



Weight loss after 12 weeks of weight training using resistance bands in obese college student

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Received: 23 June 2024; Revised: 14 July 2024; Accepted: 11 December 2024; Available online: 30 December 2024.

Abstract

Obesity among college students poses a significant health concern, as excess weight heightens the risk of various diseases. The study aims to determine the effects of a 12-week resistance band weight training program on weight loss in obese college students. This research employs an experimental method, specifically using a "One Group Pre-Post Test Design." This involves administering a pre-test before the intervention and a post-test after the intervention. The participants in this study are adolescent athletes from the State University of Jakarta. The sample consists of 30 individuals selected through purposive sampling based on specific criteria: students from the State University of Jakarta, aged 16-23 years, both male and female. Data collection involves the experimental group and control group, the participant's BMI before and after the 12-week resistance band training program. BMI measurements were conducted using the OMRON brand BIA (Bioelectrical Impedance Analysis) method. Data analysis was performed using SPSS version 21, which includes the normality prerequisite test and is continued with the independent Sample T-Test. The results of the Independent Sample T-Test showed that the Sig value was $0.000 < 0.05$. A 12-week resistance band weight training program has a significant effect on weight loss in obese college students. Therefore, the resistance band strength training model significantly influences weight loss more than traditional training methods. This suggests that resistance band training is highly effective for weight loss in adolescents aged 16-23 years and can be incorporated into physical exercise programs for this age group.

Keywords: Training, resistance band, college student, obesity.

How to Cite: Kuswahyudi, Taufik, M. S., Setiakarnawijaya, Y., Hazar, F., & Purwoto, S. P. (2024). Weight loss after 12 weeks of weight training using resistance bands in obese college student Kuswahyudi. *Jurnal SPORTIF: Jurnal Penelitian Pembelajaran*, 10(3), 420–433. https://doi.org/10.29407/js_unpgri.v10i3.22891

Authors contribution: a – Preparing concepts; b – Formulating methods; c – Conducting research; d – Processing results; e – Interpretation and conclusions; f - Editing the final version.

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INTRODUCTION

Obesity is a prevalent health issue globally, affecting individuals across all age groups (Pfledderer et al., 2023; Ruze et al., 2023). However, obesity and its associated health issues in children, adolescents, and adults have long been a concern (Jha & Mehendale, 2022). Adults obesity is a significant health concern due to its widespread occurrence and detrimental effects on both physical and psychological well-being (Stabouli et al., 2021). Adults obesity heightens the likelihood of developing hypertension, mental health problems, and academic difficulties in young individuals (Jha & Mehendale, 2022). Consequently, issues associated with adults obesity require focused attention (De Moraes et al., 2011; Hewagalamulage et al., 2016; Sim et al., 2013). Changes in the lifestyle and eating habits of people in large cities in Indonesia have increased the risk of obesity (Lisetyaningrum & Pujasari, 2021). Based on data from UNICEF 2024, 1-3 adults are obese. This is certainly a serious problem related to the prevalence of obesity (UNICEF, 2024). The incidence of obesity in Indonesia has been rising consistently each year (Kok et al., 2023).

Several studies have investigated the effectiveness of various types of exercise in weight loss programs for college students. For instance, research by Jia et al. (2022) indicated that aerobic exercises, such as jogging and cycling, significantly reduced body fat and improved cardiovascular fitness in obese college students. Additionally, these exercises were found to enhance participants' quality of life and mental health (Jia et al., 2022). Furthermore, a study by Hasenöhr et al. (2021) underscored the importance of integrating both aerobic and strength training in weight loss programs. The findings revealed that college students engaging in a structured exercise regimen that included both types of training experienced more significant weight loss compared to those who focused on only one type. This research emphasizes that a multidimensional approach to physical activity can yield better outcomes in weight management. Moreover, a study by (Teixeira et al., 2012) discovered that combining strength training with daily activities, such as walking, can

boost college students' motivation and adherence to weight loss programs. These findings suggest that incorporating a variety of exercises can help students maintain their workout routines. However, research specifically addressing weight training using resistance bands for obesity remains limited.

Resistance band training is a form of strength training that utilizes flexible rubber straps with different resistance levels. This type of exercise can include a variety of movements, such as lateral band walks, triceps extensions, bicep curls, and more (Haapala, 2020; Jelleyman, 2015; Stricker, 2020). Resistance training has become increasingly popular globally (Pichardo et al., 2019), resistance training enhances muscle performance and adaptation (Zachary M., 2022), which helps lower the risk of injury (Pichardo et al., 2019), increased muscle hypertrophy (Grgic, Schoenfeld, & Mikulic, 2021). Based on the literature reviewed by the researchers, there has been no study specifically examining the impact of 12 weeks of resistance band exercise on weight loss in obese teenagers. In particular, no study has assessed the suitability of resistance band methods and weight training for obese individuals. Resistance training serves as an effective weight loss strategy for college students for several reasons. It promotes an increase in muscle mass, which elevates basal metabolic rate (BMR) and calorie expenditure, even during (Bellicha et al., 2021). Previous studies on obesity have used aerobic exercise, resistance exercise, and combined exercise (Amare et al., 2024). Research has also been conducted on resistance exercise and a combination with aerobic exercise on obesity (Brellenthin et al., 2021). This type of training significantly decreases body fat while maintaining lean muscle, which is essential for overall health and athletic performance (Lee & Lee, 2021). Moreover, resistance training enhances self-esteem and body image, encouraging students to adopt and sustain a healthy lifestyle (Collins et al., 2019). It also improves functional strength and stability, thereby lowering the risk of injuries among physically active college students (Robinson et al., 2023).

Additionally, the wide range of available exercises helps keep students motivated and committed to their fitness routines. Therefore, this study aims to evaluate the effect of 12 weeks of resistance band weight training on weight loss in obese teenagers. The researchers conducted this study to assist students and the public in selecting the most effective physical exercise methods to significantly reduce high obesity rates in adolescents, ensuring their weight remains controlled.

METHOD

This study employs a quantitative methodology, utilizing an experimental research design with both pre-test and post-test assessments and randomized groups. It was divided into 2 groups, namely the experimental group and the control group, with a total of 30 samples. In The Experimental Group, They Did Weight Training Using Resistance Bands. Meanwhile, in the control group, the exercise was a traditional strength training method.

Participants

This study employs a quantitative methodology, utilizing an experimental research design with both pre-test and post-test assessments and randomized groups. This study was divided into 2 groups, namely the experimental group and the control group, with a total of 30 samples. The division into 2 groups was done using Random Assignment. The experimental group did weight training using resistance bands. Meanwhile, in the control group, the exercise was a traditional strength training method.

Table 1. Participant characteristics



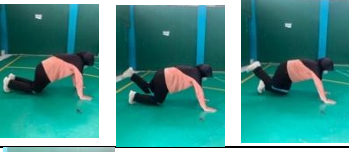



Characteristics	Frequency	Amount		Percentage
Age	16-18	10	M=5 P=5	100%
	19-20	15	M=10 P=5	
	21-23	5	M=5	
Gender	Male	20	M=20	100%
	Female	10	F=10	

Information: M (Male), F (Female).

Procedure Stages of the research

The data collection method used in this study includes conducting both pre-test and post-test measurements on the participants. Weight loss is assessed through the Body Mass Index (BMI), which serves as an indicator to determine whether an individual has a healthy weight by comparing their weight (in kilograms) to their height (in meters). The pre-test involves measuring the participants' weight before they begin resistance band exercises. The process of measuring weight and BMI is by using the BIA instrument so that weight data is obtained directly. The exercise program, detailed in Table 2, is conducted three times per week over 12 weeks. The post-test, which involves measuring weight with the BIA instrument, is performed 24 hours after the final exercise session.

Table 2. Procedure training methods

N	Training	Duration
1		Band pull in Week 1-2 HR 140-150 frequency 3x a week
2		Startad Flood Back Week 3-4 HR 150-160 training frequency 3x a week
3		Donkey Kick Week 5-6 HR 160-165 training frequency 3x a week
4		Standing Hip Extensions Week 7-8 HR 160-165 training frequency 3x a week
5		Back Of Leg Week 9-10 HR 165-170 training frequency 3x a week
6		lying lateral leg raises Week 11-12 HR 170 training frequency 3x a week

Data collection and Statistical analysis

The weight and BMI measurement instrument uses OMRON BF511 brand BIA (Saladino, 2014). Measurements were taken before and after 12 weeks of exercise. After collecting initial and final test data, it was processed and analyzed using SPSS 21. The SPSS model used is the normality test using the Shapiro-Wilk Test as a prerequisite test and then continues to determine the influence, namely the T-test using the independent Sample T-Test. The analysis included descriptive statistics, normality tests, and sample tests to assess the impact being investigated in the research.

RESULT

The results of the data analysis that has been carried out will be presented in this section.

Table 3. The results of the difference in mean pre test dan post test

Group	Mean	Difference between control groups	Difference between treatment groups
Pre Test Control	781		
Post Test Control	769,4		
Pre Test Treatment	756,125	11,6	24,625
Posttest Treatment	731,5		

Based on the mean pre-test and post-test results, body weight decreased in both the treatment and control groups. The difference between the control and treatment results was higher in the treatment group.

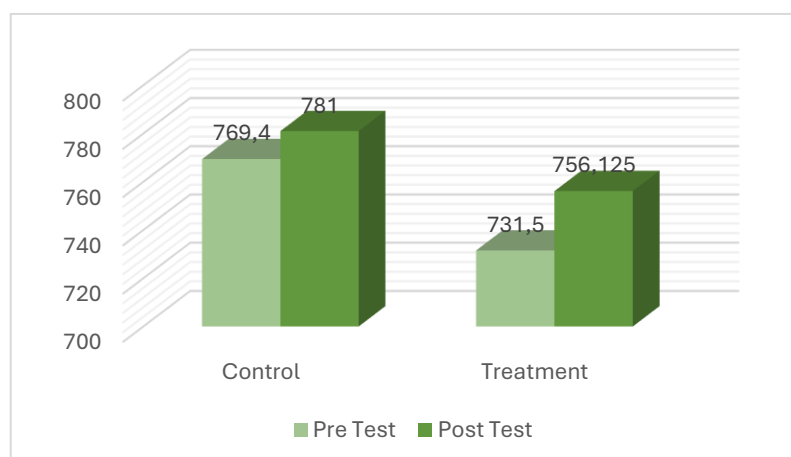


Figure 1. Difference between pre-test and post-test in the control and treatment groups

The results of Figure 1 show that the difference between the treatment group is higher than the control group. Then the hypothesis test can be

carried out using the t-test. Prior to conducting the effectiveness test, researchers assessed the impact of the compiled training model on biomotor power capabilities. The study involved 15 participants in both the control and experimental groups, and the participants were male and female. Treatment consisted of 12 sessions (12 weeks) with a frequency of 3 sessions per week. Preliminary data (pre-test) was collected from all participants before administering the treatment. Subsequently, the samples were randomly divided into experimental and control groups. This pre-test data served as the baseline for comparison (post-test). The effectiveness of the model was evaluated through three distinct comparisons, which are detailed below:

Table 4. Independent sample t-test experimental groups and control groups statistics

Group	N	Mean	Std. Deviation	Std. Error Mean	t	Sig	Result
Control	15	11,600	2,593	1,249	2,473	0.000	Significance
Experiment	15	24,625	4,758				

Table 5 above presents the average increase in pre-test and post-test results for both the control and experimental groups within a total sample size of 30 individuals. The details are as follows: (1) For data N, a t-value of 2.473 was obtained with degrees of freedom (df) = 78. The results of the p-value was $0.00 < 0.05$, and the average results in the experimental group were higher than those in the control group, indicating that the experimental group demonstrated a greater ability to lose weight. Based on the aforementioned description, it can be concluded that there are significant differences between the two groups. The treatment group experienced more significant weight loss than the control group, which can be seen from the mean results of the control group of 11.6 and the treatment group of 24.625.

DISCUSSION

These findings indicated that resistance band strength training over 12 weeks led to significant weight loss, as evidenced by changes in Body Mass Index (BMI) among obese college students. The results of the p-value

was $0.00 < 0.05$, and the average results in the experimental group were higher than those in the control group, indicating that the experimental group demonstrated a greater ability to lose weight. Training with resistance bands not only enhances muscle strength but also promotes more efficient calorie burning, which is crucial for effective weight-loss programs. Several prior studies support these results, demonstrating that resistance training can effectively reduce weight and improve body composition in individuals with obesity (Liu et al., 2022).

Moreover, resistance bands serve as a lightweight and user-friendly exercise tool, offering a suitable alternative to traditional strength training, particularly for those with physical limitations or less prior experience in exercise (Torkildsen, 2023). The versatility of resistance bands also allows for a variety of exercises, which can help sustain participant motivation and adherence to the training regimen (Li et al., 2024). Consequently, the integration of resistance training with proper supervision can yield positive outcomes in weight loss efforts and overall health improvement.

Resistance band strength training can significantly contribute to weight loss among obese students (Wang et al., 2024). Physiologically, this form of exercise increases muscle mass, which in turn elevates the basal metabolic rate (BMR). An increase in muscle mass enables the body to burn more calories, even at rest, thereby supporting weight loss efforts (Bernárdez-Vázquez et al., 2022).

Resistance bands provide resistance during muscle contraction, stimulating the process of muscle hypertrophy. Hypertrophy occurs when muscle fibers experience sufficient stress, leading to enhanced repair and growth (Witard et al., 2022). Additionally, resistance training improves insulin sensitivity and reduces visceral fat, a key risk factor linked to various metabolic diseases (Lopez et al., 2022).

Beyond its direct impact on body composition, resistance training helps regulate appetite. Research indicates that physical activity, including resistance training, influences hormones that govern hunger, such as ghrelin and leptin, assisting individuals in managing their calorie intake

(Deru et al., 2023). Thus, the combination of increased muscle mass, reduced visceral fat, and appetite regulation creates a synergistic effect that promotes effective weight loss.

The effectiveness of a 12-week exercise program in addressing obesity can be observed through several physiological changes that facilitate fat reduction and enhance overall health. Throughout this period, the body undergoes various adaptations that support fat loss and improved physical fitness.

Firstly, regular exercise boosts muscle mass, which contributes to an increased BMR. This enhancement allows the body to burn more calories at rest, facilitating the weight loss process (Witard et al., 2022). Research shows that structured exercise programs can significantly increase muscle mass and decrease body fat percentage within 12 weeks (Lee & Lee, 2021). Secondly, exercise influences the regulation of hormones related to appetite and metabolism. Physical activity enhances insulin sensitivity, which is crucial for blood glucose regulation and lipid metabolism (Mandrup et al., 2020).

Furthermore, exercise can alter levels of hormones like leptin and ghrelin, which play vital roles in hunger control and energy expenditure. A decrease in leptin levels due to reduced body fat may stimulate appetite, while heightened leptin sensitivity can help diminish calorie intake (Münzberg et al., 2020). Lastly, cardiovascular capacity also improves during the 12-week exercise program, which is essential for overall heart health and metabolic functioning. Aerobic activities such as running or cycling enhance the efficiency of the heart and lungs, enabling the body to utilize oxygen more effectively during metabolic processes (Malm et al., 2019). Overall, the success of a 12-week exercise regimen in combating obesity is closely linked to physiological changes that support fat reduction, increase muscle mass, and improve metabolic health. Based on the explanation above, resistance band strength training for 12 weeks has been proven to reduce weight and is effective for obesity.

CONCLUSION

The findings indicated that strength training with resistance bands over 12 weeks significantly facilitated weight loss, as evidenced by changes in Body Mass Index (BMI) among obese college students. These results highlight the effectiveness of a structured exercise program in helping individuals with obesity reach their weight loss objectives. By enhancing muscle mass and metabolism, this type of exercise not only aids in reducing body weight but also has the potential to improve overall health. Thus, resistance band strength training could be a valuable strategy in obesity management programs for college students. The recommendation based on the results of this study is that further research is needed on training using resistance bands on hormonal parameters in obese college students.

ACKNOWLEDGMENT

The author would like to thank the State University of Jakarta for granting permission and providing a place for the research to be implemented. Also, thank you to the samples who were willing to follow the research until completion.

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