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# EFFECT OF BRISK-WALKING EXERCISE ON BODY COMPOSITION IN OBESE MALE TRADERS OF KANO STATE, NIGERIA

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**Abstract**

This paper assessed the effect of brisk-walking exercise on body composition in obese male traders of Kano State, Nigeria. Two research objectives as well as two research questions were formulated to guide this study. An experimental research design was used for this study. The population for this study comprised obese male traders in Kantin Kwari Market in Kano State, Nigeria. The estimated sample size for this study was 80 participants. The data for this study were collected three times: before the start of the study (baseline), during (at 4 weeks) and at the end of the study (at 12 weeks). Findings from this study revealed that there was significant reduction of body mass index (Cal F (2, 26) =80.010, P = 0.005), critical F (2, 26) = 3. 3690 ≤ 0.05 due to brisk walking among obese male traders in Kano Metropolis, Kano State, Nigeria; there was significant reduction of body fat (Cal F (2, 26) =57.576, P = 0.005), critical F (2, 26) = 3. 3690 ≤ 0.05) due to brisk walking among obese male traders in Kano Metropolis, Kano State, Nigeria. It was concluded that brisk walking significantly (P < 0.05) reduced body fat, and body mass index in obese male traders in Kano State, Nigeria. Based on the findings, it was recommended that brisk walking should be prescribed for the modification of body composition, Brisk walking as a mode of aerobic exercise should be engaged in by obese male traders for fitness and the improvement of their general health.

**Keywords: Body composition, obese, body mass index, body fat, cardiovascular**

## Introduction

Obesity is a growing health problem worldwide, which is associated with a host of cardiovascular risk factors and the prevalence is rising (Schutter, Lavie & Milani, 2014). Obesity is associated with cardiovascular disease (CVD), hypertension (HTN), type 2 diabetes mellitus (T2DM), hyperlipidaemia, stroke, certain cancers, sleep apnoea, liver and gall bladder disease, osteoarthritis, and gynaecological problems (Centre for Disease Control and Prevention, CDC, 2014). A study reported an association between obesity and poor health-related quality of life (Wee et al., 2015), especially in women and people aged over 64 years (Busutil et al., 2017). Obesity plays an important role in atherosclerosis and coronary artery disease; it causes structural and functional changes in the heart, resulting in heart failure (Csige et al., 2018).

Trading is a sedentary occupation that predisposes individuals to obesity and often enhances access to food (Ukegbu et al., 2015). Trading involves buying and selling goods and the majority of traders usually sit in their stalls or shops waiting for buyers (Oladoyinbo et al., 2015). A study revealed the majority of traders were found not consciously exercising (Harriette, 2017). Though most of them go to the market six times a week, however, market activities involve mainly sitting and selling goods and this predisposes traders to obesity (Ukegbu et al., 2015). Traders also spend most hours of the day sitting down and in many other sedentary activities, which increases the risk of obesity and other chronic diseases (Oladoyinbo et al., 2015). A report on the traders in an urban market in Lagos State indicated the prevalence of hypertension at 16%, physical inactivity at 92%, diabetes mellitus at 0.8%, obesity at 26.7%, and overweight at 25.3% (Oladoyinbo et al., 2015). Overweight and obese account for 25 % and 31.7 % respectively among female traders in Umuahia (Ukegbu et al., 2015). Oladoyinbo et al. (2015) reported between 25.3 % and 26.7 %, respectively among traders in Ijebu- Ode.

Obesity-related diseases such as hypertension, diabetes, metabolic syndrome and dyslipidemia have been reported among traders in Nigeria across major cities (Awosan et al., 2014; Busutil, et al., 2017; Oladoyinbo et al., 2015) and traders in Kano State may not be exceptional. It is certainly more important, advantageous and of greater health benefit when an active step is taken to engage these traders in doing regular aerobic exercise to find its effect on their body composition and health rather than just reporting the sedentary nature of their businesses with attendant health consequence alone, as it was done in previous studies (Awosan et al., 2014; Oladoyinbo et al., 2015). To the best knowledge of the researchers, this study appeared to be the first attempt to evaluate the impact of brisk walking exercise on body composition, muscular strength and endurance in obese male traders in Kano State.

A systematic review by Bai et al. (2021) found that high-intensity (80–85 %) brisk walking is more effective than moderate-intensity (60–75 %) brisk walking on the aerobic capacity, cardiorespiratory fitness and muscular strength of the elderly. The result of the above systematic review is limited to practical application to only elderly persons and cannot be generalized to all age groups. Hence there appears to be a dearth need for the present study on the effect of brisk walking on muscle strength and endurance among obese middle-aged populations because being healthy in middle age is likely to result in a healthy life

in old age. Furthermore, another study evaluated a 15-week brisk walking combined with resistance training on lower-extremity muscle strength, balance, and walking time over 2 km in postmenopausal women. It was found that there was improvement in lower-extremity muscle strength and walking time (endurance) but not in balance (Stefani et al., 2017). There is however dearth of information on the effect of brisk walking on the muscle strength and endurance of obese middle-aged individuals, especially males. Additionally, when the effects of brisk walking combined with 'green tee extract' (GTE) ingestion was compared with brisk walking combined with placebo, among inactive overweight and obese men, it was reported that there was a significant increase in aerobic capacity and physical fitness (8-foot up-and-go and sit and reach test) in both groups (Zhang et al., 2020). However, there was a significant change in handgrip strength observed only in the brisk walking combined with GTE group. However, technically, the improvement in grip strength in GTE group could mainly be attributed to the GTE ingestion alone and not due to brisk walking exercise, since both groups practised brisk walking training. Hence the effect of brisk walking on muscle strength in obese males requires further research.

Furthermore, the outcome of a systematic review showed that a combination of aerobic and resistance exercises, in addition to diet modifications, may improve cardiovascular fitness and muscular endurance in individuals with class II and III obesity (Pazzianotto-Forti, Moreno, Plater, Baruki, Rasera-Junior, & Reid, 2020), Hence, this study will, however, assess the effects of aerobic exercise on the body composition, muscular strength and endurance in obese male traders without involving strict diet modification or the use of any dietary supplement to accurately report the effect of only brisk walking on muscle strength and endurance.

## Research Questions

1. Would brisk walking exercise have a significant effect on the BMI of obese Male traders in Kano State?
2. Would brisk walking exercise have a significant effect on the percent of body fat of obese Male traders in Kano State?

## Hypotheses

1. Brisk walking exercise has no significant effect on the BMI of obese Male traders in Kano State.
2. Brisk walking exercise has no significant effect on the percent of body fat of obese Male traders in Kano State.

**Methodology**

A total of 88 participants were initially enrolled in this study after meeting the selection criteria. However, 10 individuals dropped out between the baseline and the eighth week of the training programme. The training spanned 12 weeks, involving exercise intensity, ranging between 70 % and 80 % of the maximum heart rate, with each training session lasting 35 to 40 minutes on three alternate days per week. Data were collected at baseline, after the $4^{th}$ $8^{th}$ and $12^{th}$ weeks of training, for the remaining 78 participants. Repeated measure of analysis of variance (ANOVA) was used to analyze the data at 0.05 level of significance.

**Results**

Table 1: Descriptive Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Baseline | 36.81 | 4.62 | 78 |
| Week 4 | 36.65 | 4.76 | 78 |
| Week 8 | 35.65 | 4.62 | 78 |
| Week 12 | 35.28 | 4.60 | 78 |

Table 1 shows a descriptive analysis of the collected data at the baseline, at the end of the $4^{th,}$ $8^{th}$ and $12^{th}$ week. There were seventy-eight (78) participants for the study. The Table showed that the mean and standard deviation were 36.80 ± 4.62 for baseline, while 36.64 ± .476 for week 4, 35.65 ± 4.62 for week 8 and 35.28 ± 4.60 for week 12 respectively. The descriptive statistics of the participants on the body composition variables at the baseline, immediately after the $8^{th}$ and the $12^{th}$ weeks are presented in Table 2.

**Table 2: Descriptive statistics of the body composition variables at the 4th, 8th and 12th weeks of training**

| Variables | N | 4th Wk | | | 8th Week | | | 12th Week | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | M | SD | SE | M | SD | SE | M | SD | SE |
| BMI | 78 | 91.69 | 11.86 | 3.38 | 90.38 | 12.35 | 3.30 | 88.66 | 11.89 | 3.18 |
| Body Fat | 78 | 35.49 | 2.99 | .799 | 34.99 | 3.03 | .81 | 34.34 | 2.92 | .780 |

M = mean, SD = standard error and SE = standard error

Observation in Table 3 shows changes due to training between the 4th week and the 8th week as well as between the 8th and 12th week.

**Sub hypothesis 1:** There is no significant effect of brisk walking exercise on the BMI of obese male traders in Kano State.

To find out whether brisk walking significantly has an effect on BMI, the data collected at baseline, immediately after the 4th, 8th week and 12th weeks were analyzed using repeated-measures ANOVA. The results of which are presented in Table 3.

Table 3: Repeated-measures ANOVA on BMI of obese male traders in Kano State at baseline, immediately after the 4th and 8th, 12th weeks of brisk walking

| Source | | Sum of Squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|---|
| Training Period | Sphericity Assumed | 64.896 | 2 | 32.448 | 80.010 | .000 |
| | Greenhouse- | 64.896 | 1.970 | 32.934 | 80.010 | .000 |
| | Geisser Huynh-Feldt | 64.896 | 2.000 | 32.448 | 80.010 | .000 |
| | Lower-bound | 64.896 | 1.000 | 64.896 | 80.010 | .000 |
| Error(Training Period) | Sphericity Assumed | 10.544 | 26 | .406 | | |
| | Greenhouse- | 10.544 | 25.616 | .412 | | |
| | Geisser Huynh-Feldt | 10.544 | 26.000 | .406 | | |
| | Lower-bound | 10.544 | 13.000 | .811 | | |

Calculated F (2, 26) =80.010, P = 0.005), critical F (2, 26) = 3. 3690 ≤ 0.05,

Table 3 presents the results of the repeated-measures ANOVA on the BMI of the participants. An observation of the results showed that brisk walking had a significant effect on the BMI of the participants, with calculated F (2, 26) = 80.010, P = 0.005) and critical F (2, 26) = 3. 369 ≤ 0.05. This implies that the effect of brisk walking on BMI indicates that there is a meaningful relationship between participating in brisk walking activities and changes in BMI among the participants. This suggests that brisk walking may be an effective intervention for managing or altering BMI levels in the studied population.

**Table 4: Scheffe *post-hoc* comparison (pair-wise) on the Body Mass Index of the participants in Kano State**

| Variables | (I) Repetition | (J) Repetition | Mean Difference (I-J) | Std. Error | Sig |
|---|---|---|---|---|---|
| BMI | Base-line | Week 4 | 1.640* | .451 | .025 |
| | | Week 8 | 1.750* | .571 | .001 |
| | | Week 12 | 3.314* | .646 | 0.01 |
| | Week 4 | Base-line | -.154* | .689 | .000 |
| | | Week 8 | 1.324* | .571 | .000 |
| | | Week 12 | 1.578* | .408 | .001 |
| | Week 8 | Base-line | -2.062* | .934 | .005 |
| | | Week 4 | -3.331* | .646 | .000 |
| | | Week 12 | -1.064* | .408 | .000 |
| | Week 12 | Base-line | 2.098* | .509 | .000 |
| | | Week 4 | 1.965* | .309 | .000 |
| | | Week 8 | -3.214* | .301 | .000 |

*.The mean difference was significant at the 0.05 level.

Post-hoc tests using the Scheffe correction confirmed this position for all the values as presented in Table 4. There was a significant reduction in the mean value between week zero and 4th week, between the 4th and the 8th week as well as between the 8th and 12th weeks of brisk walking. Therefore, the null hypothesis which states that there was no significant effect of brisk walking on the BMI of obese male traders in Kano, Nigeria was rejected.

**Sub hypothesis 2:** There was no significant effect of brisk walking on the percent of body fat of obese Male traders in Kano State.

To find out whether the effect of brisk walking on the percent body fat was significant, the data collected at baseline, immediately after the 4th, 8th and 12th weeks were analyzed using repeated-measures ANOVA. The results are presented in Table 5.

Table 5: Repeated-measures ANOVA on Percent Body fat of obese male traders in Kano State at baseline, immediately after the 4th, 8th and 12th weeks of brisk walking

| Source | | Sum of Squares | Df | Mean Square | F | Level of Sig. |
|---|---|---|---|---|---|---|
| Training_Period | Sphericity | 9.396 | 2 | 4.698 | 57.576 | .000 |
| | Assumed Greenhouse | 9.396 | 1.775 | 5.295 | 57.576 | .000 |
| | Geisser Huynh-Feldt | 9.396 | 2.000 | 4.698 | 57.576 | .000 |
| | Lower-bound | 9.396 | 1.000 | 9.396 | 57.576 | .000 |
| Error(Training_Period) | Sphericity | 2.122 | 26 | .082 | | |
| | Assummed Greenhouse | 2.122 | 23.069 | .092 | | |
| | Geisser Huynh-Feldt | 2.122 | 26.000 | .082 | | |
| | Lower-bound | 2.122 | 13.000 | .163 | | |

Calculated F (2, 26) =57.576, P = 0.005), critical F (2, 26) = 3. 3690 ≤ 0.05,

Table 5 presents the results of the repeated-measures ANOVA on the per cent body fat of the participants used in this study. Brisk-walking had a significant effect on the body fat of the participants with calculated F (2, 26) =57.576, P = 0.005) and critical F (2, 26) = 3. 3690 P≤ 0.05. This implies that the effect of brisk walking on body fat implies that there is a meaningful relationship between participating in brisk walking activities and changes in percent body fat among the participants. This suggests that brisk walking may be an effective intervention for managing or altering body fat levels in the studied population.

**Table 6: Scheffe post-hoc comparison (pair-wise) on the percent body fat of the obese male traders in Kano State**

| Variables | (I) Repetition | (J) Repetition | Mean Difference (I-J) | Std. Error | Level of Sig. |
|---|---|---|---|---|---|
| Body fat | Base-line | Week 4 | 1.340* | .340 | .000 |
| | | Week 8 | 1.550* | .460 | .001 |
| | | Week 12 | 2.014* | .535 | .001 |
| | Week 4 | Base-line | -.184* | .578 | .000 |
| | | Week 8 | 1.424* | .460 | .000 |
| | | Week 12 | 1.978* | .207 | .001 |
| | Week 8 | Base-line | -3.007* | .813 | .000 |
| | | Week 4 | -3.211* | .511 | .000 |
| | | Week 12 | -1.101* | .316 | .001 |
| | Week 12 | Base-line | .068* | .418 | .000 |
| | | Week 4 | -2.609* | .207 | .001 |
| | | Week 8 | -4.150* | .210 | .001 |

*.The mean difference was significant at the 0.05 level.

Post-hoc tests using the Scheffe correction confirmed this position for all the values as presented in Table 6. There was a significant reduction in the mean value between week zero and 4th week, between the 4th and the 8th week as well as between the 8th and 12th weeks of brisk walking. Therefore, the null hypothesis which states that there was no significant effect of brisk walking on the percent body fat of obese male traders in Kano, Nigeria was rejected.

## Summary of Findings

1. The findings of this study revealed a significant decrease in BMI after 12 weeks of brisk walking (P = 0.005).

2. The findings of this study also revealed a significant decrease in the body fat of obese male traders after 12 weeks of brisk walking (P = 0.005).

**Discussion**

The findings of this study revealed a significant decrease in BMI after 12 weeks of brisk walking, which was similar to the results obtained by previous researchers. In line with this, a study was conducted on the regular exercise of walking in sedentary obese women, using body weight and body mass index (BMI) as a tool to investigate the effects on body parameters. Results reported that the difference in body weight and BMI values, along with other body composition indices, were significant (P < 0.05) (Zileli & Özkamçi, 2016).

The findings of this study also revealed a significant decrease in the percent body fat of obese male traders after 12 weeks of brisk walking. This is in agreement with the result obtained by Hong Hong, & Shin, (2014), who recorded a significant effect of walking at 50–60 % of each individual's maximal oxygen uptake, 3 times per week for 12 weeks, on per cent body fat, visceral fat, BMI, and waist circumference of middle-aged Korean women. It was also reported that a significant reduction in per cent body fat and waist and hip circumferences in obese males following a 12-week brisk-walking programme at a frequency of 5 times per week, 45 minutes per session. This decrease was attributed to the fact that brisk walking is an aerobic exercise that increases energy expenditure, thereby creating energy balance for weight loss. The findings of the present study were in agreement with the findings of Zileli and Özkamçi (2016), who reported that moderate-intensity walking reduces body fat in obese women.

Furthermore, the result of this study showed that brisk walking had a significant effect on visceral fat, which was in line with the findings of Melam et al. (2016) that a moderate-intensity walking program in a weight maintenance programme accelerated weight loss and decreased visceral fat. Melam et al., (2016) demonstrated that brisk walking for 45 minutes, 5 days per week for 10 weeks, significantly reduced visceral fat in North Indian women. The findings of the present study also corroborated the work of other researchers: Brill et al. (2022), on Hispanic women; Hui et al. (2015), among middle-aged Finnish women where it was shown that exercise is an effective tool in reducing visceral fat. The reduction of visceral fat is of particular clinical importance since the increased risk of insulin resistance, diabetes, metabolic syndrome, and mortality is associated with excess abdominal adiposity (Chen, Ismail, & Al-Safi, 2016).

**Conclusions**

Based on the findings of this study, the following conclusions were made:

1. Brisk walking significantly reduced the BMI of obese male traders in Kano Metropolis, Kano State, Nigeria.
2. Brisk walking significantly reduced body fat of obese male traders in Kano Metropolis, Kano State, Nigeria.

## Recommendations

Based on the findings of this study, the following recommendations were made:

1. Brisk walking should be prescribed for the modification of body composition, muscular strength, and endurance indices.
2. Brisk walking as a mode of aerobic exercise should be engaged in by obese male traders for fitness and the improvement of their general health.

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