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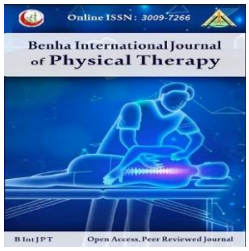

Original research

Effect of baduanjin exercise on quality of life in patients with metabolic syndrome.

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Abstract

Background: Characteristics of the metabolic syndrome include the co-occurrence of a number of cardiovascular risk factors, such as insulin resistance, dyslipidemia, hypertriglyceridemia, low-density lipoprotein cholesterol, visceral obesity, and hypertension, which are improved by baduanjin exercise. **Purpose:** Determining the impact of Baduanjin workouts on quality of life in patients with metabolic syndrome. **Methods:** A randomized prospective clinical study included 60 patients with metabolic syndrome. They were recruited from an outpatient clinic for internal diseases at Qalioup General Hospital. Two equal groups were randomly assigned to the patients. For twelve weeks, Group A engaged in daily baduanjin exercises plus medical treatment, and Group B was given only medical treatment. Systolic blood pressure (SBP), diastolic blood pressure (DBP), waist circumference (WC), triglycerides (TG), high density lipoprotein (HDL), fasting plasma glucose (FGL), the short form 12 mental component score (SF12MCS), and the short form 12 physical component score (SF12PCS) were compared before interventions and after 12 weeks. **Results:** According to analysis conducted within groups, all variables evaluated between pre- and post-treatment indicated a statistically significant difference in the group A, while the group B did not experience any statistically significant difference. Upon analyzing the group differences, it was found that, in all measure variables, no statistically significant difference was seen (p-value > 0.05) between the two groups prior to treatment. while, there was a statistically significant difference between the two groups for all variables after the treatment (P<0.05). **Conclusion:** Baduanjin exercise decreased the symptoms of metabolic syndrome and its related cardiovascular effects.

Keywords: Baduanjin exercise, Metabolic syndrome, Quality of life.

Introduction

A relatively recent group of metabolic disorders is called metabolic syndrome. It has been recognized since the early 21st century, when it was shown that food and lifestyle modifications were causing obesity rates to grow. It is characterized by several issues caused by diabetes and insulin resistance, dyslipidemia, arterial hypertension, and hyperglycemia[1].

Currently, 31% of the general population has an average prevalence of metabolic syndrome. It is particularly common in the elderly, maybe up to 55% in some study groups, and is considered a serious public health issue[2].

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The metabolic syndrome (MetS) is defined by five criteria: (i) raised triglycerides (>150 mg mL−1); (ii) elevated waist circumference (>102 cm for men, >90 cm for women); (iii) low high-density lipoprotein cholesterol (<40 mg/dL in men, <50 mg/dL in women); (iv) higher blood pressure at the systolic and diastolic points (≥130 and ≥85 mm Hg, respectively); and (v) higher blood sugar when fasting (≥100 mg/dL) [3].

A type of aerobic mind-body exercise called baduanjin exercise integrates breathing exercises, body awareness, and meditation. Recent years have seen a large number of systematic reviews that indicate the benefits of Baduanjin exercise for the management and avoidance of a variety of diseases, such as diabetes and hypertension[4]. There are eight main forms of baduanjin exercise, each concentrating on a different body part. Eight pieces of brocade can be understood as these exercises[5].

Research has demonstrated that patients' SBP and DBP can be effectively lowered with traditional Chinese exercise, easing the symptoms of cardiovascular illness[6]. Serum insulin concentration, fasting blood glucose, and the insulin resistance index can all be considerably reduced in Baduanjin by exercise[7]. It decreased blood lipid levels; the alterations were inversely correlated with the obesity index (body weight, BMI, and body fat percentage). As well, it reduced the levels of free fatty acids, triglycerides, and total cholesterol[8].

Baduanjin exercise coordinated action on the heart, body, and breath. Thus, it improves the standard of living[9]. Baduanjin exercises, like traditional Chinese mind-body exercises, are better than regular workouts because they emphasize musculoskeletal relaxation, breathing control, and peaceful mindfulness help improve the mental and physical well-being of those suffering from long-term illnesses[10]. The aim of this study was to determine the effect of baduanjin exercise on quality of life of patients suffer from metabolic syndrome.

Methods

The Ethics Committee of Cairo University's Faculty of Physical Therapy gave its clearance to this study (number P.T.REC/012/004558 Egypt). The study's techniques and objectives were well understood by the patients and adhered to ethical guidelines. Written informed consent was acquired from every patient involved. Patients were classified as either included or excluded based on the following criteria: sixty patients with metabolic syndrome, ages 60 to 75, both genders.

With thirty patients per group, the patients were split into two groups. In addition to receiving standard medical care, group (A) who completed baduanjin exercises every day for 40 minutes for a period of 12 weeks. Each session lasted five minutes.and group (B) underwent conventional medical for 12 weeks. They were hired from Qalioup General Hospital's outpatient clinic for internal disorders. Those with heart problems, such as cardiac failure, mental or psychological disorders, muscle and joint issues, neurological issues, lung, kidney, and liver problems, autoimmune conditions, and those with cognitive disorders were excluded from the study. They received their training program from June 2023 to November 2023.

Randomization:

An unbiased patient selected the patients' groups (A) (n = 30) and (B) (n = 30) by blind drawing numbers out of sealed envelopes produced by a random number generator. To guarantee that the numbers allotted to groups A and B were equal, the randomization was limited to permuted blocks. Sequences allotted to patients were put in envelopes with the allocations to each group inside of them. Eligible patients were informed about the purpose and methods of the study.

Measures and procedures:

This study collected data on each patient in groups A and B's weight, height, Systolic blood pressure (SBP), diastolic blood pressure (DBP), waist circumference (WC), triglycerides (TG), high density lipoprotein (HDL), fasting plasma glucose (FGL), The short form 12 mental component score (SF12MCS) and the short form 12 physical component score (SF12PCS) before and 12 weeks after the treatment program.

Treatment procedures: Baduanjin workouts were conducted in compliance with Koh[5].

It was recommended to do the exercises twice a day, preferably before meals in the morning and evening. Concentrate on the task at

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present and try to shut out all other thoughts. This encouraged mental serenity and precise form execution. Every workout began and ended with a brief period of relaxation because successful results depend on steady breathing and optimal performance.

The eight slow motions that make up a baduanjin exercise are often performed symmetrically with an emphasis on establishing a meditative state and deep, rhythmic breathing[11]. These exercises involve the following: " patient raise his hands and place his palms upwards." " patient use both left and right hands to shoot," " patient raising one arm to control the spleen and stomach's functioning," " patient examine the past to avoid illness and stress," " patient lower the body and swing his head to release tension," " To strengthen the kidneys, patient run his hands down his legs and back, putting his fingertips on his feet.," " to increase strength, patient can push his fists and glare his eyes." while " patient might raise or lower his heels[5].

Statistical analysis:

To verify that the data were normal and evaluate group homogeneity, Shapiro-Wilk and Levene's tests for homogeneity of variances were employed. The data had a normal distribution, and the variance was uniform. The unpaired t-test was performed to compare groups based on all patient characteristics. Additionally, to examine the distribution of sexes between the two groups, the Chi-squared test was employed. Using mixed MANOVA, the effects of the treatment on SBP, DBP, WC, TG, HDL, FGL, SF12PCS, and SF12MCS were examined. Univariate ANOVAs were performed in addition where the MANOVA yielded significant findings. Post-hoc analysis with the Bonferroni correction was done for multiple comparisons. A significance level of p-value = 0.05 was selected for all statistical tests. Version 23 of SPSS was applied.

Results

Demographic Characteristics: Table (1) displays the subject characteristics for groups A and B. Regarding the demographics of the participants in both groups, there were no statistically significant differences ($p > 0.05$)

Blended style MANOVA showed a significant influence for groups, Wilks' Lambda (Λ) = 0.37; F (8,51) = 10.89, P < 0.001, = 0.63; for time, Wilks' Lambda (Λ) = 0.21; F (8,51) =24.34, P < 0.001, = 0.79; and regarding group interactions and timing, Wilks' Lambda (Λ) = 0.26; F (8,51) =18.18, P < 0.001, = 0.74.

Within groups analysis:

As indicated in Tables 2 and 3, the results showed a statistically significant difference in SBP, DBP, WC, TG, HDL, FGL, SF12PCS, and SF12MCS before and after treatment within group A only (Tables 2,3).

Between group's analysis:

In the pre-treatment phase, there was no statistically significant difference between the two groups according to all measure parameters (p-value>0.05). As shown in Tables 2&3, there was a statistically significant difference between the two groups in every variable after treatment, with p-values less than 0.05 (Tables 2,3)

Table (1): Demographic characteristics of patients

	Study group	**Control group**	**t- value**	**p-value**
	±SD $\overline{X}$	**±SD $\overline{X}$**		
Age (years)	63.07 ± 3.17	62.8±3.25	0.32	0.74 [a]
Weight (kg)	91.23 ±13.03	90.13±14.04	0.31	0.75 [a]
Height (cm)	162.13 ±9.18	164.23±10.51	-0.82	0.41 [a]
BMI (kg/m²)	34.92 ±5.42	33.7±6.25	-0.81	0.42 [a]
Gender Mal e/ Female	16 males-14 females	17 males -13 females	$\chi 2$=0.07	0.8 [a]

[a]: Not significant, SD: Standard deviation, P: probability, BMI: body mass index; X^2= Chi square

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Table 2: Both within and between groups analysis for all dependent variables

Variables	Group A	Group B	p-value (between groups)	η^2
SBP (mmHg)				
Pre-treatment	144.33±15.67	143.67±17.65	0.88 [a]	
Post-treatment	130.7±17.55	141.37±18.16	0.02 [b]	0.1
p-value (within-group)	0.001 [b]	0.46 [a]		
MD (95% CI)	13.63(7.49 to 19.78)	2.3 (-3.85 to 8.45)		
DBP (mmHg)				
Pre-treatment	85.37±7.63	86.5±8.52	0.59 [a]	
Post-treatment	78.4±10.86	85.47±9.91	0.0001 [b]	0.12
p-value (within-group)	0.001 [b]	0.5 [a]		
MD(95% CI)	6.97(3.91 to 10.02)	1.03 (-2.02 to 4.09)		
Waist circumference (cm)				
Pre-treatment	113.03±8.67	114.77±9.99	0.48[a]	
Post-treatment	107.7±7.53	113.83±9.49	0.01 [b]	0.12
p-value (within-group)	0.001 [b]	0.13 [a]		
MD (95% CI)	5.33 (4.13 to 6.54)	0.93 (-0.27 to 2.14)		
Triglycerides (mg/dl)				
Pre-treatment	201.1±35.6	200.77±34.59	0.99 [a]	
Post-treatment	166.17±34.6	199.23±33.97	0.01 [b]	0.11
p-value (within-group)	0.02 [b]	0.92 [a]		
MD (95% CI)	34.93(5.47 to 64.39)	1.53 (-27.92 to 30.9)		

SBP: systolic blood pressure; DBP: diastolic blood pressure; mmHg: millimeters of mercury;mg/dl: Milligrams per deciliter *p*-value: probability; [a]: non-significance difference; [b]: significance difference; CI: confidence interval.MD: mean difference.

Table 3: Within and between group analysis for all dependent variables

Variables	**Group A**	**Group B**	**p-value (between groups)**	**η^2**
HDL-C (mg/dl)				
Pre-treatment	41.43±4.07	41.73±4.88	0.15 [a]	
Post-treatment	44.43±4.49	40.63±4.7	0.002 [b]	0.1
p-value (within-group)	0.001 [b]	0.06 [a]		
MD(95% CI)	-3(-4.08 to -1.92)	1.1 (-0.02 to 2.18)		
FBS (mg/dl)				
Pre-treatment	178.5±30.5	173.97±38.05	0.77 [a]	
Post-treatment	147.63±35.59	171.23±37.24	0.02 [b]	0.1
p-value (within-group)	0.001 [b]	0.75 [a]		
MD(95% CI)	30.87(13.97 to 47.76)	2.7 (-14.19 to 19.59)		

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SF12PCS				
Pre-treatment	36.23±7.85	35.17±3.71	0.5[a]	
Post-treatment	52.2±3.32	36.9±4.71	0.0001 [b]	0.79
p-value (within-group)	0.001 [b]	0.18 [a]		
MD(95% CI)	-15.97 (-18.52 to -13.42)	-1.73 (-4.28 to 0.82)		
SF12MCS				
Pre-treatment	38.27±5.65	37.03±4.56	0.58 a	
Post-treatment	52.47±7.07	38.43±4.04	0.0001 b	0.11
p-value (within-group)	0.0001 b	0.34 a		
MD (95% CI)	-14.2(-17.08 to -11.31)	-1.4 (-4.28 to 1.48)		

HDL-C: high density lipoprotein cholesterol; FBS: fating blood glucose;SF12PCS: short form 12 physical score; SF12MCS: short form 12 mental score; mmHg: millimeters of mercury;mg/dl: Milligrams per deciliter *p*-value: probability; [a]: non-significance difference; [b]: significance difference; CI: confidence interval.MD: mean difference

Discussion

The results of the study demonstrated that patients in group (A) who combined traditional medical treatment with Baduanjin exercise had a considerably higher quality of life than patients in group (B) who only received traditional medical care.

The study's findings were confirmed by Wei et al., who demonstrated that there were significant differences in the two groups' systolic blood pressure, pulse, and vital capacity ($P < 0.05$) following the exercise program in Baduanjin. (SBP) in the observation group varied significantly before and after the intervention ($t = 8.066$, $P < 0.001$), suggesting that military pilots with hypertension can safely and effectively control their blood pressure with the Baduanjin exercise. Exercise in Baduanjin raises vital capacity and aids in the maintenance of a steady pulse [12].

The outcomes were also in line with the findings of Miao et al., who found that training in Baduanjin reduced total cholesterol and showed that Baduanjin improved overall cholesterol levels[13].The outcomes also agreed with Zhao et al.'s[14] findings, which showed that this baduanjin is an adjuvant therapy for reducing the need for antihypertensives in order to ascertain the best course of action for treating hypertension. This study evaluated baduanjin as an adjuvant treatment to reduce medication in hypertensive elderly individuals[14].

The findings of Guo et al., who found that Baduanjin exercise helped T2DM patients considerably enhance their level of lipid and glucose metabolism, were consistent with the findings of this investigation. The results also indicated a decrease in FPG following combination treatment[15].

The investigation's results aligned with those of Luo et al., The standard insights for including exercise with Baduanjin for the symptomatic management of diabetes who also have emotional disorders were supplied by the systematic review and meta-analysis. Baduanjin exercise is particularly good for decreasing FBG, according to particularly positive results[16].

The results were in line with those of Ma et al[17] who found that Baduanjin exercise significantly improves type 2 diabetes patients' endothelium-dependent vasodilation function. This is very beneficial for people with diabetes mellitus who want to regain their health. Additionally, they found that non-medical physical rehabilitation techniques, which largely addressed the internal reasons of diabetes in order to treat its underlying cause, had a substantial favorable impact on the rehabilitation of diabetic patients. Traditional Chinese medical physiotherapy is also preferable to western medical treatments because it has no negative side effects[17].

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Furthermore, our results corroborated those of Zhang et al., who also found consistent results with respect to HbA1c and FBG. Based on these findings, Baduanjin may be a helpful treatment for diabetes since it may enhance life quality and mental health, glucose and lipid metabolism, it also improved FBG[18].

The results corroborated those of Guo et al., who found that Baduanjin exercise significantly raised the degree of lipid and glucose metabolism in T2DM patients. The results showed that Baduanjin exercise improved lipid metabolism in T2DM patients, resulting in lower levels of TG, total cholesterol (TC), (LDL-C) and (HDL-C)[15].
The results aligned with a meta-analysis conducted by Wen et al., which indicated that Baduanjin plus conventional medication was more effective in treating type 2 diabetes mellitus than standard care. In addition to raising HDL-C, Baduanjin in combination with conventional therapy decreased the levels of plasma glucose, FGL, and TG. Not a single study that was included mentioned any negative effects[10].

Though this study's findings conflicted with those of a study by Zheng et al.[19] comprising a control group that regularly exercised at a moderate-to-low intensity. The research revealed a decrease in the triglyceride index for both the control (5.67±0.14 before vs. 5.22±0.12 after) and engagement (5.67±0.14 before vs. 5.22±0.12 after) groups. The findings of this study indicate that performing 60 minutes of Baduanjin exercise for at least ten weeks, five or seven days a week can effectively reduce triglycerides. This could be due to a combination of factors including the control group members' lifestyle and the timing of the intervention [19].

Limitations:

The brief Baduanjin exercise time and the study's limited sample size, which was restricted to the elderly, were its main disadvantages.

Conclusion:

The study's findings demonstrated that Baduanjin exercise became beneficial way to treat or lessen the following conditions in these patients with metabolic syndrome: abdominal obesity, hyperglycemia, hyperlipidemia, hypertension, and the risk of metabolic syndrome and its related cardiovascular repercussions. We also recommend that clinical healthcare professionals use this low-intensity, safe, and easy exercise for disease prevention and control, especially for elderly patients who cannot tolerate moderate aerobic exercise, especially those with metabolic syndrome. Furthermore, the effects of Baduanjin exercise were comparable to those of moderately intense aerobic exercise.

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Potential conflict of interest:

The writers claim to have no conflicting agendas.

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