

The Effect Of Aerobic Dance Exercise On Self-Perceived Body Image And Self-Esteem In Overweight And Obese Individuals

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Abstract

Background: Exercises are fundamental to the physical management of obesity. Their roles in the management of other psychological complications of obesity have not been widely studied. Such information on the psychological benefits of exercise will guide a more holistic approach of obesity management.

Aim: This study assessed the effect of aerobic dance exercise on the self-esteem and body image dissatisfaction of overweight and obese adults.

Methodology: This is a randomized controlled trial study involving 54 overweight and obese adults (27 experimental and 27 controls), consisting of 16 men and 38 women. The experimental group performed three sessions of 30 minutes dance aerobics weekly for a total of six weeks while the controls did not perform any exercise. Pre and post intervention body mass index (BMI), waist-hip-ratio (WHR), body size dissatisfaction (BSD) and self-esteem (SE) measurements were taken at baseline and end of the sixth week.

Result: 16 male and 38 female undergraduate students of mean age 21.0 ± 2.1 were recruited from University of Nigeria, Enugu. Findings revealed significant improvements in the BMI ($p=0.001$), WHR ($p=0.002$), BSD ($p=0.001$) and SE ($p=0.001$) of the experimental group compared to those of the control.

Conclusion: Participants involved in 6 weeks dance aerobics showed a great improvement in self-esteem and reduction in both physical parameters and body size dissatisfaction which was not seen in control group.

Key words: Body image, self-esteem, obese, overweight, dance aerobics.

Introduction

Obesity constitutes a major health problem and is associated with lifestyle diseases including cardiovascular diseases, cancer, cerebrovascular accident, diabetes mellitus as well as reduced quality of life [1]. In addition to the known physiological and physical complications of obesity, it has been associated with changes in the psychological and mental statuses of affected individuals [2]. Depression, reduced self-esteem, mood affectations, poor physical and mental

health as well as adverse health behaviours such as binge eating and physical inactivity have been reported in obese adults [2-4]. These may result from stigmatization and discrimination and often lead to social isolation [5].

Additionally, body image is negatively affected by obesity [2]. Body image refers to an individual's perceptions of and attitude toward their own body. Shame, dissatisfaction and wrong perceptions of one's body image is considered negative [4] and has been reported to occur more in women than

in men [2-4,6]. In some cases, cultural norms and values on the acceptable body size of individuals may negatively influence their willingness to control body weight since overweight and obese individuals may misperceive their actual body weights as ideal. Therefore, accurate body image perception especially if it is not the ideal weight may initiate health seeking behaviours and may improve quality of life [7,8].

Self-esteem is one of the psychological parameters adversely affected by obesity. It reflects a person's sense of self-worth and capacity [9]. It is necessary for a successful and satisfying life and is a fundamental aspect of psychological well-being [10,11]. High self-esteem has been associated with a positive self-evaluation [9,12] and perception of well-being about one's good qualities [9,13]. In this regard self-esteem is often regarded as a situation specific type of self-confidence and therefore influences the way people evaluate their own achievements strongly [9,14]. On the other hand, low self-esteem, as has been reported in obese individuals, [15] is the lack of confidence and negative feeling about oneself which often contributes to negative outcomes including depression, anxiety, eating disorders, poor social functioning and high-risk behaviour which can prove life threatening [15].

Regular exercise generally increases physical and mental well-being, improves quality of life and reduces symptoms of depression and anxiety [16,17]. Previous studies have shown a positive relationship between regular exercise and body image [18-20]. Such improvements in body image may be attributed to decreased body fat, resulting from regular exercise [21]. Several studies have also reported significantly improved self-esteem, [22-24] stress and emotional intelligence [22] in response to various modes of exercise.

In spite of the known positive effects of exercise on perception of body image and self-esteem,

some contrary reports on exercise-related body image satisfaction still exist [25-27]. Despite the wealth of research on the effects of several modes of exercises on human psychological status, [22-24,28] more evaluations of the specific effects of other exercise modes are necessary. Studies on the psychological status outcomes in response to aerobic dance exercise are scarce. This study, therefore, investigated the effect of aerobic dance exercise on self-perceived body image and self-esteem of overweight and obese undergraduate students of University of Nigeria Enugu Campus (UNEC).

Materials and Methods

Design: This study was a randomised controlled trial evaluating the effect of aerobic dance exercise on body image dissatisfaction and self-esteem of overweight and obese undergraduate students of UNEC. Prior to the commencement of the study, the written informed consent of the participants was obtained and an ethical approval (NHREC/05/01/2008B-FWA00002458-1RB00002323) received from the Health Research and Ethics Committee Review Board of University of Nigeria Teaching Hospital, Ituku-Ozalla, Enugu.

Participants: This study was conducted between February and August, 2019 at the physiotherapy gym of University of Nigeria Enugu Campus (UNEC). Study volunteers were screened for eligibility with the study aims and procedures explained in details. G power analysis using an effect size of 0.5 at a power of 0.09 and a significance level of 0.05 gave a minimum sample size of 45. However, sixty-one (61) overweight and obese participants between the ages of 18-30 years (males-16, females-38) who were apparently healthy with no underlying medical, musculoskeletal or cardiopulmonary condition were recruited (Figure 1). Pregnant females as well as overweight and obese participants who were on

ketogenic (protein) diet, slimming medications/supplements were excluded from the study.

Instruments for data collection: The following instruments were used to collect data: Stadiometer (Leaidal Medical Limited, RGZ-160, China), weighing scale (Harson Model H89, UK), measuring tape, Rosenberg Self-Esteem Scale (RSES) and Stunkard Figure Rating Scale (SFRS) respectively. BMI was calculated as weight in kilograms divided by square of height in metres. The RSES is a 10-item self-report instrument used for evaluating self-esteem with scores ranging between 0-30. The higher the score, the higher the self-esteem with a score of 15 or less indicating low self-esteem [10]. The colourful SFRS consists of nine drawings of female and male figures representing gender specific body sizes with their assumed BMI, each drawing increasing in size from extremely thin (1) to very obese (9). The discrepancy between the perceived current size score and ideal (current-ideal) is an index of body

size dissatisfaction. SFRS has a sound test re-test reliability and validity [29].

Randomization: After baseline assessment, the 61 participants were randomly assigned to either experimental or control group using the fish bowl method by the principal investigator who is a physiotherapist. Numbers 1-62 were written on a card, squeezed and put in a bowl and eligible participants were asked to pick a card. Numbers 1-31 represented the experimental group while numbers 32-61 represented the control group. Four participants withdrew from the study group because they could not cope with the exercise and three dropped out of the control group because they had to travel (Figure 1).

Blinding: This study was double blinded as both the outcome assessors and the participants were blinded for group assignment.

Intervention: This was conducted by two investigators who are physiotherapists. The control group did not perform any form of exercise but was

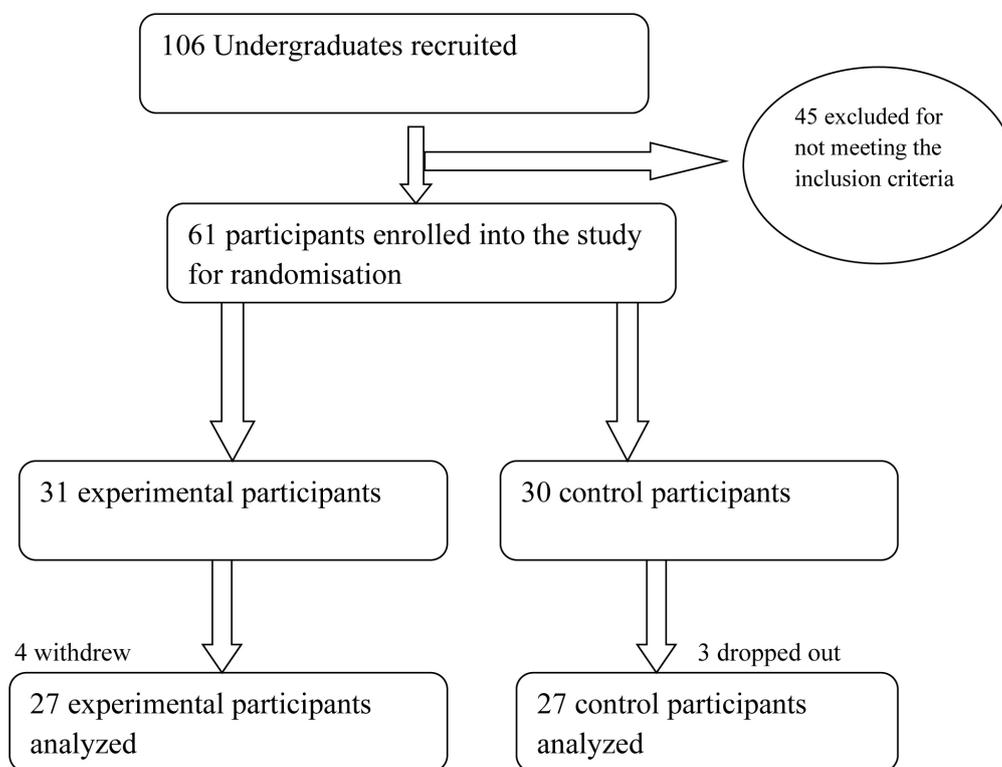


Fig. 1. Flow chart showing the participants' progression

educated and counselled on lifestyle modifications. The experimental group, on the other hand, was first subjected to a modified Bruce protocol stress test on a treadmill to determine their functional capacity and fitness level. The treadmill was started at an initial speed of 1.7 mph with no inclination (0%). At three-minute intervals the incline of the treadmill was first increased by 5% twice and then by 2% while the speed remained the same. The test stopped when the subject could no longer continue. Only those who could exercise for 20 minutes at a stretch without undue fatigue and with scores of between 12 and 14 (moderate intensity) on Borg Scale were allowed to participate in the study. The participants performed aerobic dance exercise for 30 minutes, five times a week for six weeks. A "Befit burn to the beat" dance video [30] which has a dance coach teaching various dance moves with moderate intensity was used for this experiment.

Ten-minute warm up exercises like stretching, jumping and running around the environment were done before the dance exercise and five-minute cool down exercises after the dance. The dance moves include the following; [31]

Hip Roll: The knees are slightly bent and feet slightly apart, with the arms stretched out and palms placed on the hips facing down, afterwards lowered to the side with the abdominals sucked in. Then, an alternating movement on each side of the hips is performed.

Abdominal Squeezing March: Involves contracting the abdominals by pushing the shoulder and the hip forward and backward while marching.

Pump the Arms Up: Involves contracting the abdominals by pushing the shoulder and hip forward and backward but with the arms in the air.

Pump Squat: With the feet apart and knee slightly bent in the squat position, the arm is

pumped down in front and behind at the same time while shoulder and elbow movements are controlled. This was achieved by dropping both arms simultaneously, one in between the legs and the other behind the gluteus.

Side Knee Crunch: Involves raising the knee to touch the elbow with the two palms on the head.

Oblique Crunch: Involves touching the knee to the elbow on one side and repeating the movement on the other side.

Body Roll: Involves slowly turning of the entire body in a rhythmic way.

Snake Roll: Involves bending forward and slowly coming up in a snake-like manner.

Abdominal Twist: The feet are slightly kept apart, the abdomen is twisted from one side to another and after some seconds, the abdomen is twisted twice with a leg lift on the third one and the same leg lift done on the other side.

Body Roll squat: This is done from squatting by pushing the hips back and not letting the knees go beyond the toes and then slowly roll and push through the heels to stand up.

Alternating Side Crunch: Raising the knee to touch the elbow of the alternate side and doing the same on the opposite side.

Body Roll: Involves fast twisting of the entire body.

The principal investigator sent text messages to the participants to remind them of their appointments. The exercise duration for the first two weeks was 30 minutes including the warm up and cool down sessions. This duration was gradually increased by 10 minutes every two weeks till the 6th week. At the end of 6 weeks, post intervention data were assessed from participants in both groups.

Data Analysis: Data were summarized using descriptive statistics of mean and standard

deviation. Inferential statistics of paired samples t-test and independent t-test were used to compare means within and between groups, respectively. Alpha level was set at $p < 0.05$. Data was analysed using Statistical Package for Social Sciences (SPSS) (IBM, Chicago, IL, USA) version 21.0.

Results

Out of 61 participants who entered this randomized controlled trial, 7 dropped out before the end of the trial giving an 88.5% attrition rate. Table 1 shows the general characteristics of the participants. Independent t-test revealed that the baseline age, BMI and WHR were comparable at baseline.

Paired sample t-test comparing the means of pre

and post variables within the groups is presented in table 2. There were significant differences found in the pre and post BMI ($p < 0.001$), Self Esteem (SE) ($p < 0.001$), Body Size Dissatisfaction (BSD) ($p < 0.001$) and WHR ($p < 0.05$) of the experimental group. Conversely, there were no significant differences in the pre and post SE ($p = 0.306$) and BSD ($p = 0.713$) within the control group but there were significant differences in the BMI ($p < 0.05$) and WHR ($p < 0.05$).

Table 3 shows the independent t-test comparison of mean differences between the experimental and control groups after 6 weeks of intervention. SE ($p < 0.001$) was significantly higher while BMI ($p < 0.05$), WHR ($p < 0.05$) and BSD ($p < 0.05$) were significantly lower in the experimental group compared to the control group.

Tab. 1. General characteristics of the participants, N=54

Variable	Experimental	Control	t-value	p-value
Age (years)	20.8± 2.1	21.1±2.0	-0.586	0.561
BMI (kg/m ²)	30.2± 3.8	31.6±4.4	-1.414	0.163
WHR	0.8±0.0	0.8±0.1	-1.457	0.151

Keys: N= Total number of participants. Values presented as mean± standard deviation. BMI - Body mass index. WHR - Waist hip ratio.

Tab. 2. Paired sample t-test comparing the variables within groups

Variables	Pre	Post	t-value	p-value
Experimental group				
BMI	30.0±3.8	29.2±3.6	6.072	0.001*
WHR	0.8±0.0	0.8±0.0	2.078	0.048*
SE	30.9±3.9	35.0±2.9	-12.550	0.001*
BSD	2.3±0.9	1.3 ±0.7	5.925	0.001*
Control group				
BMI	31.6±4.4	32.1±4.6	-4.341	0.001*
WHR	0.8±0.1	0.8±0.1	2.501	0.019*
SE	31.3±3.1	31.6±3.0	-1.045	0.306
BSD	2.2±1.0	2.3 ±1.0	-0.372	0.713

Key: Values presented as mean± standard deviation. BMI- Body mass index. WHR- Waist hip ratio. SE- Self-esteem. BSD- Body size dissatisfaction.* significant at $p < 0.05$

Tab. 3. Comparison of mean differences between groups after 6 weeks of intervention

Variables	Experimental	Control	t-value	p-value
BMI	0.86±0.74	-0.46±0.55	7.462	0.001*
WHR	0.01±0.02	-0.01±0.02	3.227	0.002*
SE	4.19±1.73	0.26±1.29	9.446	0.001*
BSD	1.00±0.88	-0.04±0.52	5.292	0.001*

Key: Values presented as mean± standard deviation. BMI- Body mass index. WHR- Waist hip ratio. SE- Self-esteem. BSD- Body size dissatisfaction. * significant at p<0.05

Discussion

This study evaluated the effect of six-week aerobic dance exercise on the body size dissatisfaction and self-esteem of overweight and obese undergraduate students of UNEC.

Effect of aerobic dance exercise on Body Mass Index and Waist Hip Ratio

The findings of this study revealed that six-week aerobic dance exercise significantly reduced the BMI and WHR of the participants compared to the control group. This agrees with previous studies which reported significant reduction in BMI and WHR after eight weeks of aerobic exercise [21,32]. Contrary to this finding, Nassis et al. [33] reported that there was no change in BMI after twelve weeks of aerobic exercise among patients with type 2 diabetes although there was increased insulin sensitivity. The reduced BMI and WHR in the current study points to the beneficial effect of dance as a form of aerobic exercise in the reduction of excessive fat and body weight through increased metabolism and burning of calories. Incidentally, the control group also revealed a significantly higher BMI and WHR after 6 weeks. This may suggest that the participants were increasing in weight and body fat as they were not subjected to aerobic exercise.

Effect of aerobic dance exercise on Self Esteem

This study found a significantly increased self-esteem among the experimental participants after

6 weeks of aerobic dance exercise compared to the control group. This is consistent with those of Mohamed et al. [34] and Rabiei et al. [35] who reported significant improvement in self-esteem following aerobic exercise among obese adolescent females after 12 and 8 weeks respectively. Previous studies [28,36] have also reported improvements in self-esteem in response to dance aerobics in middle aged women and type 2 diabetes mellitus patients respectively. Aerobic dance exercise-induced improvements in self-esteem may be attributed to the fact that consistent aerobic exercise triggers the release of mood enhancing hormones called beta endorphins which reduce anxiety, stress, depression, boosts self-confidence and produce a long-lasting effect on mental health[37].

Effect of aerobic dance exercise on Body Size Dissatisfaction

Results from this study show an appreciable reduction in body size dissatisfaction among the overweight and obese participants. These findings are consistent with the works of Kathlen et al. [38] and Siervo [39] who reported that aerobic exercises led to improvement in body size dissatisfaction in normal weight, overweight and obese women. Similarly, previous studies which valued the effect of one-hour aerobic exercises on both male and female subjects of various ages, revealed a significant positive improvement on perceived body image among basketballers and badminton players respectively [40,41]. This reduction in

body size dissatisfaction could be traced to the “feel good” effect that comes with exercise which makes one feel good with themselves and happy with their physique [37]. Additionally, it could also stem from the appreciable weight and body fat loss associated with the exercise which brings the current body shape closer to the ideal body shape.

Limitation of the study

The limitation of this study is that there were no mid-intervention measurements taken as the results would have better showcased the trend of responses to aerobic exercises if the post intervention assessments were done intermittently before the end of six weeks.

Conclusion

Six weeks of aerobic dance exercise resulted in significant improvements in body mass index, waist to hip ratio, self-esteem and body size dissatisfaction among overweight and obese adults. Therefore, it is recommended that dancing should be incorporated as a weight reduction management tool for the overweight and obese adults.

Declaration of interest statement: The authors report no conflict of interest.

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