Effects of 8-Week Jogging Training on Body Composition of Obese and Non-Obese Students in Aminu Saleh College of Education, Azare Bauchi State Nigeria

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Abstract

The study assessed effects of 8-week jogging training on body composition of obese and non-obese students in Aminu Saleh College of Education, Azare Bauchi State Nigeria. Repeated measure design using one group repeated trials research design was adopted for this study. The population for this study comprised of one thousand five hundred and seventy (2570) male and female students where 80 students were selected using the purposive sampling. The participants were assigned to two experimental groups of 40 obese and non–obese male and female students, each group exposed to 8-week jogging between the hours of 4:30pm to 5:45pm on alternate days (Mondays, Wednesdays and Fridays). The training session consist of three components which were, 10 minutes of warm – up, 45 minutes of jogging session and 10 minutes of cool down. Descriptive statistics of mean standard deviation and standard error of means was used to analyse the body composition variables. The repeated measure ANOVA was used to analyse the data to determine the effect of jogging on the participants' body composition and independent t-test was used to analyse the data for gender to the alpha level of significance p< 0.05 was used to accept or reject the null hypotheses. It is concluded among others that,, there are specific gender differences in response to jogging. The eight (8) weeks jogging did not produce significant effect on %BF of female, and BMI (male and female). It was recommended among others that, regular assessment of physical fitness status of youths in Nigerian schools by exercise Scientist should be emphasized so as to be able to prescribe exercise programmes to meet children's fitness needs and standard. Obese youths should be exposed to physical activities to improve their well-being and alleviate obesity complications.

Introduction

Obesity is a condition in which excess body fat accumulated to the extent that health is adversely affected (World Health Organisation WHO, 2016). Percent body fat (%BF) is the proportion of the total body weight that is composed of fat (McArdle, Katch, & Katch, 2000). Body Mass Index (BMI) is an indicator of body fat for most people. It is mostly identified through numerical value of one's weight in relation to his height square. BMI of less than $18.5kg/m^2$ indicates underweight; BMI between $18.5kg/m^2$ to $24.9kg/m^2$ indicates a normal weight and BMI between $25kg/m^2$ to $29.9kg/m^2$ indicates overweight. Similarly, BMI between $30kg/m^2$ to $34.9kg/m^2$ indicates obesity I; BMI between $35kg/m^2$ to $39.9kg/m^2$ indicates obesity II and BMI equal or greater than $40kg/m^2$ indicates obesity III (World Health Organisation, 2015). Investigation showed that, excess body fat is associated with so many cardiovascular diseases such as high resting heart rate, heart disease and high blood pressure.

Jogging is a form of running at a slow pace targeted at increasing the fitness status with less stress to the body. It helps to burns calories which help keep the body lean. However, exercise scientist and health fitness professionals have maintained that regular physical activity for preventing disease and premature death and in maintaining a high quality of life has recently received recognition (Haruna, 2018). Regular aerobic physical activity therefore leads to a significant cardiovascular risk reduction by improving lipid profile (Kang, Gutin, Barbeau, Owens, and Lemmon 2017). Therefore, Aerobic exercise of moderate intensity has been recommended with particular reference to jogging as the type of aerobic exercise for this research (Werner & Sharon, 2019), with minimal training contraindication.

Statement of Problem

The incidence of obesity among adolescents is a growing modern health epidemic in many developing nations of the world. World Health Organization (2016) concludes that, obesity among adolescents and youths is one of the most serious public health challenges of the 21st century. World Health Organization estimated that by the year 2020, obesity, type 11 diabetes and cardio respiratory diseases will account for approximately three quarters of all deaths in the developing world.

Body compositional changes, including the regional distribution of body fat, are large during puberty transition. The hormonal regulation of the growth spurt in adolescents and the alterations in body composition depend on the release of gonadotropins, leptin, the sex-steroids, and growth hormones. The changes in body composition of adolescents could be detrimental to health which could transcend to adulthood later in life. It is against this menace that, this study is undertaken to assess effect of 8-week jogging on body composition of male and female obese and non-obese students in Aminu Saleh College of Education, Azare, Bauchi State Nigeria.

Research Questions

The following questions were answered:

1. What is the effect of 8-week jogging training on percent body fat of male and female obese and non-obese students in Aminu Saleh College of Education, Azare?
2. . What is the effect of 8-week jogging training on body mass index of male and female obese and non-obese students in Aminu Saleh College of Education, Azare?

Hypotheses

The following hypotheses were tested:

$H0_1$: There is no significant effect of 8-week jogging training on percent body fat (%BF) and body mass index (BMI) of obese and non-obese students in Aminu Saleh College of Education, Azare Bauchi State

$H0_2$: There is no significant effect of jogging on male and female obese and non-obese students in Aminu Saleh College of Education, Azare Bauchi State.

Methodology

Repeated measure design using one group repeated trials research design was adopted for this study as suggested by Ryan (2012). In this design, one group was given different treatment at different times. The base line assessment serves as control while the 4th and 8th week was the experimental manipulation. The population for this study comprised of one thousand five hundred and seventy (2570) male and female students in Aminu Saleh College of Education, Azare Bauchi State, Nigeria. A stratified random sampling technique was used to divide the participants by age and gender. Screening of the weight and height of the participants was carried out to establish their BMI weight (kg) divide by height (m^2). Using the purposive and convenient sampling technique, 80 male and female students aged 18 to 41years who were normal weight (18.5 - $24.9kg/m^2$) and obese (25.0 - $29.9kg/m^2$) volunteered to participate in the study.

The instruments used for data collection were weighing scale attached with stadiometer and digital body fat caliper. Body height (stature) was measured in metre (m) with a vertical ruler when the horizontal headboard brings into contact with the highest pong on the head. Body Weight was measured using weighing scale while a participant wore track down and light T-Shirt, with no shoes. Body weight (kg) was divided by height (m^2) (David & Nieman, 2016) and determined body mass index (kg/m^2) of each participant. Percent body fat of the participants was estimate using digital skinfolds caliper at suprailliac crest.

The training session commenced shortly after the participants were assigned to two experimental groups of 40 obese and non–obese male and female students in each group. The two groups were exposed to 8 weeks jogging (aerobic exercise) used for the study. The training session was conducted between the hours of 4:30pm to 5:45pm on alternate days (Mondays, Wednesdays, and Fridays). The training session consist of three components which were, 10 minutes of warm – up, 45 minutes of jogging session and 10 minutes of cool down as adapted from American College of Sports Medicine (2008) position statement on quantity and quality of exercise prescription. The frequency of training for this research work was 3 days per week in accordance to the recommendation of American College of Sports Medicine (2008), which emphasizes three to five training sessions per week. The program was of low intensity and long duration considering the fitness level of the participants. The intensity of the main jogging started with a working heart rate of 55% of estimated HRmax (1 to 4 weeks) increased progressively to 60% HRmax (5 to 8 weeks) (Ryan, 2012). The progression was from low to moderate intensity of exercise from 0 week to eight (8) weeks of the training programme.

Descriptive statistics of mean standard deviation and standard error of means was used to analyse the body composition variables. The repeated measure ANOVA was used to analyse

the data to determine the effect of jogging on the participants' body composition and independent t-test was used to analyse the data for gender to the alpha level of significance p< 0.05 was used to accept or reject the null hypotheses.

Results

Table 1: Physical characteristics of participants showing mean, standard deviation and standard error of obese and non-obese male and female children on %BF and BMI (N=80)

variable	Gender	Male			Female		
%BF	Obesity Status	Mean	SD	SEE	Mean	SD	SEE
	Obese	20.05	5.49	1.23	39.80	11.75	2.62
	Non-obese	19.02	5.50	1.23	35.81	8.54	1.93
BMI	Obese	29.90	4.85	1.09	31.73	5.42	1.21
	Non-obese	19.96	1.69	0.38	20.83	1.76	0.39

Table 1 above revealed that obese male and female participant's %body fat had $20.05 \pm 5.49\%$ and 39.80 ± 11.75 while the non-obese male and female youths had 19.02 ± 5.50 and 35.81 ± 8.54 %BF respectively. It is noted that obese and non-obese female had higher %BF than their male counterpart. The table showed the mean and standard deviation value on BMI of obese male to be 29.90 ± 1.09 and female had 31.73 ± 5.42 while non-obese male and female had 19.96 ± 1.69 and 20.83 ± 1.76 respectively. It is noted here that the BMI for obese and non-obese female seem to be higher than their male counterpart.

Hypotheses Testing

H0$_1$: There is no significant effect of 8-week jogging training on percent body fat (%BF) and body mass index (BMI) of obese and non-obese male and female students in Aminu Saleh College of Education, Azare Bauchi State.

Table 4.2: Repeated ANOVA for effect of 8-week jogging training on %BF and BMI of obese and non-obese male and female children (N=80)

Variable	Sex	Male					Female				
	Source	SS	DF	MS	F	Sig	SS	DF	MS	F	Sig
%BF	Corrected model	791.69	5	158.34	6.45	0.00	1129.22	5	225.84	2.18	0.061
	Test	754.75	2	377.37	15.38	0.00*	607.12	2	303.56	2.93	0.057
	Test x obesity	5.29	2	2.64	0.11	0.898	44.37	2	22.19	0.21	0.807
	Error	2797.89	114	24.54			11795.59	114	103.47		
	Corrected total	3589.58	119				12924.81	119			

BMI	Corrected model	405764.67	5	81152.93	1.09	0.369	3660.66	5	732.13	45.74	0.009
	Test	149410.78	2	74705.39	1.01	0.369	87.74	2	43.87	2.74	0.069
	Test x obesity	148551.20	2	74275.61	0.99	0.371	3.71	2	1.86	0.12	0.891
	Error	8475058.12	114	74342.62			1824.70	114	103.47		
	Corrected total	8880822.79	119				5485.36	119			

*= Significant   F (2.119) =3.07 P ≤ 0.05

Table 2 above showed that the difference in %BF between the baseline values and the weeks of training for obese and non-obese male were significant as the obtained values (F (2,119) =3.07 >15. 38) was greater than the calculated values to be significant at 0.05 alpha level. The obtained values for the female counterpart was (F (2,119) =3.07 <2.93) less than the calculated values to be not significant at 0.05 alpha level. The result for BMI showed that the effects between the baseline values and the weeks of training in the two groups were not significant as the obtained values (F (2,119) =3.07 <1.01) for obese and non-obese male was less than the calculated values to be significant at 0.05 alpha level. Equally, the values for the female obtained was presented as (F (2,119) =3.07 <2.74) less than the calculated values to be significant at 0.05 alpha level. Also, result for BW revealed that effect between baseline values and the weeks of training in the two groups were significant as the obtained values (F (2,119) =3.07 >4.56) and (F (2,119) =3.07 >5.12) respectively. The obtained values were greater than the calculated values to be significant at 0.05 alpha levels.

Table 3: Descriptive statistics of Mean, Standard deviation, and standard error of gender (obese and non-obese) (N=80)

	Gender	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
%BF	Male	40	19.5343	5.49223	.50137
	Female	40	37.8017	10.42170	.95137
BMI	Male	40	49.9299	273.18265	24.93805
	Female	40	26.2806	6.78936	.61978

Table 3 above showed descriptive statistics of mean, standard deviation and standard error of gender of the participants. In order to find out the effects of 8 weeks jogging on the parameters under investigation of the participants, the researcher used the independent t-test and result presented in the table below.

H0$_2$: There is no significant effect of jogging on male and female obese and non-obese students in Aminu Saleh College of Education, Azare Bauchi State.

Table 4: Results of independent t-test for gender of the effects of jogging on body composition and cardiorespiratory functions of obese and non-obese students in Aminu Saleh College of Education, Azare Bauchi State (N=80)

		F	T	df	Sig.(2-tailed)	Mean Diff Std.	Error Diff
%BF	Equal variances assumed	61.951	-16.987	238	*.000	-18.26742	1.07539
	Equal variances not assumed		-16.987	180.366	.000 -	18.26742	1.07539
B MI	Equal variances assumed	3.218	.948	238	.344	23.64933	24.94575
	Equal variances not assumed		.948	119.147	.345	23.64933	24.94575

Table 4 above indicated that, there were significant effects of 8-week jogging training on %BF between the two groups of obese and non-obese male and female students. However, the result revealed that there was no significant effect of jogging on obese and non-obese male and female students on BMI. This means that the pattern of change from weeks 4-8 was constant on the said variables. Base on this therefore, the result for which agrees with the stated null hypothesis was retained.

Discussion

The result revealed that there were significant effects of 8-week jogging training on %BF of obese and non-obese male students in Aminu Saleh College of Education, Azare Bauchi State. The obtained values for the female counterpart was (F $(2,119)$ =3.07 <2.93) less than the calculated values to be not significant at 0.05 alpha level. This finding was consistent with the submission of Flegal et al (2018) and Dikko, (2003) which stated that reduction in blood pressure in overweight and normal weight individuals are independent of weight loss. The findings in table 4.2 showed that, there is no significant effect of 8-week jogging training on %BF of the female subject also agrees with the findings of Wilmore and Costill (2014) which stated that, there are no significant responses among male and female groups in their %BF irrespective of their body sizes.

The result for BMI showed that, the effects between the baseline values and the 8-week of jogging training in the two groups were not significant as the obtained values (F $(2,119)$ =3.07 <1.01) for obese and non-obese male was less than the calculated values to be significant at 0.05 alpha level. Equally, the values for the female obtained was presented as (F $(2,119)$ =3.07 <2 .74) less than the calculated values to be significant at 0.05 alpha level. This finding is was consistent with the works of Kono et al. (2014), who reported a correlation coefficient of r = 0.60 between adiposity and left ventricular mass normalized for height in 6-year old males, while, Rowland and Dunbar (2017) found a correlation of r = 0.59 between body mass index and left ventricular end diastolic dimension in a group of early adolescent females with a BMI range of 14 - 63kg/m^2.

Conclusion

Based on the findings of this study, it is concluded that, there are specific gender differences in response to jogging. Several factors were noticed such as sedentary lifestyle, dietary habit, environment, gender or even age. Similarly, duration of training have significant impact on the effect of jogging on the variables from mid training period (week 4) of when the intensity of exercise was between 55% - 60% of HRmax of the participants. This entails that involvement in low to moderate intensity training programmes by adolescents who were previously living a sedentary lifestyle will have positive effects on the stated variables. The eight (8) weeks jogging did not produce significant effect on %BF of female, and BMI (male and female), between the ranges of 50% - 60% HRmax moderate intensity thus, the need for increased intensity and duration could help produce the desired significant change. This therefore implies that regular participation in physical aerobic exercise programmes would help to ensure healthy lifestyle.

Recommendations

Based on the conclusions drawn, recommended that, physical education for children already in existence in school curriculum should be seriously re-emphasized and stressed. Regular assessment of physical fitness status of youths in Nigerian schools by exercise Scientist should be emphasized so as to be able to prescribe exercise programmes to meet children's fitness needs and standard. Obese youths should be exposed to physical activities to improve their well-being and alleviate obesity complications.

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