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Effect of Shadow Boxing Exercises on Body Fat Percentage

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ABSTRACT

Obesity is a global health problem which is a condition characterized by excessive body fat percentage that increases the risk of serious health problems, including diabetes, heart disease, high blood pressure, and sleep apnea. Physical activity (PA) plays a critical role in both preventing and treating obesity by influencing energy balance, metabolic health, and body composition. One form of PA that is shadow boxing exercise. The main objective of this study was to assess the effectiveness of a six-week shadow boxing exercise program in reducing the BFP of university students. The study was designed as a six-week experimental intervention, involving 67 undergraduate students (20 male, 47 female) 18-20 years old from State University of Surabaya. Participants engaged in a shadow boxing exercise regimen on alternating days. Each session comprised four rounds of four-minute exercises with one-minute breaks between each round, totaling 20 minutes per session. BFP was measured before and after treatment. Data were analyzed using SPSS-26 software, the data were not normally with using the kolmogorov-smirnov method and the data was performed using the wilcoxon signed-rank test. The study started with an average BFP of 28.3164 % then a post-test was conducted after six weeks and resulted in an average BFP of 25.9821 %. Statistically significant reductions in BFP were observed in the sixth weeks (p = 0.000). These findings suggest the potential efficacy of shadow boxing exercises in BFP control and weight reduction strategies among young adults.

INTRODUCTION

Overweight and obesity have become significant global health issues. Data from the World Health Organization (WHO) shows that the prevalence of obesity continues to increase, both in developed and developing countries. According to the American Council on Exercise (ACE), obesity in men is defined as a BFP of 25% or higher, and in women, it's 32% or higher. Healthy body fat ranges for non-athletes are 18-24% for men and 25-31% for women (1) (2). BMI is often used clinically, but body fat % is more accurate for obesity assessment. In Indonesia, Basic Health Research (Riskesdas) does not measure BFP directly as it requires DEXA/BIA. Data related to percentage fat content is only available usually from local studies or small samples. So, recent data reveals a troubling upward trend, with 21.8% of Indonesian adults now classified as obese (BMI ≥27.0), according to the 2018 Riskesdas by the Ministry of Health. This marks a 47% surge from just 14.8% in 2013, highlighting a rapidly worsening crisis. The obesity burden disproportionately affects women (26.9%) compared to men (16.3%), reflecting broader socio-cultural and biological factors. Equally concerning is the growing prevalence among children (8% in 5–12-year-olds) and adolescents (16% in 13–15-year-olds), signaling a generational shift toward unhealthy weight gain. Obesity in Indonesia is fueled by a complex interplay of dietary, lifestyle, and environmental factors. One of the primary contributors is the decline in physical activity due to modernization and urbanization. More than 33.5% of Indonesians report insufficient physical activity, a trend driven by sedentary jobs, increased screen time, and reliance on motorized transportation (3). Excess body fat not only affects physical appearance, but also increases

the risk of various diseases, such as type 2 diabetes mellitus, cardiovascular disease and other metabolic disorders. Obesity has a more pronounced impact on morbidity than on mortality Therefore, effective strategies are needed to help reduce body fat levels, one of which is through regular physical activity. Physical exercise is an important component of weight management, as it can increase calorie burning and improve body composition (4)(5)(6). One form of exercise that is gaining popularity is shadow boxing exercise. Shadow boxing is an exercise that involves punching movements without an opponent, usually performed in a series of dynamic movements that train speed, agility, and cardiovascular endurance. It requires no specialized equipment, so it can be done anywhere, making it a practical and efficient option. Shadow boxing exercises uses boxing movement technique such as jab, straight, hook, uppercut and footwork. Shadow boxing exercise offers a combination of aerobic and strength exercise, which could be beneficial for BFP reduction . Several studies have revealed that high-intensity exercise, such as shadow boxing, can increase energy expenditure and trigger fat burning (7). However, there are limited studies that specifically examine the effect of shadow boxing on reducing body fat levels. Therefore, this study aims to investigate

RESEARCH METHOD

The study was designed as an experimental investigation to assess the effects of shadow boxing exercise on BFP among undergraduate students. A random selection process was employed to recruit 67 participants aged between 18 and 20 years from State University of Surabaya (UNESA). These individuals expressed an interest in the exercise research and subsequently met with the researcher for a detailed briefing about the study. The exercise protocol consisted of a six-week shadow boxing regimen, conducted on alternating days. BFP measurements were taken using ioimpedance Analysis **(**BIA) by tanita BC-451. Each participant's BFP was recorded prior to the commencement of the exercise sessions. The workout sessions were structured to include four rounds of four-minute exercises, interspersed with three one-minute breaks, totaling 20 minutes per session. This format was chosen to maximize the efficacy of the workout while ensuring participant safety and compliance. Participants who reported extensive experience in boxing workouts, those engaged in regular aerobic activities (three or more times a week), or those involved in strenuous strength exercise were excluded from the study. This exclusion criterion was established to ensure a homogeneous sample less likely to exhibit pre-existing conditioning that could influence the study's outcomes. Additionally, individuals with a high risk for cardiovascular disease were excluded to prioritize participant safety. Data collection occurred at one week prior to exercise (pre-test) and one week after the last exercise (post-test). The collected data were analyzed using SPSS-26 application, the normality test was measured using the kolmogorov-smirnov test, if the data were normally distributed, the difference test is measured using a paired t-test, but if the data were not normally distributed, the difference is going to measured using the wilcoxon signed-rank test providing a robust statistical framework to evaluate the efficacy of the intervention.

RESULTS AND DISCUSSION

A number of 67 male and female participants were included in the research, 20 were male and 47 were female shown in table 1, with a mean age of 19.3 years old. from table 1 can be seen in the average percentage of body fat which initially 28.3164 % dropped to 25.9821% with a value of (p = 0.000).

Table 1. Descriptive data and Test of Normality Using Kolmogorov-Smirnov test

Body Fat%	N	*Mean*	*Std. Deviation*	*Min*	*Max*	*Sig.*
Pre – Test	67	28.3164	8.46990	11.00	50.60	.200
Post – Test	67	25.9821	7.76047	11.20	47.30	.001

The normality test found that the p-value was 0.200 in the pre-test data and 0.001 in the post-test data, so that the data was categorised as abnormal so that further calculations would be carried out with a non-parametric test using the wilcoxon sign-rank test.

Table 2. Comparison Pre-test and Post-test Using Wilcoxon Signed-Rank Test

Variable	Pre-test	Post-test	p-value
Body fat percentage	28.3164%	25.9821%	0.000

In the comparison of the pre-test in the first week and the post-test in the sixth week, the result was found insignificant

A boxer usually has a goal to lose weight in order to enter the desired class. They usually do various kinds of exercise such as shadow boxing. In addition to improving movement techniques, shadow boxing also had an impact on weight loss. Shadow boxing exercise could be done by anyone as long as they know the basics of boxing exercise movements such as doing jabs, straights, hooks, uppercuts and footwork. In this study, shadow boxing exercise was carried out by students of the State University of Surabaya who had been given knowledge about the basics of boxing movements. They were given instructions to do several combinations of boxing movements that had been agreed upon. The exercise could be done together or alone with special provisions. None of them had previous boxing exercise experience.

The increasing prevalence of obesity and sedentary lifestyles has led to a growing interest in effective exercise modalities for reducing BFP. Shadow boxing, a form of high-intensity aerobic and anaerobic exercise, has gained attention as a potential method for improving body composition. Shadow boxing is one of the important physical exercises to control body weight and body fat levels as in several previous studies (4)(5)(6). Shadow boxing is a physical exercise that combines aerobic and strength exercise which has benefits in reducing body fat levels (8). So shadow boxing exercise can also increase muscle mass and muscle endurance, especially in the shoulder, arm, core and leg areas (9). Additionally, the combination of upper and lower body movements enhances muscular endurance and metabolic rate, further supporting fat loss (10). This discussion explores the physiological mechanisms through which shadow boxing may contribute to fat loss and compares its effectiveness with other forms of exercise based on existing research. Shadow boxing involves rapid, repetitive movements that engage multiple muscle

groups, increasing energy expenditure and promoting fat oxidation. Studies suggest that high-intensity intermittent exercise, such as shadow boxing, can elevate excess post-exercise oxygen consumption (EPOC), leading to prolonged calorie burning even after the workout (11). Research indicates that shadow boxing may be as effective as traditional aerobic exercises (e.g., running, cycling) in reducing body fat. A study by Ismail et al. (2020) found that participants who engaged in shadow boxing for 12 weeks experienced significant reductions in BFP, comparable to those performing moderate-intensity continuous exercise (MICT). However, unlike steady-state cardio, shadow boxing incorporates explosive movements that may also preserve lean muscle mass, a critical factor in long-term metabolic health (12). Another study demonstrates that a 3-week exercise program based exclusively on shadowboxing can increase aerobic capacity, muscle mass, bone mass, basal metabolic rate, and daily calorie intake, and decrease resting heart rate, fat mass, body fat percentage, and visceral fat rating in a previously sedentary individual. The results of this research demonstrate that shadowboxing can be a safe and effective form of exercise leading to morphological and physiological improvements including fat loss and increased aerobic capacity (7). While current evidence supports the efficacy of shadow boxing for fat loss, most studies have small sample sizes and short durations. Future research should investigate long-term effects and compare shadow boxing with other high-intensity interval exercise (HIIT) protocols. Additionally, standardized intensity measurements are needed to optimize exercise prescriptions.

However, this study was proved that shadow boxing exercise could significantly reduce body fat percentage, so this exercise might be an alternative choice for body fat percentage reduction programmes or weight control as obesity mitigation. By the results of this study, it can be a reference for policy makers to see shadow boxing as an option for handling obesity that can be done in the world of education. By including shadow boxing exercise in schools or universities as a permanent curriculum, it is hoped that students will be able to increase their level of physical activity so that weight and fat levels can be controlled so that early obesity prevention can be done since school.

CONCLUSION

Shadow boxing may a promising exercise modality for reducing BFP due to its high energy expenditure, EPOC effects, and psychological benefits. While comparable to traditional aerobic exercises, its unique combination of intensity and engagement may offer superior adherence and muscle retention. Further studies are needed to establish optimal protocols and long-term outcomes. Future research should investigate long-term effects and compare shadow boxing with other high-intensity interval exercise (HIIT) protocols. Additionally, standardized intensity measurements are needed to optimize exercise poscriptions.

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