ORIGINAL ARTICLE

A Tabata-based high-intensity interval training study on body composition and physical fitness in sedentary university female students

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ABSTRACT

The current investigation explored the impact of given 12-week Tabata training intervention on decreasing body composition and overall physical performance among sedentary female students. The study involved the random assignment of forty undergraduate women into two groups for the purpose of this research. The age of individuals spans from 18 to 23. The study consisted of two groups: the control group (CG N = 20) and experimental group (EG N = 20). The experimental group engaged in a 12-week Tabata training routine. Pre and post data were calculated with the dependent variables, which comprises height, weight, body mass index, waist circumference, speed, agility, endurance, abdominal strength, and leg strength. Followed by the statistical analysis of the collected data. The majority of the enhancements resulted in a decrease in BMI and waist-to-hip ratio. In addition to that there was a rise in physical performance, including improved abilities in areas such as speed, agility, endurance, abdominal strength, and leg strength of sedentary female students.
Keywords: Sport medicine, Tabata exercise, Motor fitness, Body composition, Sedentary lifestyle, Females.

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INTRODUCTION

The World Health Organisation defines inactivity as non-participation in a minimum of 150 minutes in a week of moderate-intensity aerobic activity. Füzéki & Banzer (2018) reported that a minimum of 75 minutes of high-intensity exercise in a week, or a combination of high and low intensities, Gaetano (2016), is beneficial to maintain good health. Health and lifestyle are strongly related to each other. Inactivity ranks as the fourth major cause of death worldwide, resulting in four to five million unnecessary deaths. According to the research by Dishman, Heath, Schmidt, and Lee (2021), there is a strong link between a sedentary lifestyle and specific health issues. Physical inactivity is widely seen as a potentially dangerous attribute that leads to a range of health issues (Bull & Bauman, 2011). As a result, elderly individuals who do not engage in physical activity experience reduced muscle and bone growth, which in turn raises their chances of acquiring serious health conditions.

Engaging in regular physical exercise produces advantageous results for both physical and emotional well-being. Consistent engagement in physical activity has the potential to significantly decrease the mortality rate (Taylor et al., 2004). Specifically, it helps decrease the probability of getting coronary heart disease, stroke, high blood pressure, colon cancer, and other related illnesses. Scientific studies have consistently indicated that participating in appropriate physical activity can enhance the general well-being and quality of life for individuals of all ages and health problems (Blair & Morris, 2009). Physical exercise encompasses any form of physical activity that involves the movement of skeletal muscles and necessitates the use of energy (Dasso, 2019). Physical exercise encompasses many types of movement, done for pleasure, transit, or employment, that involve both vigorous and moderately intensive activity with the goal of improving physical well-being (Jackson, 2004). Empirical data has shown that regularly participating in physical exercise helps to control and prevent non-infectious diseases, like cardiovascular disease, stroke, diabetes, and various forms of cancers. In addition, it regulates blood pressure, facilitates a healthy body weight, and enhances mental well-being, so improving the overall standard of life (Lee et al., 2012).

According to a recent study, HIIT (High-Intensity Interval Training) is the most effective training for physical exercise. This workout routine involves short bursts of intense activity, usually at 75% of the maximum heart rate, and can last for several minutes (Roxburgh, Nolan, Weatherwax, & Dalleck, 2014). Recent research has revealed that HIIT (High-Intensity Interval Training) enhances physical fitness, particularly in terms of body composition, cardiorespiratory health, and physical efficiency (Andersen et al., 2020). From a time and convenience point of view, HIIT appears to help individuals who are not engaged in regular physical activity overcome significant barriers in order to maintain a healthy lifestyle. Tabata training is a kind of HIIT (High-Intensity Interval Training), currently undergoing a substantial surge in popularity. Interval exercise stimulates a metabolic increase that leads to significant benefits in lowering the buildup of body fat. Tabata is a type of HIIT (high-intensity interval training) that was introduced by researcher Izumi Tabata in 1996 (Tabata, 2019). The objective of HIIT using the Tabata training regimen enhance aerobic and anaerobic capacity, fortify ligaments and muscles, and elevate resting metabolism, finally resulting in a gradual reduction in body fat. This interval training regimen is specifically tailored to provide a cardiovascular exercise aimed in reducing body fat (Murawska-Cialowicz et al., 2020).

The Tabata program employs the HIIT (High-Intensity Interval Training) technique, which involves 8 cycles of brief and intense exercise lasts for 20 seconds, followed by 10 seconds of rest. The curriculum incorporates high-intensity workouts that efficiently excite the cardiac muscle and enhance metabolic processes, leading to a prolonged 24-hour post-training benefit (Olson, 2014). Prior research studies investigating the impact of Tabata exercise on adipose tissues have primarily focused on adolescents (Emberts, Porcari, Dobers-Tein, Steffen, & Foster, 2013), obese men (Andersen et al., 2020), and obese women (Shah & Purohit, 2020; Zhang et al., 2015). The aforementioned studies have demonstrated notable improvements in anaerobic capacity and the physical and motor characteristics of athletes (Mulazimoglu, Boyaci, Afyon, & Çelikbilek, 2021), (Afyon, Mulazimoglu, Celikbilek, Dalbudak, & Kalafat, 2021; Munandar, Setijono, & Kusnanik, 2022). While there has been considerable study on the physiological responses to regular and consistent exercise, there is a lack of studies explicitly examining its effects on adult women. Early studies on the impact of Tabata training have shown a dearth of evidence regarding its effects, specifically in terms of reducing fat in sedentary adults with advanced physical fitness. Carrying out a study to assess the benefits of Tabata training on physically inactive women, has the potential to establish this group fitness program as a novel method for promoting healthy recreational activities. The Tabata protocol is a time-efficient training technique that allows for regular exercise without requiring a significant amount of time every session, therefore enhancing long-term sustainability. The study should be able to determine if a Tabata 12-week training program will lead to a reduction in body composition and enhancement of physical performance among sedentary women.

MATERIAL AND METHODS

Participants

The study comprised 45 participants who were in a state of good health, with an average age of 20.73 ± 1.83 years. The participants were recruited through various avenues, such as posters, emails, and social media sites. Table 1 gives a comprehensive overview of the physical attributes of the participants. Non-athletic, untrained female volunteers readily agreed to participate in the study. Physical inactivity is defined as the lack of participation in any type of physical activity for at least one hour in a week during a period of at least 12 months. The present study recruited people who satisfied the following criteria: (1) individuals who abstained from medication, and (2) those who had engaged in little physical activity, namely no exercise in the six months preceding the study. Participants granted their informed consent by affixing their signature to a written document, indicating their comprehensive understanding of the experiment's objectives and the potential adverse outcomes. We have eliminated adolescent girls from our study who have chronic illnesses, recent joint replacements, lower limb fractures within the preceding six months, or severe cognitive impairments.

Participants were randomly given either an experimental group (EXP -1) or a control group (CON-2) using a random allocation software 2.1 in a controlled trial design. During the training session, five individuals left because of health problems and personal circumstances, leaving a total of 40 active participants. Upon obtaining an elaborate account of the training conditions and comprehending the potential adverse outcomes, the participants expressed their consent by affixing their signatures. Subsequently, the 20 experimental participants were then separated in to two distinct groups, that is, experimental group and control group, with 20 persons in each group. Since only 40 participants completed the 12-week investigation successfully, only the data of those 40 participants were considered in the analysis. Four participants dropped out of the study and there was a n = 5 (Figure 1). In their study, Park et al. (2020) based the sample size on an effect size of 0.49, an alpha value of .05, and a power of 0.80. Therefore, the calculation estimated a sample size of 12 participants to achieve statistical significance. The experimental dimensions were calculated by using G*Power software, version 3.1.9.7, developed by Heinrich-Heine-UniversitätinDüsseldorf, Germany.

Procedure

The study adopted the methodology of randomized controlled experimentation. Every subject participating in the study conducted a 12-week High-Intensity Interval Training plan that consisted of 36 sessions, and all subjects completed the study. The intervention was a schedule of three sessions a week, where each session lasted for 35-45 minutes. The workout routine included 15-minute warm-up followed by 4-minute training followed by 10-minute cool-down. The sessions took place only within the confines of the indoor stadium and were conducted and observed from 7:30 to 8:30 in the morning. Data was gathered before and during the intervention at two distinct time intervals. Prior to the baseline and post-test assessments, the volunteers were given instructions to abstain from drug use, alcohol consumption, and extreme physical activities for a period of two days. The participants arrived promptly at 8:00 a.m. for the first measurement session. The subjects underwent a thorough body composition examination and their speed, agility, and sit-up performance were evaluated in a controlled setting. On the second day, at the same time, they participated in a stamina exercise called the standing long jump.

The individuals' height was measured using a stadiometer, while morphological traits like body weight, BMI, and WHR (waist-hip ratio) were determined using an Accuniq B-C 380 body composition analyser. The physical fitness exam comprises multiple components that assess various facets of fitness. The assessment battery of a 50-meter sprint to evaluate speed, a (4x10) shuttle run to examine agility, a step test to measure endurance, sit-up test to gauge muscular strength, and a broad leap to evaluate explosive power. Following the administration of the pre-test scheduled for next week, the experimental group will commence their training interventions. The identical methodologies employed for gathering initial data were also utilized for assessing post-test data subsequent to the training session.

Body composition assessments

The participants were instructed to go to the indoor stadium at 9:30 am dressed appropriately, following a briefing on the regulations. The subject complied with all instructions given by the investigator. The main purpose of using a stadiometer is to measure the height of the participants. In addition, the Standard Accuniq B-C 380 model body composition analyser calculates morphological measurements comprising body weight, WHR (waist-hip ratio), and BMI.

Physical efficiency assessments

The assessment of aerobic capacity was conducted using the Harvard Step Test. Afterwards, PEI (Physical Efficiency Index) was calculated. The test's reliability is deemed adequate, as determined by the intraclass correlation coefficient. The Harvard Step Test is advantageous due to its minimal equipment requirements, lack of calibration necessity, and suitability for indoor administration. The athlete executes a periodic motion of ascending and descending on the platform at a rate of 30 steps in a minute (equal to one step every two seconds) for a length of 5 minutes or until experiencing fatigue. Exhaustion is defined as the athlete's inability to maintain the stepping movement for a duration of 15 seconds. After finishing the test, the athlete immediately sits down and the total number of heartbeats is measured for a period of 1 to 1.5 minutes while monitoring the heart rate. The Fitness Index is calculated by dividing the product of the test duration in seconds and 100 by the product of the number of heartbeats recorded between 1 and 1.5 minutes and 5.5. The PEI (Physical Efficiency Index) is calculated using the formula by Bajaj, Appadoo, Bector, and Chandra (2008). The formula for PEI can be written as $PEI = (100 \times L)/(5.5 \times p)$, where L represents the duration of the test in seconds ($L < 300$ seconds) and p indicates the heart rate within 1.5 minutes after the subject finished the test.

The purpose of the 50M Dash test was to assess an individual's speed. The test entails doing a solitary maximal sprint across a distance of 50 metres, while recording the elapsed time. Following the warm-up, it is advisable to incorporate workouts that specifically target initiating movement and enhancing speed. Commencing motion by placing one foot in front of the other when in a still position. Once the subject has been prepared and is completely still, the initiator provides the command to begin. Participants are permitted to conduct two trials, and the fastest time achieved is documented (Suleiman et al., 2019).

30-second sit-up test estimated the number of sit-ups performed while holding both hands at the sides of the head, knees bent at a 90-degree angle, and feet firmly held by another person. A complete sit-up is achieved when the knees make contact with the elbows and the shoulders are subsequently lowered to the floor. The precise tally of sit-ups performed with proper form within a 30-second timeframe was documented. Throughout the assessments, the evaluators intermittently notified the participants of the time left, delivering updates at intervals of 10, 20, and 30 seconds. No more verbal assistance was provided during the exam, save for audibly tallying the repetitions. All participants completed the test on a single occasion (Diener, 1992).

The shuttle run (4x10 m) was performed according to the protocol described by Ruiz et al. (2006). Two lines were laid on the ground, 10 yards apart. Subjects raced to the other line, and immediately back to the starting line, touching each line with both feet. The experimenter stood at the starting line and started stopwatch when the subjects crossed the line with one foot. The test time was measured to one decimal place. Each subject wore athletic clothing and was tested twice, with a 5-minute break between tests. The time obtained, which was the fastest, was selected.

The broad leap is a test that measures an individual's leg strength (Maulder & Cronin, 2005). The individual positions oneself behind a designated line on the ground, with their feet slightly separated. The approach employed entails a bipedal take-off and landing, whereby arm oscillation and knee flexion are utilized to provide anterior propulsion. The athlete aims to achieve maximum distance in their jump, skilfully landing on both feet without sacrificing their balance in a backward orientation. The measurement is determined by measuring the distance between the take-off line and the point of contact on the landing that is closest, and the greatest distance achieved in a jump is recorded based on three attempts.

Training Intervention

Tabata training sessions were conducted three times per week in the evening, precisely between 4:30 to 5:30 p.m. During non-business hours. There were a total of 36 training sessions. Every individual in the TPG participated in the 12-week Tabata exercise regimen, as illustrated in Table 1. The instruction was carried out by the research scholar. Each training session could not exceed 30 minutes and included warm-up, Tabata program, cool-down, and stretching. The warm-up session took 15 minutes to complete and involved performing basic exercises that increase mobility to get the body ready for the rest of the exercise program. A Tabata program consists of 8 cycles, each of which lasted for four minutes. There was a one-minute interval in between each round, thus the total exercise time amounts to 20 minutes. Each cycle completes a structured plan of exercising for 20 seconds and active recovery for 10 seconds. The concluding section of the workout entails a 10-minute time of relaxation and stretching. This entails engaging in activities such as listening to soothing music and concentrating on establishing a state of relaxation, with the objective of gradually decreasing heart rate and attaining mental and psychological tranquillity. The music's tempo is capped at a maximum of 100 beats per minute. Stretching is done to promote muscular relaxation and relieve muscle tension. During the activity, all participants utilized the palpation method to monitor their pulse rate (PR). This assessment quantifies the degree of physical exertion between the time it takes to reach maximum exercise intensity (TTP) and the maximum heart rate (HRmax) which is calculated using the formula 211 - 0.8 x age (Tanaka, Monahan, & Seals, 2001). The computed maximum heart rate was utilized to ascertain the high-intensity workout, which corresponds to a range of 75% to 80% of the maximum heart rate.

Table 1. Participants' physical characteristics, expressed as the mean value plus or minus the standard deviation (SD).

Variable	EG(N = 20)	CG(N = 20)	*p*-value
Age (year)	20.73 ± 1.83	20.80 ± 1.69	.836
Height (cm)	158.14 ± 7.60	158.14 ± 7.60	1.230
Weight (kg)	52.44 ± 8.96	49.70 ± 7.07	.000
BMI (kg/m^2)	21.40 ± 4.20	20.37 ± 4.21	.050
WHR (cm)	75.73 ± 7.58	73.12 ± 8.42	.000

Note: SD: Standard deviation; BMI: Body mass index; WHR: waist hip ratio; EG: experimental group; CG: Control group.

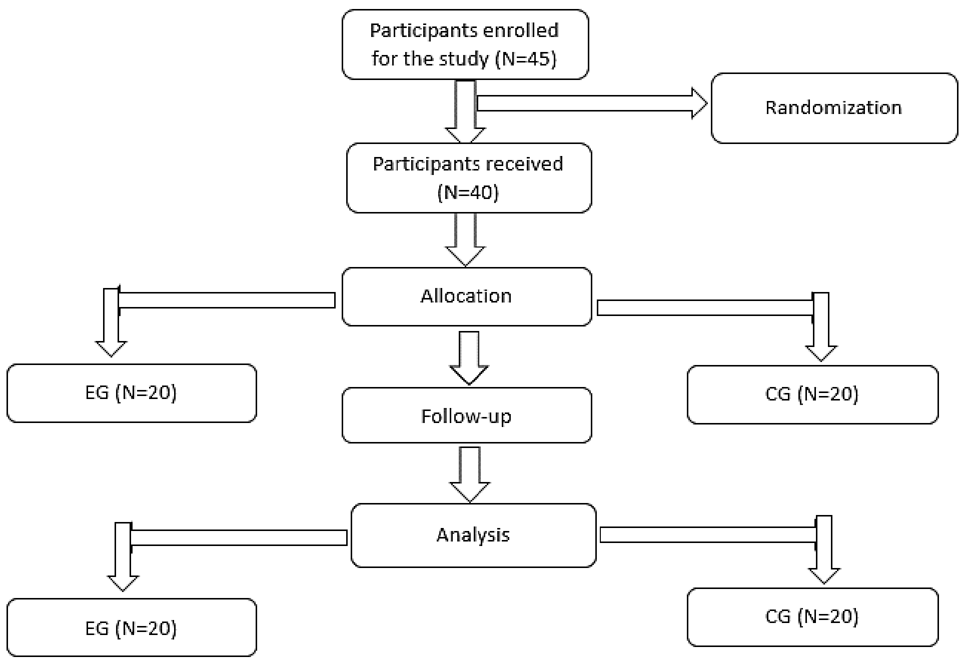

Figure 1. Participant's selection flow chart.

Table 2. Twelve week training schedule.

Week	Strength Training Practices schedule	Time distribution	Detailed Program
1-4 week	Warm-up & stretching	15 minutes.	Hands & Head rotation, Shoulder rotation, Chest swing, Hand stretching exercise etc.
	Tabata Training Programme	**10 minutes.** Exercise 20 Seconds. Rest between exercises 10 second. Rest between sets 1 minute. No of sets 2.	High knee, Side lunges, Back kick, squat, Jumping Jacks, Wall push ups, Mountain climbers, plank.
5-8 week	Tabata Training Programme	**15 minutes.** Exercise 20 Seconds. Rest between exercises 10 second. Rest between sets 1 minute. No of sets 3.	High knee, Side lunges, Back kick, squat, Jumping Jacks, Wall push ups, Mountain climbers, plank.
9-12 week	Tabata Training Programme	**20minutes.** Exercise 20 Seconds. Rest between exercises 10 second. Rest between sets 90 seconds No of sets 3.	High knee, Side lunges, Back kick, squat, Jumping Jacks, Wall push ups, Mountain climbers, plank.
	Cooling down	10 minutes.	Stretching, Cooling down.

Data analysis

The basic descriptive analysis, comprising the mean and standard deviation, was calculated for the initial and final measurements of body composition and physical efficiency variables in the experimental and control groups. Descriptive values were calculated for the total sample, and then separately for the experimental group and control group. The Kolmogorov-Smirnov test (K-S) was conducted for the check of normality of distribution, $p > .05$. According to the obtained result, the significance level of $p < .05$ was used for conducting an independent t-test, which was aimed at verifying possible changes in body composition and physical efficiency between the two groups of participants during the first measurement. A dependent t-test was conducted, based on the significance level of $p < .05$ for verification of statistically significant differences between the final measurements of the groups regarding the body composition parameters and physical efficiency. The effect size values were calculated and analysed using the following formula: $t^2/ t^2 +(N1+N2-2)$. According to the study by Cohen (2013), the meaning of this number was assessed; the criteria used are the following: the value of 0.01 means the impact is insignificant, 0.065 means the impact is moderate, and 0.14 means the impact is significant. The data was processed by the statistical software SPSS 20.0 (IBM, Armonk, NY).

RESULTS

Table 3 describes the body composition and physical performance characteristics of female university students in the experimental group (EG) and control group (CG) for $p < .05$. Independent T test indicated that there were no statistically significant differences in the initial measurements in between the groups. The experimental groups were equally capable at the start of the experiment since there was a significant degree of homogeneity of variance. The Levene's test indicates that there is statistically significant homogeneity of variance at the initial assessment.

Table 3. Initial measurement of pre-test and post-test of inactive female university students.

Variables	Group	Mean	SD	t-test	*p*	Mean Difference	Levene's test	
							F	*p*
Height	EG CG	158.714 157.550	7.301 8.049	0.486	.630	1.164	0.011	.917
Weight	EG CG	49.211 55.710	3.937 12.274	2.306	.027	-6.498	14.653	.006
BMI	EG CG	19.847 22.585	2.732 4.965	2.201	.034	-2.737	8.125	.007
Waist hip ratio	EG CG	73.857 77.700	4.693 9.487	1.656`	.106	-3.842	6.737	.013
Speed	EG CG	13.586 13.678	0.454 0.662	0.517	.608	0.091	7.935	.008
Agility	EG CG	14.005 13.894	1.227 0.631	0.362	.719	0.111	7.817	.008
Endurance	EG CG	49.761 44.850	6.647 2.641	3.080	.006	4.911	20.880	.016
Abdominal strength	EG CG	14.619 15.050	1.071 1.276	1.173	.248	-4.309	0.579	.451
Leg strength	EG CG	1.330 1.300	0.083 0.090	1.123	.269	0.0304	0.160	.691

Note: EG – Experimental Group; CG – Control Group; indicates p < .05; SD – Standard Deviation.

The dependent t-test showed a significant difference between the final measurements of groups, with regard to body composition attributes and physical performance (see Table 4). Levene's test showed that the variance was homogeneous at the latest measurement due to a *p*-value greater than .05. The body composition variable height did not show statistically significant differences after Tabata training. The average height of the sample was 158 ± 7.60, and that of the control group was 158.71. The statistical test T = 3.92, *p* = 1.23 found that, no significant difference in the parameters of the body composition after Tabata training.(CG Vs EG) weight: The mean weight of CG is 52.44 ± 8.96, while for EG is 49.21. The t-value is 2.01 with a *p*-value of .00. BMI: The mean BMI for CG is 21.40 ± 4.20, while for EG is 19.84. The t-value is 4.99 with *p*-value of .05. Waist-hip ratio: The mean waist-hip ratio for CG is 75.73 ± 7.58, while for EG is 73.857. The t-value is 4.638 with a *p*-value of .000. In addition, statistically significant differences were also found in the measures of physical efficiency. These included a significant difference on speed (mean CG = 13.63 ± 8.42 Vs, EG = 13.586 for T = 5.211, *p* = 5.211), agility (mean CG = 13.95 ± 2.8972 Vs, EG = 14.005 for T = 5.220, *p* =.000), endurance (mean CG = 47.36 ± 5.62 Vs, EG = 49.761 for T = 4.019, *p* =.000, and abdominal strength (mean CG = 14.82 ± 2.82 Vs, EG = 14.619 for T = 5.377, *p* =.000) and leg strength (mean CG = 1.31 ± 0.87 Vs, EG = 1.330 for T = 5.953, *p* =.000). The control group also did not show a statistically significant difference in the final measurement.

Table 4. Final measurement of pre-test and post-test of inactive female university students.

Variables	Group	Mean	SD	t-test	*p*	Mean Difference	Levene's test	
							F	*p*
Height	EG CG	158.14 158.14	7.60 7.60	3.928	1.23	0.006	0.011	.917
Weight	EG CG	52.44 49.70	8.96 7.07	2.012	.000	-2.740	0.592	.446
BMI	EG CG	21.40 20.37	4.20 4.21	4.995	.050	-1.030	0.255	.616
Waist hip ratio	EG CG	75.73 73.12	7.58 8.42	4.638	.000	-2.610	7.369	.060
Speed	EG CG	13.63 12.98	0.56 0.87	5.211	5.211	-0.650	1.452	.236
Agility	EG CG	13.95 13.43	0.972 1.18	5.220	.000	-0.520	0.269	.627
Endurance	EG CG	47.36 52.82	5.62 8.83	4.019	.000	5.460	0.338	.564
Abdominal strength	EG CG	14.82 16.92	1.18 2.82	5.377	.000	2.100	0.164	.688
Leg strength	EG CG	1.31 1.43	0.087 0.12	5.953	.000	0.120	2.331	.135

Note: EG – Experimental Group; CG – Control Group; indicates p < .05; SD – Standard Deviation.

DISCUSSION

The primary finding of this study indicates that the 12-week Tabata exercise program yielded favourable effects on the body composition and physical performance of sedentary female students. An experimental group consisting of physically fit young women was chosen, and the findings revealed a significant disparity in the final measurement values. Nevertheless, the control group did not display any measurement characteristics that were statistically significant. In addition, the Tabata training routine has shown success in reducing body composition percentage and enhancing athletic performance for experimental group. For college women, it is especially important to be aware that as they age, their body fat levels tend to gradually grow. During the perimenopausal period, there are variations in hormone levels. Consequently, this causes a decline in muscle mass and a rise in adipose tissue, namely in the abdominal region. The observed body composition metrics indicate that following the Tabata training programme led to an average reduction of 3.8

kg in weight (kg), a decrease of 1.61 in BMI (kg/m²), and a decrease of 5.45 cm in WHR for experimental group. After 12 weeks of participating in the Tabata training program, there were improvements in various physical fitness parameters. Specifically, there was an average increase in speed of 1.33 km/h, agility of 1.06 m/s, endurance of 4.05, muscular strength of 4.5, and explosive power of 0.24 for the experimental group compared to the control group.

The implementation of the Tabata training program did not have any impact on height. However, it had a favourable effect on reducing weight by an average of 3.8 kg/m2, BMI by an average of 1.61%, waist-hip ratio by an average of 5.45 kg, and speed by 1.3 m/s. The average agility declined by 1.06 m/s, the average endurance decreased by 11.5 m/s, the average abdominal strength decreased by 4.5 kg, and the average leg strength decreased by 0.24 kg. These decreases represent a 0.7% decrease in the body. In addition to changes in body composition, alterations can also be noticed in terms of body circumferences. Furthermore, there was a decrease in physical index. After examining body mass percentages of the control group (mean = 22.58 ± 4.96) and experimental group (mean = 19.84 ± 2.32) at the beginning of the program, it was concluded that the participants were classified as having a moderate to excessive level of body fat. After undergoing Tabata training, the experimental group (EG) observed a significant decline in adipose tissue percentage, with an average decrease of 4.11% (mean = 21.40 ± 4.20, $p = .05$). The reduction in body fat % resulted in the Experimental Group (EG) falling into the range of an acceptable fat percentage. This change is statistically significant when compared to the Control Group (CG), which had a mean body fat percentage of 28.55 ± 4.21 and did not see any change in body fat percentage.

A study conducted among a diverse group of women revealed that engaging in frequent Tabata workouts in a health club, with a minimum frequency of three sessions per week, can result in a reduction in body weight (Shilenko, Pyanzina, & Petrova, 2020). Moreover, studies have shown that Tabata training contributes to the process of fat oxidation, boosts physical strength, and enhances endurance.

Shah and Purohit (2020) conducted a study on body composition and found that Tabata training has a noteworthy effect on decreasing waist circumference and body mass index in a group of women between the ages of 20 and 35. Scientific research has proven that participating in 20 minutes of Tabata training leads to the stimulation of 86% of the maximum heart rate (HR_{max}) and the utilization of 74% of the maximum oxygen consumption (VO_{2max}). This finding reinforces the idea that Tabata could be a viable option for anyone looking for a short yet effective workout regimen (Emberts et al., 2013). According to Shilenko et al. (2020), engaging in Tabata courses at a health club can result in weight loss for women between the ages of 25 and 30, as long as they consistently participate in the workouts at least three times per week. Moreover, studies have shown that Tabata training has a crucial function in facilitating fat burning, boosting physical strength, and enhancing endurance.

Presently the studies evaluated the impact of HIIT-R and HIIT-F training protocols on aerobic fitness by quantifying aerobic capacity. Previous studies have demonstrated that participating in High-Intensity Interval Training (HIIT) that includes jogging can promote aerobic capacity. Several research studies have reported significant improvements in VO_{2max} after engaging in High-Intensity Interval Training (HIIT) (Pantelić & Mladenović, 2004). Furthermore, a thorough examination also shown that High-Intensity Interval Training (HIIT) has beneficial impacts on improving aerobic fitness in healthy young persons (García-Hermoso et al., 2016).

The number of sit-ups and distance achieved in the standing wide jump were significantly improved after the HIIT session. In contrast, the parameters did not change in the group that did not perform High-Intensity

Interval Training. Our findings are consistent with the conclusions of previous studies on High-Intensity Training. The study revealed a significant enhancement in muscle function following 6 weeks of HIFT (High-Intensity Functional Training), however, no improvement was observed in the HITT (High-Intensity Interval Training) group that utilized rowing as the exercise modality (Mulazimoglu et al., 2021).

CONCLUSION

The present study implies that the 12-week Tabata training intervention is favourable for reducing body weight in inactive women in a state of excellent health. The improvements mostly led to a decrease in BMI percentage and waist-hip ratio, measured in centimetres. Furthermore, there was a notable improvement in physical performance, characterized by heightened velocity, dexterity, stamina, core strength, and lower limb strength. Tabata provides a time-efficient option for improving body composition and physical efficiency, in addition to traditional weight loss methods. Moreover, this specific type of physical activity does not necessitate any apparatus, rendering it a financially efficient choice.

AUTHOR CONTRIBUTIONS

Conceptualization, SJ and MSK; methodology, SJ and JD; software, SJ and JD; investigation, JD; resource, SJ; data curation, SJ and JD; writing, SJ; writing review and editing, JD; supervision, MSK.

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