent symptoms and attitudes of depression demonstrated by individuals.²¹ Observations collected under 21 symptoms and attitudes were graded according to their intensity from 0 to 3. A Turkish version of BDI was used in this study.^{22,23}

Body image

A Turkish version of the Body Cathexis Scale (BCS) that was developed by Secord and Jourard²⁴ was used in order to identify the satisfaction level of body image.²⁵ The scale consists of 40 items. Each item defines a part of the body (arm, leg, face, etc...) or a function of the body, such as the level of sexual activity. Each item has a point value between 1 and 5; a total score of 40–200 is reached at the end with high points representing a more positive evaluation.²⁶

Self esteem

A Turkish version of the Rosenberg Self-esteem Scale (RSES) was used to evaluate self-esteem.²⁷ This scale is a Likert scale consisting of 10 items. Each question has a different point for the calculation of a self-esteem score. The scale is evaluated considering the total points and a high score represent high self-esteem.²⁸

Fatigue

The Visual Analog Scale (VAS) is a scale of 10 cm that was used to evaluate individual fatigue in the final week of this study. The left side of the scale is marked with the statement, "I feel no fatigue" and the right side with, "I feel overwhelmed and exhausted". The VAS value is defined by measuring the distance between the far left edge of the scale and the point marked by the individual. The values differ from 0 to 10 and high values represent increased fatigue.²⁹

Statistical analysis

The data obtained were analyzed using Statistical Package for the Social Sciences (SPSS) 15.0 program and descriptive data were expressed as minimum-maximum, mean, and standard deviations. In order to determine the superiorities of implementations to each other, the pre- and post-implementation difference values were calculated. Since the obtained difference values were not distributed normally, 25th, 50th (median) and 75th percent values were used to compare the groups.

Results

This study was started with a total of 80 selected cases. A total of 29 cases were excluded from study; 10 cases in HYG due to non-regular participation, 6 cases due to non-regular participation and two cases due to injury in REG, and 11 cases who did not attend the second follow-up or could not be contacted. The participant scheme is given in Fig. 2. As a result, the study was accomplished with 51 cases in total, 17 cases in HYG, 17 cases in REG and 17 cases in CG. The demographic data of the cases in each group are shown in Table 1. The data of the questionnaire implemented before the training are presented in Table 2.

In HYG, it was determined that the post-training fatigue level and the level of depression symptoms decreased in proportion to the pre-training values. Self-esteem and body

image were seen to have improved after training. The NSP score evaluating life quality and its emotional reactions subgroup decreased. The energy level, pain, social isolation, sleep and physical activity values did not change (Table 3).

In REG, post-training fatigue levels and depression symptoms decreased in proportion to the pre-training levels. Body image and self-esteem also improved. The total NSP score decreased after training, and so it was observed that quality of life increased. The physical activity, energy level, and emotional reaction values of NSP were affected positively. No change was observed in the other sub-divisions of pain, social isolation, and sleep values (Table 3).

In CG, no significant change was observed in the result evaluations of the participants (Table 3).

The pre-training and post-training difference values of the groups were compared. In this study, it was found that fatigue, self-esteem, and quality of life have improved in HYG more than REG. Comparing body image values of REG with those in HYG, it was determined that REG had been affected more positively. Both hatha yoga and resistance exercise showed similar levels of decreased depression symptoms (Table 3).

Discussion

Maintaining psychological well-being is very important in daily life for sedentary healthy subjects in terms of salutogenesis.¹ In this study, the effects of hatha yoga and resistance exercise training on mental health and sense of well-being in sedentary adults were investigated and compared. It was observed that hatha yoga and resistance exercise affected quality of life, depression, body image, self-esteem, and fatigue level values positively. Comparing the efficiency of the two different methods, it was found that hatha yoga improved fatigue, self-esteem and quality of life more, while resistance exercise training improved body image more. In both the hatha yoga and resistance exercise groups, depression symptoms decreased in a similar way.

This study has both strengths and limitations. The strength of the study is that it is the first study where the efficiency of hatha yoga and resistance exercise on sedentary adults has been compared. The other strength of the current study is that the mental health and sense of well-being of the participants was evaluated through result measurement methods with Turkish validity. The most important limitation of the study is that the sample size was low. Studies of larger samples conducted with cases at different levels may have clinical importance. In addition, the protocol of the current study did not conduct an intention-to-treat. Another limitation is that it was not a blind study. Due to the low numbers of subjects, the implication is that this has limited ability to identify possible differences between hatha yoga and resistance exercise.

In a study evaluating the effects of yoga on depression, it was found to decrease stress and depression and increase the general well-being of individuals.³⁰ It was also reported to prevent the development of a negative mood or to decrease the signs of it and the feeling of fatigue.^{31–33} Lee et al.,³⁴ demonstrated that yoga caused an increase in quality of life and self-esteem together with a decrease in the signs of anxiety and depression. However, they concluded

Table 1 Demographic characteristics.

Variables	HYG (n = 17)		REG (n = 17)		CG (n = 17)	
	Min–Max	Mean ± SD	Min–Max	Mean ± SD	Min–Max	Mean ± SD
Age (year)	21–40	26.65 ± 6.66	21–39	24.76 ± 3.65	20–36	25.29 ± 5.68
Height (cm)	160–192	169.47 ± 9.52	155–190	173.35 ± 9.91	163–180	170.82 ± 5.98
Weight (kg)	49–105	68.94 ± 16.98	48–100	71.06 ± 14.89	49–85	67.71 ± 11.66
BMI (kg/m ²)	17.30–28.73	23.73 ± 3.79	16.30–27.77	23.51 ± 3.65	17.96–28.73	23.12 ± 3.24
Sex	n %		n %		n %	
Female	8 (47.05)		8 (47.05)		9 (52.95)	
Male	9 (52.95)		9 (52.95)		8 (47.05)	

HYG: Hatha Yoga Group, REG: Resistance Exercise Group, CG: Control Group, cm: centimeter, kg: kilogram, m: meter, BMI: body mass index, Min: minimum, Max: maximum, SD: standard deviation.

Table 2 The first comparison of the values obtained prior to the exercises.

Variables	HYG (n = 17) Mean ± SD	REG (n = 17) Mean ± SD	CG (n = 17) Mean ± SD
Fatigue (VAS)	3.62 ± 1.93	3.17 ± 1.77	3.42 ± 1.67
Depression (BDI)	5 ± 3.69	6.71 ± 4.35	7 ± 3.79
Self Esteem (RSES)	24.82 ± 3.97	22.82 ± 4.62	21.71 ± 4.01
Body Image (BCS)	158.94 ± 25.20	145.06 ± 21.14	154 ± 21.85
Quality of life (NSP)			
Total score	59.83 ± 49.84	77.54 ± 70.95	52.59 ± 65.16
Energy level	20.75 ± 25.15	24.84 ± 30.64	11.15 ± 22.34
Pain	4.31 ± 6.86	4.94 ± 6.90	3.67 ± 8.71
Emotional reaction	16.01 ± 18.45	17.08 ± 18.56	13.49 ± 14.05
Social isolation	8.82 ± 21.53	11.77 ± 21.95	4.74 ± 11.10
Sleep	3.82 ± 7.78	10.40 ± 19.80	12.46 ± 24.63
Physical activity	6.45 ± 7.70	8.47 ± 7.31	7.02 ± 12.99

min: minimum, max: maximum, SD: Standard deviation, HYG: Hatha Yoga Group, REG: Resistance Exercise Group, CG: Control Group, VAS: Visual Analog Scale, BDI: Beck Depression Inventory, RSES: Rosenberg Self-esteem Scale, BCS: Body Cathexis Scale, NSP: Nottingham Health Profile.

Table 3 Comparisons of changes in the groups.

Variables	HYG (n = 17)			REG (n = 17)			CG (n = 17)		
	%25	Median	%75	%25	Median	%75	%25	Median	%75
Fatigue (VAS)	−3.4	−2.2	−1.2	−2.8	−1.8	−0.6	−1.1	0.4	1.3
Depression (BDI)	−6	−3	−0.5	−6	−4	−2	−2	−1	1
Self esteem (RSES)	1.5	3	5	0	2	4	−2.5	0	2.5
Body image (BCS)	3	11	31.5	7	15	31.5	−3	1	8.5
Quality of life (NSP)									
Total score	−64.7	−39.2	−17.3	−75.92	−35.2	−4.48	−24	0	23
Energy level	−39.2	0	0	−50	−24	0	0	0	0
Pain	−8.9	0	0	−8.96	0	0	0	0	0
Emotional reaction	−28.2	−7.1	0	−20.66	−2.2	0	−3.6	0	12.2
Social isolation	0	0	0	−11.2	0	0	0	0	10
Sleep	0	0	0	0	0	0	0	0	0
Physical activity	−11.2	0	0	−11.2	−10.8	0	−0.3	0	5.4

HYG: Hatha Yoga Group. REG: Resistance Exercise Group. CG: Control Group. VAS: Visual Analog Scale, BDI: Beck Depression Inventory. RSES: Rosenberg Self-esteem Scale. BCS: Body Cathexis Scale. NSP: Nottingham Health Profile.

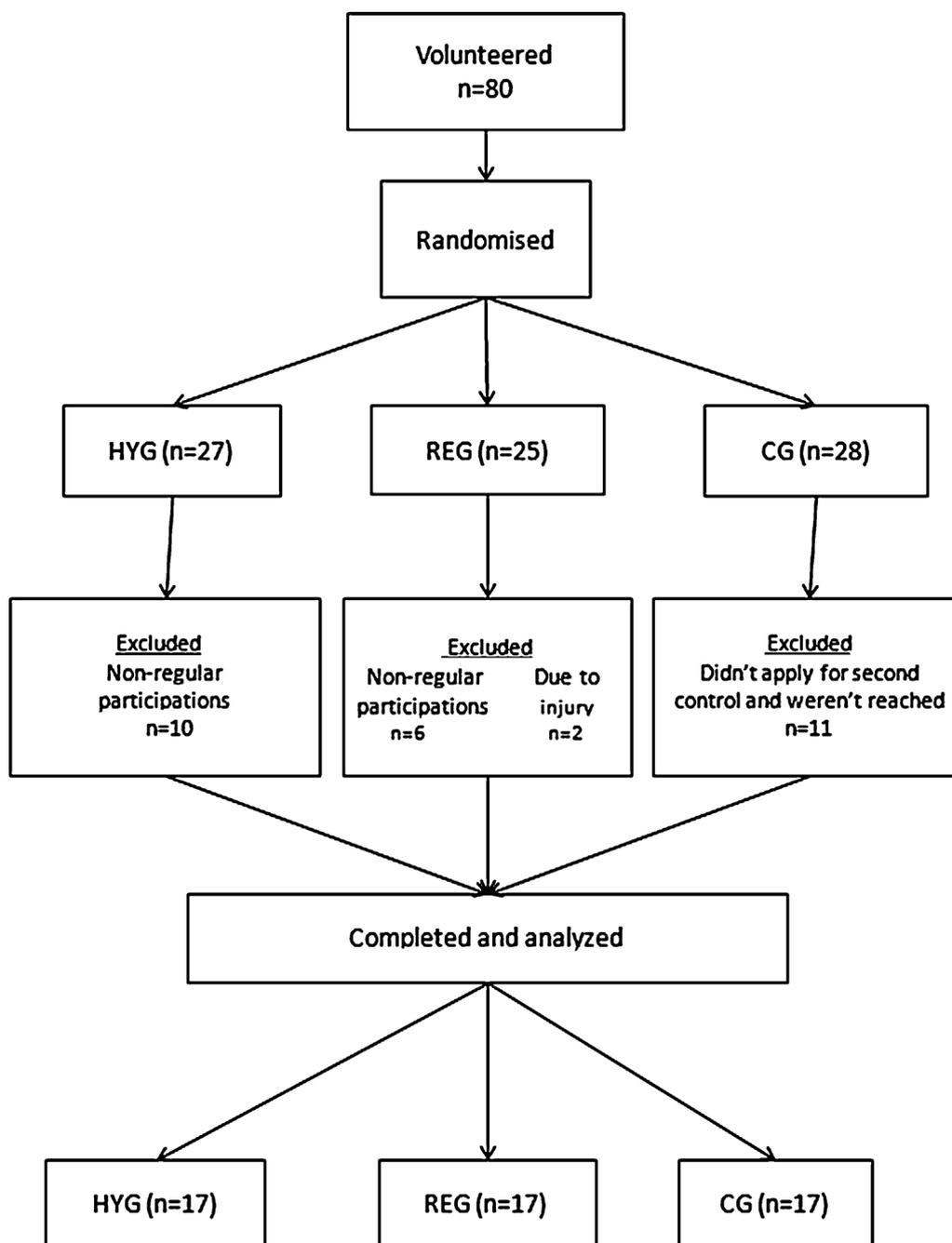


Figure 2 Flowchart of subject participation. HYG: Hatha Yoga Group, REG: Resistance Exercise Group, CG: Control Group.

that randomized and controlled studies were needed on this subject. Hadi and Hadi,³⁵ Sahajpal and Ralte,³⁶ and Engelman et al.,³⁷ reported positive effects of yoga on quality of life, beneficial effects on self-esteem and stress levels, and improvement in body image, respectively. In other studies on the effects of yoga, Hafner-Holter³⁸ demonstrated improvement in mood and body image, Bridges and Madlem,³⁹ and Elavsky and McAuley⁴⁰ demonstrated increased self-esteem, and Oaken et al.⁴¹ reported a decreased level of fatigue and an increase in quality of life. In the current study, it was observed that the effects of hatha yoga on quality of life, depression, body image, self-esteem and fatigue conformed with previous reports in literature. A

growing body of evidence supports the belief that yoga benefits physical and mental health via down regulation of the hypothalamic–pituitary–adrenal (HPA) axis and the sympathetic nervous system (SNS).⁴²

In the current study, it was observed that various aspects of mental health and the sense of well-being improved via resistance exercise. There is a limited number of studies in this field, and most of those have been conducted on an older population. Resistance exercise has been reported to improve quality of life, self-concept, and life-satisfaction,⁴³ decrease depression symptoms^{8,44,45} and improve psychological well-being in elderly individuals.⁴⁶ There has been significant evidence in previous studies of the positive

effect on body image of resistance exercise in the adult population.^{7,47–49} In the current study, resistance exercise training was also determined to have made contributions to body image.

To the best of our knowledge, there have been no studies comparing the effectiveness of resistance exercise and yoga on quality of life, depression, body image, self-esteem, and fatigue together. However, there are several studies comparing the efficiency of different exercise methods on health improvement. In a review study by Ross and Thomas⁴², in a comparison of the efficiency of yoga and exercise, yoga was found to be as efficient as exercise in both the healthy and patient population. Ford et al.⁵⁰ found no differences in body image and self-esteem between groups of aerobic dance, jogging, swimming, resistance training, and controls when evaluating the effects of physical activity on physical fitness and psychological well-being. In a previous mind-based study, low-impact exercise activity was found to improve the mood more than aerobic exercises.⁵¹ However, Robson⁵² evaluated the acute effects of yoga and exercise in non-depressed individuals and found that yoga and exercise improved mood similarly and decreased stress. In a study by Hafner-Holter et al.³⁸ comparing the effects of fitness and yoga training on well-being, mood, coping with stress, body image, and social proficiency, it was reported that physical activity improved psychological well-being, although fitness and yoga were found to have different psychological effects. In addition, they emphasized that future studies should focus on the psychological effects of different physical activity programs and that individuals with mental diseases might benefit from exercise prescriptions. Yoga and swimming were found to affect anxiety, confusion, stress, and depression in a study similar to the current one.⁵³ In another study performed on healthy older individuals, yoga was found to be more effective compared to walking in terms of physical measurements, quality of life, well-being, increased level of energy, and decreased feeling of fatigue.⁴¹ In a study evaluating the effects of yoga on self-esteem, physical activity was found to increase self-esteem and it was concluded that alternative physical activities such as yoga might be used to increase self-esteem.³⁹ The results of the current study showed that hatha yoga and resistance exercise may affect different aspects of mental health and well-being.

Conclusion

This study demonstrated that hatha yoga and resistance exercise have positive effects on mental health and well-being in sedentary adults. It was thought that these two different approaches are methods which can be chosen to improve mental health and well-being, that the exercise should be performed regularly in order to protect and improve mental health, and that yoga and resistance exercise may be given as an exercise prescription for this purpose. Comparing the efficiency of yoga and resistance exercise on mental health and the sense of well-being, it was determined that hatha yoga and resistance exercise may affect different aspects of mental health and well-being. As this study was a pilot study, future clinical trials are needed to examine the distinctions between resistance exercise and

yoga in a bigger sample and there should also be follow-up of long-term effects. In future studies, the physiological effects (parasympathetic nervous system activity etc.) can be investigated in order to determine whether or not there is any difference between the effect mechanisms of hatha yoga and resistance exercise.

Conflict of interest statement

There is no conflict of interest with any institution or individuals.

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