



## Promoting Body Satisfaction through Aerobic Exercise in Obese Women: Findings from a Single-Arm Intervention Study

Addisalem Girma<sup>\*1</sup>, Mathivanan Dhamodharan<sup>2</sup>, Kumaresan Ramanathan<sup>3</sup>,  
Aschenaki Taddese<sup>4</sup>, Zeru Bekele<sup>4</sup>, Theodros Berhane<sup>1</sup>, Mulay Gebretensay<sup>1</sup>

<sup>\*1</sup>Department of Sport Science, Mekele University, Mekele, Ethiopia,

<sup>2</sup>Department of Sport Science, Wollega University, Nekemte, Ethiopia,

<sup>3</sup>Department of Biomedical Sciences, Jimma, Ethiopia

<sup>4</sup>Department of Sport Science, Addis Ababa University, Addis Ababa, Ethiopia,

<sup>4</sup>Department of Sport Science, Addis Ababa University, Addis Ababa, Ethiopia,

<sup>1</sup>Department of Sport Science, Mekele University, Mekele, Ethiopia,

<sup>1</sup>Department of Sport Science, Mekele University, Mekele, Ethiopia,

Corresponding author: Addisalem Girma Wae; Email: [addisalemgirma0@gmail.com](mailto:addisalemgirma0@gmail.com)

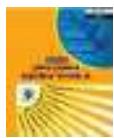
### Abstract

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Overweight and obesity are growing global health challenges, with Sub-Saharan Africa experiencing rising rates, especially in urban areas. This study examined the effects of a 12-week moderate-intensity aerobic exercise program on body satisfaction among obese women. Forty women aged 30–38 years with a BMI  $\geq 30$  kg/m<sup>2</sup> were purposively selected from E Dilla University. Participants engaged in 30-minute aerobic sessions three times weekly. Body satisfaction was assessed using the Body Areas Satisfaction Scale (BASS) at baseline, week 4, week 8, and week 12. Data analysis was conducted using one-way ANOVA in SPSS Version 20. The results showed a statistically significant improvement in body satisfaction after the intervention ( $p < 0.05$ ). These findings suggest that

regular aerobic exercise can enhance body image and psychological well-being in obese women. The study supports the use of non-pharmacological, exercise-based interventions as effective, accessible strategies to improve mental health and body satisfaction in low- and middle-income countries.

**Keywords:** Obesity, Body satisfaction, Exercise intervention, Single-arm



## Background of the Study

One of the most common and urgent public health issues in the world today is obesity, especially in developed countries. Obesity is today understood to be a complex metabolic illness with important social, psychological, and physiological ramifications. It is characterized by an excessive build-up of adipose tissue as a result of a prolonged positive energy balance (Stephens, 2012). Obesity is defined by the World Health Organization (WHO) as an abnormal or excessive build-up of fat that poses a serious health risk (Ellulu et al., 2014).

Approximately 10% of children and 1.1 billion people worldwide are overweight or obese, making obesity the sixth most important risk factor for the world's disease burden (Shaban Mohamed et al., 2022). An estimated 3.4 million fatalities, 3.9% of years of life lost to impairment, and 3.8% of years lived with disability were linked to overweight and obesity in 2010 alone. The prevalence of obesity is rising quickly in low- and middle-income countries (LMICs), especially in urban areas throughout Sub-Saharan Africa, despite previously being thought of as a health problem exclusive to

Commercial Bank of Ethiopia personnel, were obese, and 24.7% of men and 25.7% of women were overweight. In a same vein, adult obesity (32.4%) was more common in Gondar than overweight (16.2%) (Mekonnen et al., 2018).

high-income nations ('Burden of Obesity in the Eastern Mediterranean Region', 2018).

Adipocytes, the main cells in charge of energy storage and metabolic regulation, are among the many cell types that make up adipose tissue, which is today recognized as a metabolically active and dynamic endocrine organ. Adipose tissue contributes significantly to systemic energy balance by secreting bioactive substances including metabolites and adipokines (Rutkowski et al., 2015).

According to data from Ethiopia's 2011 Ethiopian Demographic and Health Survey (EDHS), the country's urban populations are becoming more overweight (12.1%) and obese (2.8%). Age, marital status, economic level, urban residency especially in places like Addis Ababa, Harari, and Dire Dawa and higher levels of educational attainment are some of the factors causing this increase (Abrha et al., 2016). For example, a study conducted in Addis Ababa revealed that 25.7% of women were overweight and 10.2% of women were obese. 2.1% of men and 10.2% of women in particular occupational groupings, such as government school teachers and

The most widely used anthropometric statistic for categorizing people according to their weight in relation to their height is still the Body Mass Index (BMI). Although BMI is a useful screening tool in clinical and public health contexts, it has



significant drawbacks, most notably its incapacity to evaluate fat distribution or differentiate between fat mass and lean mass. These drawbacks have raised interest in more accurate anthropometric measures that can more accurately determine regional adiposity and body fat percentage (Nuttall, 2015).

Obesity has significant psychological and social repercussions in addition to its physiological impacts. Even though obesity has a complex etiology that includes genetic predisposition, lifestyle variables, and psychological impacts, it is typically stigmatized and seen as a self-inflicted condition brought on by poor diet and physical inactivity. Negative stereotypes about obese people are prevalent and include ideas that they are unsightly, lazy, and lacking in willpower. Internalized self-stigmatization, low self-esteem, low self-efficacy, and inefficient coping mechanisms for managing weight are frequently caused by this social stigma. Furthermore, a distorted body image and intense discontent with one's appearance are common among obese people, which exacerbate psychological discomfort and hinder behavior modification.

Interventions that target both physical and mental health outcomes are crucial given the complex effects of obesity, including its effect on

psychological well-being. Aerobic exercise has been demonstrated to boost self-perception and body satisfaction in addition to physical health indicators. The psychological advantages of systematic aerobic therapies for obese women in low-resource environments like Ethiopia, however, are not well documented. Therefore, the purpose of this study is to assess how a 12-week program of moderate-intensity aerobic exercise affects body satisfaction in obese adult women.

## Method

A purposive sampling technique was used, with a pre-registered office record list (N=70) serving as the sampling frame. The study included 40 obese women aged 30-38 years ( $BMI \geq 30\text{kg/m}^2$ ) who voluntarily engaged in a structured aerobic exercise regimen. Participants followed a structured aerobic exercise regimen (three sessions per week, 30 minutes each) for 12 weeks, which was organized retrospectively using a single-arm interventional design. Body satisfaction levels were measured four times (baseline, week four, week eight, and week twelve) using "The Body Areas Satisfaction Scale (BASS)," a critical psychological health indicator questionnaire developed from Thomas F. Cash, Ph.D. (2018). Data were analyzed using one-way ANOVA via SPSS Version 20.



## Results

**Table 1, Body Assessment Scale****ANOVA Table for participants Body assessment scale**

Round	Mean		Sum of Squares	df	Mean Square	F	Sig.
round1(base)	2.5000	Between Groups	553.869	3	184.623	504.178	.000
round2	2.6750	Within Groups	57.125	156	.366		
round3	4.4750	Total	610.994	159			
round4	7.1250						

The above Table shows that the changes due to aerobic exercise among obese adult women between baselines to 12 weeks training period were analyzed using Analysis of variance (One Way ANOVA). The moderate intensity level of aerobic exercise for a psychological measure of

body assessment scale has 504.178 of the obtained 'F' ratio value and a mean group effect of 0.000 which is less than 0.05. This result reveals that aerobic exercise at moderate intensity level has significance differences on body assessment scale of adult obese women in each round exercise.

**Table 2, Tukey's Post Hoc test for paired mean difference among the rounds for body assessment scale on obese adult women**

(I) measures after aerobic exercise	(J) measures after aerobic exercise	Mean Difference (I-J)	Std. Error	Sig.
round1(base)	round2	-.17500	.13531	.198
	round3	-1.97500*	.13531	.000
	round4	-4.62500*	.13531	.000
round2	round1(base)	.17500	.13531	.198
	round3	-1.80000*	.13531	.000
	round4	-4.45000*	.13531	.000
round3	round1(base)	1.97500*	.13531	.000
	round2	1.80000*	.13531	.000
	round4	-2.65000*	.13531	.000
round4	round1(base)	4.62500*	.13531	.000
	round2	4.45000*	.13531	.000
	round3	2.65000*	.13531	.000

The

above Table shows the paired means difference of treatment between rounds in Tukey's post hoc

method of testing the significance. The mean differences of aerobic exercise in baseline (round



1) versus week 8(round 3), baseline versus week 12(round 4) and week 4(round 2) are found significant at  $\alpha = 0.05$  because each mean difference has a smaller p-value ; 0.000, 0.000,

and 0.000, respectively. Thus, aerobic exercise has a significant difference on body assessment scale of obese adult women.

### Detail Interpretation of Findings

A considerable improvement in Body Areas Satisfaction Scale (BASS) scores from 1 to 5, indicating how dissatisfied or satisfied you are with each of your body's nine areas or characteristics. Higher scores were observed following the intervention ( $p < 0.05$ ), indicating increased body satisfaction. This findings showed that moderate intensity aerobic exercise had a significant effect on body satisfaction in the interventional group ( $F=17.647$ ;  $P=0.000$ ). The data show that moderate-intensity aerobic exercise caused statistically significant favorable improvements in the group. Regular aerobic exercise has a positive impact on psychological well-being by increasing body satisfaction in obese women. Furthermore, comparing the means of treatment in post hoc comparison (Tukey's test) demonstrated a substantial increase in body satisfaction (except for baseline compared to round two aerobic exercises). These findings indicate exercise-based therapies as effective non-pharmacological techniques for improving mental health in this population.

### Discussion

This study looked at how a 12-week organized aerobic exercise intervention affected adult obese women's body satisfaction. The findings demonstrated a statistically significant increase in

body satisfaction following the intervention, highlighting the possibility of moderate-intensity aerobic exercise as a successful, non-pharmacological method to improve psychological well-being in this demographic. These results are in line with an increasing amount of research emphasizing the psychological advantages of regular exercise, especially for obese people. For instance, regardless of whether the program was manual or in-person, Annesi (2021) found that women taking part in behaviorally based obesity therapies showed notable improvements in body image, mood, self-regulation, and eating patterns. In a similar vein, Baruth et al. (2015) stressed the significance of comprehending body size perceptions and disparities since they could affect how successful weight-loss programs are.

As a self-inflicted illness associated with inactivity and excessive eating, obesity is still stigmatized (Kinzl, 2016). However, aerobic exercise has been widely recognized for its ability to improve body image, boost self-esteem, and reduce symptoms of anxiety and depression (Suwalska et al., 2024). Increased physical satisfaction, health, and general quality of life are all closely linked to these psychological advantages. On the other hand, physical activity has a protective impact, whereas depression has



been demonstrated to considerably lower the likelihood of body and health satisfaction.

Both physiological and psychological pathways are probably involved in the ways that exercise improves body pleasure. According to Pioreschi et al. (2017), physiological increases in physical fitness and decreases in adiposity lead to more positive self-perceptions of body function and appearance. Psychosocially, through behavioral activation and social reinforcement, structured exercise promotes a good body image, increases self-efficacy, and creates a sense of accomplishment (Annesi et al., 2016). Furthermore, Larson et al. (2018) emphasized the need of early preventive techniques, such as peer support, to encourage body satisfaction and deter young people from engaging in maladaptive weight management behaviors.

These findings are especially pertinent in low- and middle-income countries (LMICs), where obesity is becoming more common, particularly among urban women. However, public health initiatives in these areas frequently ignore the psychosocial and mental health aspects of obesity in favor of physical health outcomes (Dodd et al., 2016; Han et al., 2024; Annesi et al., 2022; Platta et al., 2023). According to encouraging research by Tsartsapakis et al. (2024), maintaining a healthy diet, like the Mediterranean diet, along with engaging in regular physical activity might enhance body satisfaction and lower the risk of eating disorders.

While aerobic exercise has been proven to improve body image and lower anxiety and depression in women with polycystic ovarian syndrome (PCOS) (Kogure, 2019), other research have similarly shown that poor body image is a powerful predictor of emotional eating (Annesi et al., 2024). These results support exercise's dual function in addressing the psychological and physiological components of obesity.

Crucially, long-term weight control may be supported by increases in body satisfaction. Healthy habits including consistent exercise and a balanced diet are more common among those who are more satisfied with their bodies (Annesi, 2020; Meko & Nel, 2021). On the other hand, maladaptive behaviors like emotional eating, sedentary lifestyles, and increased psychological discomfort are linked to low body satisfaction (Ribeiro et al., 2018). Yoga and meditation practitioners reported higher levels of bodily satisfaction than non-practitioners, according to Lauche et al. (2017), indicating that mind-body therapies might also be helpful.

According to a review of the literature by Binsaeed et al. (2023), emotional support, family engagement, self-determination, and health concerns are all motivators for weight loss. These results imply that incorporating participant-defined objectives and psychological elements may enhance the efficacy of therapies aimed at improving body satisfaction (Coleman et al., 2020). Furthermore, Wang and Zhou (2022) highlighted the greater advantages of mixed



aerobic anaerobic exercise for obese women's physical and mental growth.

### Limitations and Future Directions

Despite its contributions, this study has several limitations. First, the absence of a control group restricts the ability to conclusively attribute the observed improvements to the intervention itself. Second, the sample was limited to women within a specific age range from a single urban area, which may limit the generalizability of the findings. Third, body satisfaction was assessed using self-reported measures, which may introduce response bias.

Future research should employ randomized

controlled trial designs with larger, more diverse samples to enhance external validity. Incorporating objective psychological assessments and long-term follow-up could also provide a more comprehensive understanding of the sustained effects of exercise on body satisfaction.

### Conclusion and Recommendation

In conclusion, the findings support the role of moderate-intensity aerobic exercise in enhancing body satisfaction among obese women. In recommendation, this underscores the importance of incorporating psychological health indicators into obesity intervention programs and highlights physical activity as a holistic strategy to improve both physical and mental health outcomes.

### Acronyms

BMI - Body mass index; BFP (%BF) – Body fat percentage; CVD - Cardiovascular Disease; IRB - Institutional Review Board; HRM - heart rate monitor; LMICs - low- and middle-income countries; EDHS - Ethiopian Demographic and Health Survey; WHO - World Health Organization; DU - Dilla University; MU - Mekelle University

### Declarations

#### *Ethics approval and consent to participate*

All participants provided written informed consent. This research adhered to good clinical practice standards and was carried out in accordance with the Declaration of Helsinki 1975 and its subsequent revisions. Furthermore, the study received approval from the Institutional

Review Board (IRB) ethics research committee at Mekelle University's College of Medicine and Health Sciences in Mekelle, Ethiopia.

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### *Authors' contributions*

AG conceived, planned the study and wrote the first draft of the manuscript; KR, AT and ZB



conducted data analysis and interpretation; MD, MG and TB oversaw the project; all authors have reviewed and endorsed the final manuscript version.

the ethical policy regarding participant privacy and confidentiality but the complete original data presented in the manuscript can be obtained by contacting the corresponding author via the email address "[addisalemgirma0@gmail.com](mailto:addisalemgirma0@gmail.com)" upon making a reasonable request.

#### ***Availability of data and materials***

The data produced and examined in the present study are not accessible to the public as a result of

#### ***Competing interests***

The authors declared there is no conflict of interest.

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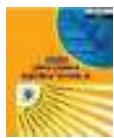
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