

EFFECT OF JOGGING PROGRAMME ON VISCERAL FAT OF *ALMAJIRAI* IN *TSANGAYA* IN GUSAU METROPOLIS, NIGERIA

EFEITO DO PROGRAMA DE JOGGING SOBRE A GORDURA VISCERAL DO *ALMAJIRAI* EM *TSANGAYA* NA METRÓPOLE DE GUSAU, NIGÉRIA

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Abstract: This study therefore assessed the effect of jogging programme on visceral fat of *Almajirai* in *Tsangaya* in Gusau Metropolis, Nigeria. For the purpose of this study, a 1x2 x3 factorial research design was used. The population are *Almajirai* who are *gardi* in Gusau Metropolis within the ages of 13-15 years, stratified sampling and simple random sampling technique were used to select 48 *Gardi Almajirai* in Gusau metropolis who volunteered to participate in the study. Hand-held Bioelectrical Impedance Analysis device was used to assess visceral fat. All of these *Girdi Almajirai* were found to have met the inclusion criteria and were all assigned to the jogging programme and the baseline values were used as the control. All exercise sessions were preceded by 10 minutes warm-up; the programme lasted between 30 and 45 minutes, which ended with a cool down session. All exercise sessions were conducted between 5.30p.m - 6.00p.m on alternate days every Monday, Wednesday and Friday of the consecutive weeks. Training intensity was maintained between 50-65% of estimated HR max for 4 weeks and which was increased progressively from 60-70% from the 5 to 8 weeks of training. The data collected were statistically analyzed using repeated measured ANOVA and scheffe post hoc test was used to locate where significant effect lies at level of 0.05. The result of the study revealed that jogging had significant effect on visceral fat $p=0.001$. It was recommended that Adolescent *almajirai* should participate every day in 45 minutes or more of moderate to vigorous physical activity that is enjoyable and developmentally appropriate.

Keywords: Jogging programme. Visceral fat. *Almajirai* and *tsangaya*.

Resumo: Este estudo avaliou, portanto, o efeito do programa de jogging na gordura visceral de *Almajirai* em *Tsangaya*, na Metr pole de Gusau, Nig ria. Para o prop sito deste estudo, foi utilizado um projeto de pesquisa fatorial de 1x2 x3. A popula o   de *Almajirai* que   *gardi* na metr pole de Gusau dentro dos 13-15 anos de idade, amostragem estratificada e t cnica simples de amostragem aleat ria foram usadas para selecionar 48 *Gardi Almajirai* na metr pole de Gusau que se voluntariaram para participar do estudo. O dispositivo de An lise de Imped ncia Bioel trica manual foi usado para avaliar a gordura visceral. Verificou-se que todas estas *Girdi Almajirai* cumpriram os crit rios de inclus o e foram todas designadas para o programa de jogging e os valores de base foram usados como controle. Todas as sess es de exerc cio foram precedidas de 10 minutos de aquecimento; o programa durou entre 30 e 45 minutos, o que terminou com uma sess o de resfriamento. Todas as sess es de exerc cios foram

realizadas entre 17h30min e 18h00min em dias alternados, todas as segundas, quartas e sextas-feiras das semanas consecutivas. A intensidade de treinamento foi mantida entre 50-65% do RH máximo estimado por 4 semanas e que foi aumentado progressivamente de 60-70% das 5 a 8 semanas de treinamento. Os dados coletados foram analisados estatisticamente usando ANOVA medida repetidamente e o teste post-hoc de esquema foi usado para localizar onde o efeito significativo está no nível de 0,05. O resultado do estudo revelou que o jogging teve efeito significativo sobre a gordura visceral $p=0,001$. Foi recomendado que o adolescente almajirai participasse todos os dias em 45 minutos ou mais de atividade física moderada a vigorosa que seja agradável e apropriada para o desenvolvimento.

Palavras-chave: Programa de Jogging. Gordura visceral. Almajirai e tsangaya.

Introduction

Body composition is a complex condition associated with many detrimental physiological and psychological health complications (Must & Strauss 1999; Schwimmer, Burwinkle, & Varni, 2003). In order to counter this rapidly growing worldwide epidemic, a variety of lifestyle, behavioral and environmental interventions have been proposed (Dehghan, Akhtar-Danesh, & Merchant, 2005). In particular, physical activity is regarded as a key component of childhood obesity treatment (Watts, Jones, Davis, & Green, 2005). Even without weight loss, regular physical activity has many positive benefits for the underweight, overweight or obese child such as improved cardiovascular fitness, insulin sensitivity (Nassis et al., 2005) and vascular function (Watts *et al.*, 2004).

In order to promote an active lifestyle among children, it is important to understand what motivates them to be physically active. It is well established that enjoyment is a key predictor of physical activity commitment and adherence in a young population (DiLorenzo, Stucky-Ropp, Vander Wal, & Gotham, 1998; Dishman *et al.*, 2005; Prochaska, Sallis, Slymen, & McKenzie, 2003; Weiss, Kimmel, & Smith, 2001). However, in addition to being enjoyable, it is important that the types of activities children engage in evoke a high amount of energy expenditure, together with opportunities to develop fundamental movement skills. For these reasons, participation in team sports is often encouraged since these activities have been shown to elicit significantly greater enjoyment in children and adolescents compared to individual sports (McCarthy, Jones, & Clark-Carter, 2008).

Among children and adolescents, body composition is emerging as a powerful predictor of body dissatisfaction (Lawler & Nixon, 2011). Much of this empirical literature has been

based in sociocultural theory (Hausenblas & Fallon, 2006), which maintains that social pressures from a range of sources (for example the media, parents and peers) promote body disturbance through pervasive pressure to conform to an idealised physique, characteristic of an unrealistically thin ideal for females and an often unobtainable lean and muscular ideal for males (Rodgers, Ganchou, Franko, & Chabrol, 2012). Consistent with this theory, overweight and obese children who deviate from these cultural norms are at increased risk of body image disturbance (Holsen, Carlson Jones, & Skogbrott Birkeland, 2012; Paxton, Eisenberg, & Neumark-Sztainer, 2006). Participation in physical activity is one means of meeting these cultural ideals and is thought to serve as a protective factor against body image disturbance.

The *Almajiri* type of education is a system in which children are sent to a settlement other than their own to study under a traditional Islamic teacher laved Mallam. As Galadanci (1997) noted, the children are let loose and engage in begging on the streets. Adamu (2000) also observed that in desperation to meet their basic needs, the *Almajiri* look up to those who will give to enable them feed and take care of their necessities like clothing. The *Almajiri* school system is organized by individuals who have either been requested by a community to teach the pupils or have voluntarily decided to establish the schools on their own. This is in line with the Hadith of the Prophet which says that “the best amongst you is one who learns the Qur’an and cares to teach it”.

Hypothesis

There is no significant effect of jogging programme on visceral fat of *almajirai* in Gusau Metropolis, Nigeria.

Research Design

1x2 x3 factorial research design was used for this study. The study has three factors; the dependent variables are flexibility, body composition and cardiorespirestory fitness which measured on jogging programmes. This will be done to determine effects of jogging programmes on cardio respiratory fitness, flexibility and body composition of *Almajirai* in Gusau Metrpolis, Nigeria. A factorial design is an experimental research design used by scientists wishing to understand the effect of two or more dependent variables (Martyn, 2015 & Jerry, Jack & Stephen, (2005).

The population for this research comprised of all *Almajirai* in Damba, Marire, and Lalan areas in Gusau Metropolis with a population of nine hundred and eighty seven (987) male *Almajirai* (Mallams of *Almajirai* in Damba, Marire, and Lalan areas, 2016)

The study adopted multi-stage sampling procedure. Stratified sampling procedure was used to divide Gusau metropolis according to the major settlements of *Almajirai* as Damba, Marire, and Lalan areas. The purposive sampling technique was used to select *Almajirai* that have been under their teachers who at least five years and above. These were *Almajirai* who mostly recited daily within their teachers without much activity out the school. The name of each area was written on a piece of paper, wrapped and placed in a container. Using the simple random sampling technique each participant was picked a wrapped piece of paper containing, 'Yes or 'No' written on it. Participants who pick 'Yes' were place in the experimental study and those who pick 'No' were placed in the control group (Ndagi, 1999). Twenty-four (24) participants in each group, that is, the experimental group engage in jogging programme while, twenty-four (24) participants the controlled group did not participant in any activity. Thus, the total sample size for this study comprised of 48 (forty-eight) apparently healthy male *Almajirai* in Gusau Metropolis.

Instrument for Data Collection

The following instruments were used to collect data for this study:

- i. Weighing scale, the portable bathroom type Hanson scale, model B1801A.
- ii. Bioelectrical Impedance Analysis (Model BF 511 made by OMRON, Japan)
- iii. Stop watch(Rk 250, India, Ambad Technologies).
- iv. 400m Standard track
- v. Score sheet for recording results.
- vi. Stadiometer, model NJO772 by Pfister Inc, USA

Bioelectrical Impedance Analysis (BIA)

Body composition monitor was used to assess the variables of body composition of the participants. It is a device that measures the body weight, body fat percent, visceral fat, skeletal muscle mass, and resting metabolic rate which works according to Bioelectrical Impedance Analysis (BIA) which analyzes the electrical resistance of the body tissues by sending extremely

weak electrical current through the body. The following procedures were used for the measurement:

1. The power switch was pressed to turn on the machine the input button was pressed to enter each participant's age, height and sex;
2. each participant mounted the machine, barefooted placing the sole on the electrode of the machine;
3. Raise your arms horizontally and extend your elbows straight to form a 90° angle to your Body;
4. Stand with your knees and back straight and look straight ahead;
5. Hold the display unit in front of you;
6. Step on the Main Unit barefoot;
7. Make sure the heels are positioned on the heel electrodes and
8. Stand with your weight evenly distributed on the measurement platform.

Training Procedure

Jogging programme was performed 3- times alternatively per week, that is, Monday, Wednesday and Friday. A total distance of 3.2 Km was covered during each training session. The experimental group jog at an intensity of 60-70% of their predicted maximum heart rate (220 minus the age of the subject) as recommended by Howley & Franks (1992), the training was always preceded by ten (10) minutes warm-up which consisted of calisthenics and running on the spot, and 10 (ten) minutes cool down exercise following each the training session by walking slowly round the track.

Continuous jogging programme for 30 (thirty) minutes on the 400m outdoor track at the Federal College of Education (Technical), Gusau, complex, for the first 4 (four) weeks of the training to familiarize participants training procedure at intensity level of 50-65% maximum heart rate. Thereafter, last remaining 4 (four) weeks training session was increased to 45 (forty five) minutes at intensity of 65-70% maximum heart rate.

Table 1: Procedure for Training for Participants

Weeks	Duration	Intensity	Borg's scale
First four (4) weeks	30 (thirty) minutes	50-65%	Light
4 to 8 weeks	45 (forty five) minutes	60-70%	Somewhat hard

Procedure for Data Analysis

Descriptive statistics of mean, standard deviation and standard error of estimate was used to analyse the physical characteristics of age, height and weight of the participants. Repeated measures ANOVA was used to compare the control and experimental groups; Statistical significance for all analysis was set at an alpha level of 0.05. Data collected for this study were analyzed using the Statistical Package for Social Science (SPSS) version 22.0 for windows (SPSS INC Illinois USA, 2014).

Results

Table 2: The Demographic Statistics of the Participants of both the Experimental Group (EG) and Control Group (CG)

Variable	Control (n=24)			Experimental (n=24)		
	\bar{x}	SD	SE	\bar{x}	SD	SE
Age (yrs)	13.83	0.87	0.18	13.83	0.87	0.177
Weight (Kg)	53.91	0.71	0.71	49.95	0.53	0.622
Height (m)	1.50	0.0007	0.007	1.58	0.071	0.007
BMI (Kg/m ²)	26.01	0.29	0.30	24.35	0.21	0.23

The subjects as presented in table 2 were randomized into pre test group and post test groups. The results show that participants in pre test group and post test group do not differ in age; there were significant difference in weight of the post test of the participants; the table also

show no significant difference in the height of pre test group and post test group and there were significance in BMI of post test group, this is because the group participated in the jogging programme.

Research Question:

Would the participation of *Almajirai* in jogging programme improve their visceral fat?

Table 3: Descriptive Statistics of Mean, SD and SE of Visceral Fat of *Almajirai* in Tsangaya before, during and after Jogging Programmes

Variable	Duration of Exercise	Mean	SD	SE
Heart	Baseline EG	13.5458	1.85938	.33930
	CG	13.2091	1.8629	.70491
Rate (HR)	4 th week EG	13.6708	2.26481	.26730
	CG	13.2091	1.8629	.70491
	8 th week EG	15.9775	2.93379	.55361
	CG	13.9685	1.9548	.66934

Table 3 shows the means, SD and SE of muscle mass at baseline, immediately after 4th and 8th week of jogging programmes on visceral fat of *Almajirai* in Tsangaya in Gusau Metropolis, Nigeria. An observation of the baseline data showed that the participants had mean visceral fat value of 13.5458 ± 1.85938 for the experimental group and 13.2091 ± 2.26481 for the control group value. Additional observation of the table also indicated that the means of visceral fat were 13.6708 ± 2.26481 and 15.9775 ± 2.93379 after 4th and 8th week for the experimental group respectively. More so, the mean and SD value of the control group were also maintained except in the 8th week of the training with slight increase in value.

To confirm whether these values were statistically significant, the data were analyzed using repeated measures ANOVA, the results of which is given below in Table 4.9.

Hypothesis

There is no significant effect of jogging programme on visceral fat of *almajirai* in Gusau Metropolis, Nigeria.

Table 4: Repeated Measures Analysis of Variance on Visceral Fat of Almajirai in Tsangaya for Difference before, during and after Jogging Programmes

Source		Sum of Squares	Df	Mean Square	F	Sig.
Jogging	Sphericity Assumed	2.368	2	1.184	6.266	.004
	Greenhouse-Geisser	2.368	1.577	1.501	6.266	.008
	Huynh-Feldt	2.368	1.674	1.415	6.266	.007
	Lower-bound	2.368	1.000	2.368	6.266	.020
Error (jogging)	Sphericity Assumed	8.692	46	.189		
	Greenhouse-Geisser	8.692	36.278	.240		
	Huynh-Feldt	8.692	38.495	.226		
	Lower-bound	8.692	23.000	.378		

F (2, 46) = 6.266; P < 0.05; F_{critical}=; *=Significant

Table 4 indicated that the results of repeated measures ANOVA of jogging programmes on visceral fat of Almajirai in Tsangaya. The result shows statistical significance after 4th and 8th week of regular aerobic exercise (P<0.05). jogging programmes has significant effects on visceral fat of almajirai in tsangaya in Gusau Metropolis, Nigeria. This means that almajirai in experimental and control groups were equivalent before the commencement of experiment. Meanwhile, the post-test result revealed that jogging programmes has significant effects on muscle mass of almajirai in tsangaya in Gusau Metropolis. The table shows that P value is 0.008 which is less than α value (0.05), that is P<0.05. Therefore, the null hypothesis which started that there will be no significant effects of jogging programmes on visceral fat of almajirai in Gusau Metropolis, Nigeria was rejected.

Table 5: Results of Scheffe's Post-hoc tests on the Means of Visceral Fat of Almajirai in Tsangaya for difference before, during and after Jogging Programmes

(I) Jogging	(J) Jogging	Mean Difference (I- J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
					Lower Bound	Upper Bound
1	2	-.125	.092	.185	-.314	.064
	3	-.432*	.128	.003	-.697	-.167
2	1	.125	.092	.185	-.064	.314
	3	-.307	.150	.052	-.617	.003
3	1	.432*	.128	.003	.167	.697
	2	.307	.150	.052	-.003	.617

Table 4.10 repeated measures ANOVA was used to compare effect of jogging programmes on visceral fat of Almajirai in Tsangaya. A significant difference was found among the weeks. Scheffe test was used to determine the nature of the differences among the weeks. This means that baseline and week 4 differs from week 8.

Discussion

These results are in line with those showing that, when the energy deficit is matched, fat loss from the abdominal region is not enhanced by addition of aerobic exercise to calorie restriction in younger persons Redman, Heilbronn, Martin, Alfonso, Smith, Ravussin, (2007). However, we did observe that changes in visceral fat were inversely related to increases in aerobic fitness, and addition of exercise did result in less lean mass loss. Aerobic exercise of moderate to vigorous intensity seems to have a greater effect on visceral fat than low intensity aerobic exercise or strength training. This is in line with the findings of Ismail, Keating, Baker, Johnson (2015) who concluded in their meta-analysis that aerobic exercise is central for exercise programs aimed at reducing visceral fat. The study of Ismael et al. (2015) included predominantly studies with overweight and obese participants, but also to some extent studies with normal weight participants. Differences between the present meta-analysis and the meta-

analysis of Ismael et al. are that the present meta-analysis focused exclusively on overweight and obese individuals, only included exercise-only intervention groups, required a minimum of 8 weeks of exercise for inclusion, presented results of subgroup analyses for gender and training intensity, included studies published up to August 2012 and re-expressed Hedge's g in cm^2 for clinical interpretation. An association has been reported between the volume of physical activity and weight loss Slentz, Duscha, Johnson, Ketchum, Aiken, (2004), with indications for a possible 'dose-response relationship' between exercise intensity and increase in lean body mass. Also an association between cardiorespiratory fitness and diminished abdominal adiposity has been described Ross, Katzmarzyk (2003) and between the amount of physical activity and the risk for metabolic syndrome (Ekelund, Brage, Franks, Hennings, Emms, 2005). However, the direct association between exercise intensity and reduction in visceral fat has not been investigated as a primary goal extensively. Gutin, Barbeau, Owens, Lemmon, Bauman (2002) reported no clear effect of the intensity of physical training on the reduction of visceral and total-body adiposity. The study of Irving, Davis, Brock, Weltman, Swift (2008) is one of few studies to report on the effect of exercise intensity in obese adults with abdominal visceral fat as primary outcome parameter.

Recommendations

1. Adolescent almajirai should participate every day in 45 minutes or more of moderate to vigorous physical activity that is enjoyable and developmentally appropriate.
2. Physical activities during adolescence relative to the development of skills and to behavioural, health, and fitness benefits.

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