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EFFECT OF RECREATIONAL PHYSICAL ACTIVITIES ON HEALTH RELATED COMPONENTS OF PHYSICAL FITNESS OF ADOLESCENTS IN SECONDARY SCHOOLS IN GBOKO LOCAL GOVERNMENT AREA OF BENUE STATE, NIGERIA

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ABSTRACT

Purpose: The purpose of the study was to investigate the effect of recreational physical activities on the five health-related components of physical fitness of adolescents in secondary schools in Gboko Local Government Area.

Methodology: The study employed the Quasi-experimental research design. The population of the study comprised of Twenty-four thousand, six hundred and thirty-four- (24,634) Secondary School adolescents' students in private and public secondary schools in the 2020/2021 academic session in Gboko Local Government Area. 200 participants (students) were sampled for the study using the multistage sampling technique. The University of Pretoria's HRF index protocol was used for data collection in the study. The HRF index was used to calculate the health related components of physical fitness of the adolescents. Inferential statistics of t-test was used to analyse the differences in health related components of physical fitness between the Control Group and the study Group at 0.05 level of significance.

Results: Results of the study revealed that: Recreational physical activities have a significant effect on body composition; cardiovascular fitness; muscular strength; muscular endurance and flexibility of adolescents in secondary schools in Gboko Local Government Area.

Recommendations: Based on the findings, it was recommended that adolescents should further improve on their intensity of participation in recreational activities both at home and school in order to maximise total physical fitness.

Keywords: Adolescents, Health related components, Physical fitness, and Recreational physical activity

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PUBLIC INTEREST STATEMENT

The finding of this study is expected to be of significance to the adolescents, parents and researchers. To the adolescents, the findings of the study might help them to understand the benefits of recreational physical activities and make the best of it for improved physical fitness and general wellbeing. To the parents, the study could enable them to understand the need and importance of recreational physical activity. The results of the study will stimulate parents' positive attitudes towards their children's participation in recreational physical activities. To researchers, this study is expected to engender further discussion and probably provide some answers regarding the effect of recreational physical activities on physical fitness. The study might also help to fill that existing gap of knowledge in academia and research in the field of recreational physical activity.

INTRODUCTION

Recreation is an activity of body and mind which gives relief from tension and fatigue (Gulam, 2016). Recreational activities are activities carried out or actively participated in alone or with others, for fun during leisure time. This include experiences that require physical activity and interactions and playing with other people (Spracklen, 2015). Taylor and Torkildsen (2011) corroborated that recreation activities are an important tool for improving the social values of individuals and it is stated that these activities have positive influences on the mental and physical health of individuals. The needs for having recreation are gathered under by attaining new experiences, awareness, identity, responsibility and social interaction, mental effectiveness, creativity, providing service, physical fitness, and vitality (Torkildsen, 2015; Taylor & Torkildsen, 2011).

Participation in recreational physical activities on a regular basis during childhood and adolescent stage causes significant changes that affect individuals in adulthood. It is important to note that improvements in physical fitness are frequently equated with improvements in health status of disease prevention. Recreational activities improve physical fitness (or its components) and clinical health status at the same time. The benefits of recreational activities are vital to the overall physical fitness, especially those of adolescents. These benefits are particularly applicable in childhood and adolescence because these are stages of life in which healthy habits have a positive effect on the components of physical fitness (Andersen et al., 2011; Erwin et al., 2012; Militao, et al., 2013; Trudeau & Shephard, 2018). In addition, the increase of physical activity in childhood and adolescence should be acquired to prevent diseases such as obesity, diabetes and hypertension (Tsiros et al., 2019). The health benefits of recreational activity have gained interest as an intervention tool for the components of physical fitness. Previous studies reported that participation in recreational physical activity is associated with reduced risk of all-cause mortality, cardiovascular disease, type 2 diabetes, hypertension, breast cancer, colon cancer, gestational diabetes, ischaematic heart disease and ischaematic stroke (Aceijas et al., 2017; Warburton & Bredin, 2017; Doyle et al., 2019; Fatih et al., 2020). Physical activity in general is also associated with arrange of psychological health benefits including reduced risk of depression, anxiety and stress and improved mood (Wald et al., 2014: Rebar et al., 2015).

Physical fitness is the body's ability to function efficiently and effectively. Physical fitness is a state of being that consists of at least five health-related and six skill-related physical fitness components, each of which contributes to total quality of life. Physical fitness is associated with a person's ability to work effectively, enjoy leisure time, be healthy, resist hypokinetic diseases or conditions, and meet emergency situations. It is related to, but different from, health and

wellness. The development of physical fitness is the result of active participation in physical activity and proper nutrition (Grant et al., 2014). Optimal physical fitness is defined in the health context as a state of good health or physical condition, primarily as a result of exercise and proper nutrition (Grant et al. 2014; Corbin et al., 2019). Controversy has arisen as to what the components of physical fitness are, and this led to the grouping of physical fitness into health-related fitness and skill-related physical fitness. Health-related fitness focuses mainly on the optimum health of the individual (Heyward, 2010; Grant et al., 2014). Ogu and Ayaji (2020), clarified that; health-related components of physical fitness are those components of fitness that are affected by habitual physical activity related to health status. It is defined as a state characterized by; ability to perform and sustain daily activities; demonstration of traits or capabilities that are associated with a low risk of premature development of diseases and conditions related to movement. Similarly, health-related physical fitness components are directed towards the prevention or rehabilitation of disease as well as the development of high level of functional capacity for the necessary and discretionary task of life. These are concerned with the development and maintenance of fitness component that can enhance health and well-being. Rieck and Lundin (2021) asserted that, the ultimate focus of the health related components of physical fitness is to provide a framework for components that are necessary for good health. They are cardio-respiratory (CR) endurance (also called aerobic endurance), flexibility, muscular strength, muscular endurance, and body composition. This implies that, health-related component of physical fitness is important for all individuals throughout their lifespan, thus enhancing the achievement and maintenance of those qualities necessary for an individual to function effectively and to improve his or her health through the prevention and remediation of diseases.

Body composition is the proportion of fat and fat-free mass (lean body mass) throughout the body. It is the amount of fat mass compared to lean muscle mass, bone and organs. Similarly, it is the ratio of water, bone, muscle, and fat in the body. A healthy body composition indicates that you may have less risk of developing obesity-related diseases, such as diabetes, high blood pressure, and even some cancers (Withrow & MacEwen, 2017; Pradeep, 2019). This is measured using body mass index (BMI); which is a measure of body fat based on height and weight, and the skin fold test, which measures total fat percentages by measuring the layer of fat that is directly under the skin, underwater weighing, and bioelectrical impedance. Physical activity can produce significant a change in body composition and lean mass (LM), and is an important factor in the control of excess weight in children and adolescents (Jorgić, et al., 2011; Meenapriya, et al., 2018; Mukesh, 2020).

Cardiovascular fitness refers to the physical work capacity of an individual, in the form of amount of oxygen capacity per kilogram of body weight over time (mL/kg/min) (American College of Sports Medicine (ACSM, 2013). Cardiovascular or cardio pulmonary fitness is the physical ability to maintain aerobic exercise for a prolonged period of time. It is important because the more cardio-respiratory fit one is, the healthier the lungs, heart, and vascular system work (Mukesh, 2020). It has been established over time that regular physical activity can prevent a large number of chronic medical problems, including many types of cardiovascular disease, in all age groups (Jorgić, et al., 2011). Researchers have revealed that performing at least 150 minutes' balanced physical exercise or at least one hour's dynamic physical activity per week can reduce the risk of coronary heart disease by about 30% (WHO, 2017). In order to obtain these positive health benefits at least 60 minutes of regular physical activity are required per day (WHO, 2017). Regular physical activity in

young people reduces the risk of childhood and adolescent obesity and decreases the risk of costly and fatal chronic diseases related to obesity (Carson et al., 2013; Erfle & Gamble, 2015).

Flexibility is the ability of a joint or series of joints to move through an unrestricted, pain free range of motion (Institute of Medicine (IOM, 2012). Although flexibility varies widely from person to person, minimum ranges are necessary for maintaining joint and total body health. Joint structure, age and gender, connective tissues, muscle bulk and proprioceptors affect the loss of normal joint flexibility including injury, inactivity or a lack of stretching (University of California Davis Health, 2021). Recreational sports activities improve flexibility by relaxing the muscles and keeping the joints healthy by ensuring that the body bends and stretches. Studies by Sady et al.,(2012) and Bandy et al.,(2018) revealed that flexibility increased with different efficiency after static, dynamic or proprioceptive neuromuscular facilitation (PNF) stretching techniques. Physical activities that improve flexibility are; hip circles, leg swings, forward lunges, side lunges, cross-over, standing quad stretch, seat straddle lotus, seat side straddle, seat stretch and knees to chest (Andy, 2014).

Muscular endurance is the ability of a muscle or group of muscles to sustain repeated contractions against a resistance for an extended period of time. It is one of the components of muscular fitness, along with muscular strength and power (Suchomel, et al., 2018). In strength training, muscular endurance refers to the number of repetitions of a single exercise one can do without needing to stop and rest. Examples include how many times you can do a full squat, a sit-up, or a bicep curl with a light-to-moderate weight before breaking form (Pimlot, 2010). The sit up test, squat test, and push up test are most often used to test muscular endurance. Participation in physical activities increases muscular endurance (Shaver et al., 2010; Holloszy & Coyle, 2021).

Muscular strength refers to the amount of force a muscle can produce and is usually measured by the maximum amount of force a muscle can produce in a single effort (maximal effort) (American College of Sports Medicine, 2018). Muscular strength is an important part of overall wellness and can improve health, in addition to boosting confidence. Strength training makes the muscles work harder than they usually do. It usually requires some form of resistance for the muscles to work against, from free weights, resistance machines, or resistance bands. Exercise, especially anaerobic exercises cause muscles to get bigger and stronger (Suchomel, et al., 2018).

STATEMENT OF THE PROBLEM

The nature of children's, recreational pursuits has changed dramatically over the last few decades with the advent of technology and industrialisation. The progresses in the physical sciences and technology have adversely affected the play life of a typical child. Recent technological development has reduced the physical demand of day-to-day activities resulting in low physical activity level reflected by low fitness. The importance of recreational physical activity for the physical, mental and social health of youth is undisputed, and therefore it is critically important that efforts are made throughout the world to "reintroduce" physical activity into our youth.

All-round fitness is a key to quality of life, to be able to carry out daily tasks without undue fatigue or to enjoy leisure-time pursuits requires a certain degree of conditioning exercise on health related physical fitness components so that a person looks better, feels better and thinks better and so lives better. The development of such health related component of fitness is dependent on how secondary school adolescents engaged in regular recreational activities. However, many adolescents either are not physically fit or

do not attempt to develop it by participating in recreational physical activities. Given the importance of physical fitness to adolescents, the researcher deems it fit to investigate the effect that recreational activities have on the health related components of physical fitness among adolescents in Gboko Local Government Area of Benue State.

PURPOSE OF THE STUDY

Specifically, the study intends to find out the:

1. effect of recreational activities on body composition of adolescents in secondary schools in Gboko Local Government Area.
2. effect of recreational activities on cardiovascular fitness of adolescents in secondary schools in Gboko Local Government Area.
3. effect of recreational activities on flexibility of adolescents in secondary schools in Gboko Local Government Area.
4. effect of recreational activities on muscular endurance of adolescents in secondary schools in Gboko Local Government Area.
5. effect of recreational activities on muscular strength of adolescents in secondary schools in Gboko Local Government Area.

HYPOTHESES

1. Recreational activities will not have any significant effect on body composition of adolescents in secondary schools in Gboko Local Government Area.
2. Recreational activities will not have any significant effect on cardiovascular fitness of adolescents in secondary schools in Gboko Local Government Area.
3. Recreational activities will not have any significant effect on flexibility of adolescents in secondary schools in Gboko Local Government Area.
4. Recreational activities will not have any significant effect on muscular endurance of adolescents in secondary schools in Gboko Local Government Area.
5. Recreational activities will not have any significant effect on muscular strength of adolescents in secondary schools in Gboko Local Government Area.

METHODOLOGY

Research Design

This study employed Quasi-experimental research design. Quasi-experiment is a prospective or retrospective study in which patients or clusters of patients self-select into (or their providers select on their behalf) one of several different treatment groups for the purpose of comparing the real-world effectiveness and safety of those non-randomized treatments (Maciejewski, 2018; Thomas, 2021), The quasi-experimental research design mirrors the 2-arm structure of many randomized controlled trials (RCTs) by enabling between-person comparisons of treatment and comparator groups and within-person changes of the same patients over time and has a potential greater generalizability of results, due to the ability to examine outcomes in patients who might not otherwise participate in a randomized trial (Maciejewski, 2018; Choueiry, et al., 2019). Thus, the design was considered appropriate for this study as it attempts to find out the effects of recreational activities on health related components of physical fitness.

Population and Sample

The population of the study consisted of 97 secondary schools (private and public) in Gboko Local Government Area with a total of 24,634 students (TSB, 2021). A total of 200 participants were sampled for the study using the multistage sampling technique. All the participants were secondary school adolescents' students in Gboko Local Government Area of Benue State.

Stage 1: In the initial stage, the study area was stratified based on the number of council wards in the local government area. This gave a total of 8 clusters

representing the 16 strata of the council wards in the local government.

Stage 2: In the second stage, one (1) school was selected from each council ward using purposive sampling. The school selected had a high population and an active Physical Education teacher or games master. This gave a total of 16 schools.

Stage 3: In stage three, simple random sampling technique was used to select two classes from each school.

Stage 4: In stage four, purposive sampling was used to select participants from each class based on their age (10 – 19 yrs).

Stage 5: In the fifth stage, the participants were grouped into two groups: Study Group (SG) and Control Group (CG) using random assignment.

Inclusion Criteria: The study included healthy students aged 9 to18 years of both sexes from selected schools with no known medical conditions and contraindications to exercise.

Instruments for Data Collection

The University of Pretoria's HRF index protocol was used for data collection in the study. The HRF index was used to calculate the Health related components of physical fitness of the adolescents. The HRF index protocol consists of 10 tests but 5 tests adopted for this study: Body Composition (Body mass index (BMI), Cardiorespiratory Fitness (Twelve-minute walk/run test to calculate a predicted maximal oxygen consumption test (VO2max/VO2peak), Muscular Endurance (One-minute push-ups), Muscular Strength (One-minute bent-knee sit-ups), Flexibility (Sit and reach test).

BMI was calculated using the following formula: body weight (kg)/height squared (m2) = BMI (kg/m2). The waist-to-hip ratio was expressed as the waist measurement (mm) divided by largest hip circumference (mm). VO2max (ml/kg/minute) was calculated using the Cooper 12-minute walk/run test.

Procedure for Data Collection

The HRF index was used to collect the pre-exercise values of the health related components of physical fitness. Using the 12-minute walk/run test, participants had to walk or run continuously for 12 minutes. The aim was to cover as much distance as possible. For the one-minute push-ups and one-minute bent-knee sit-ups, participants had to accomplish as many sit-ups or push-ups as possible in a one-minute period. For the leg-bend test, participants had to stand on one leg and bend that leg until they could not see a line right in front of that foot. They then determined the average amount of leg bends that they could do in 30 seconds using both legs. The sit and reach test determined how far they could stretch with their hand while sitting flat on the floor, legs extended in front of them and reaching towards their feet. With the shoulder flexibility test, participants had to stand straight, place one arm behind the other, with fingers pointing down between the shoulder blades and the palm lying flat against the back. They then brought the other hand up behind the back, palm outward as far as it would go, without undue stain. With the stork stand test, participants had to remove their shoes and stand up straight with their hands on their hips. They then placed the left foot against the inside knee of the right leg. Then, raising the heel of the right leg, they stood on the ball of the foot only for as long as possible.

Students in the CG then performed the usual school activities. The Study group had 4 physical education classes weekly, lasting 60 minutes each, totalling 24 classes within six weeks. The students in the SG underwent programmed physical activity consisting of three parts: aerobic activity (exercises for flexibility, muscular strength, jumping rope, walking, alternating running, continuous jumping, recreational games), lasting 30 minutes; sports games (volleyball, soccer, handball), lasting 20 minutes; and stretching, lasting 10 minutes. At the end of the six weeks, the

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HRF index was used again to collect the post-exercise values of both groups.

Method of Data Analysis

At the end of data collection and consequent upon the nature of the data expected, the researcher used t-test to analyse the differences in health related components of physical fitness between the Control Group and the study Group. The Statistical Package for Social sciences (IBM SPSS v. 21.00.00) will be used for coding, data cleaning and analysis. This will be done in order to eliminate any human errors imminent in a manual analysis.

RESULTS

Hypothesis 1: Recreational activities will not have any significant effect on body composition of adolescents in secondary schools in Gboko Local Government Area.

Table 1: *t*-test Comparison of Mean Rating of Effect of Recreational Activities on Body Composition

Source of variation	N	Mean	SD	Df	MD	t-cal	*p-value*	Decision
Before intervention								
Study Group	100	29.34	2.89	198	.19	-.64	.52	Not
Control Group	100	29.53	3.05					Significant
After intervention								
Study Group	100	29.34	2.89	198	11.07	-.17.15	.00	Significant
Control Group	100	40.40	8.65					

Results in table 2 above presents the summary of t-test comparison of mean rating on the effect of recreational activities on body composition. Body composition scores of the study group were compared before physical exercise intervention and after intervention. Results of the study revealed that on average before physical exercise intervention, the study group (M = 29.34, SD = 2.89) did not differ from the control group (M = 29.53, SD = 3.05). This difference (MD = 0.19, 95%CI [-0.78 – 0.39) was not statistically significant (t (198) =-0.64, p>0.05). However, after the physical exercise intervention, results revealed that on average, the study group (M = 29.34, SD = 2.89) differed from the control group (M = 40.40, SD = 8.65). The difference (MD = -17.15, 95%CI [-12.33 – -9.79]) was statistically significant (t (198) =-11.07, p<0.05). These results suggest that recreational activities really do have an effect on body composition. This implies that the null hypothesis which states that recreational activities will not have any significant effect on body composition of adolescents in secondary schools in Gboko Local Government Area has been rejected.

Hypothesis 2: Recreational activities will not have any significant effect on cardiovascular fitness of adolescents in secondary schools in Gboko Local Government Area.

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Table 2: *t*-test Comparison of Mean Rating of Effect of Recreational Activities on Cardiovascular Fitness

Source of variation	N	Mean	SD	Df	MD	t-cal	*p-value*	Decision
Before intervention								
Study Group	100	6.41	1.62	198	-.28	-1.74	.08	Not
Control Group	100	6.68	1.54					Significant
After intervention								
Study Group	100	6.41	1.62	198	-10.15	-35.96	.00	Significant
Control Group	100	16.56	3.65					

Results in table 3 above presents the summary of t-test comparison of mean rating on the effect of recreational activities on cardiovascular fitness. Cardiovascular fitness scores of the study group were compared before physical exercise intervention and after intervention. Results of the study revealed that on average before physical exercise intervention, the study group (M = 6.41, SD = 1.62) did not differ from the control group (M = 6.68, SD = 1.54). This difference (MD = -0.28, 95%CI [-0.59 – 0.04) was not statistically significant (t (198) = -1.74, p>0.05). However, after the physical exercise intervention, results revealed that on average, the study group (M = 6.41, SD = 1.62) differed from the control group (M = 16.56, SD = 3.65). The difference (MD = -10.15, 95%CI[-10.71 – -9.59]) was statistically significant (t(198)=-35.96, p<0.05). These results suggest that recreational activities really do have an effect on cardiovascular fitness. This implies that the null hypothesis which states that recreational activities will not have any significant effect on cardiovascular fitness of adolescents in secondary schools in Gboko Local Government Area has been rejected.

Hypothesis 3: Recreational activities will not have any significant effect on muscular strength of adolescents in secondary schools in Gboko Local Government Area

Table 3: *t*-test Comparison of Mean Rating of Effect of Recreational Activities on Muscular Strength

Source of variation	N	Mean	SD	df	MD	t-cal	*p-value*	Decision
Before intervention								
Study Group	100	17.13	4.56	198	-.65	-1.43	.16	Not
Control Group	100	17.77	4.49					Significant
After intervention								
Study Group	100	17.13	4.56	198	-11.19	-18.26	.00	Significant
Control Group	100	28.32	7.37					

Results in table 4 above presents the summary of t-test comparison of mean rating on the effect of recreational activities on muscular strength. Muscular strength scores of the study group were compared before physical exercise intervention and after intervention. Results of the study revealed that on average before physical exercise intervention, the study group (M = 17.13, SD = 4.56) did not differ from the control group (M = 17.77, SD = 4.49). This difference (MD = -0.65, 95%CI[-1.54 – 0.25) was not statistically significant (t(198)= -1.43, p>0.05). However, after the physical exercise intervention, results revealed that on average, the study group (M = 17.13, SD

= 4.56) differed from the control group (M = 28.32, SD = 7.37). The difference (MD = -11.19, 95%CI[-12.40 – -9.99]) was statistically significant (t(198)= -18.26, p<0.05). These results suggest that recreational activities really do have an effect on muscular strength. This implies that the null hypothesis which states that recreational activities will not have any significant effect on muscular strength of adolescents in secondary schools in Gboko Local Government Area has been rejected.

Hypothesis 4: Recreational activities will not have any significant effect on muscular endurance of adolescents in secondary schools in Gboko Local Government Area

Table 4: *t*-test Comparison of Mean Rating of Effect of Recreational Activities on Muscular Endurance

Source of variation	N	Mean	SD	df	MD	t-cal	*p-value*	Decision
Before intervention								
Study Group	100	17.36	3.29	198	.20	.59	.56	Not
Control Group	100	17.17	3.32					Significant
After intervention								
Study Group	100	17.36	3.29	198	-12.11	-21.17	.00	Significant
Control Group	100	29.47	7.39					

Results in table 5 above presents the summary of t-test comparison of mean rating on the effect of recreational activities on muscular endurance. Muscular endurance scores of the study group were compared before physical exercise intervention and after intervention. Results of the study revealed that on average before physical exercise intervention, the study group (M = 17.36, SD = 3.29) did not differ from the control group (M = 17.17, SD = 3.32). This difference (MD = 0.20, 95%CI[-0.46 – 0.85) was not statistically significant (t(198)= -0.59, p>0.05). However, after the physical exercise intervention, results revealed that on average, the study group (M = 17.36, SD = 3.29) differed from the control group (M = 29.47, SD = 7.39). The difference (MD = -12.11, 95%CI[-13.24 – -10.99]) was statistically significant (t(198)= -21.17, p<0.05). These results suggest that recreational activities really do have an effect on muscular endurance. This implies that the null hypothesis which states that recreational activities will not have any significant effect on muscular endurance of adolescents in secondary schools in Gboko Local Government Area has been rejected.

Hypothesis 5: Recreational activities will not have any significant effect on flexibility of adolescents in secondary schools in Gboko Local Government Area.

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Table 5: *t*-test Comparison of Mean Rating of Effect of Recreational Activities on Flexibility

Source of variation	N	Mean	SD	df	MD	t-cal	*p-value*	Decision
Before intervention								
Study Group	100	17.44	3.46	198	.46	1.29	.19	Not
Control Group	100	16.98	3.68					Significant
After intervention								
Study Group	100	17.44	4.46	198	-12.90	-21.17	.00	Significant
Control Group	100	30.34	7.90					

Results in table 6 above presents the summary of t-test comparison of mean rating on the effect of recreational activities on flexibility. Flexibility scores of the study group were compared before physical exercise intervention and after intervention. Results of the study revealed that on average before physical exercise intervention, the study group (M = 17.44, SD = 3.46) did not differ from the control group (M = 16.98, SD = 3.68). This difference (MD = 0.19, 95%CI[-0.24 – 1.16) was not statistically significant (t(198)= -1.29, p>0.05). However, after the physical exercise intervention, results revealed that on average, the study group (M = 17.44, SD = 3.46) differed from the control group (M = 30.34, SD = 7.90). The difference (MD = -12.90, 95%CI[-14.10 – -11.71]) was statistically significant (t(198)= -21.17, p<0.05). These results suggest that recreational activities really do have an effect on flexibility. This implies that the null hypothesis which states that recreational activities will not have any significant effect on flexibility of adolescents in secondary schools in Gboko Local Government Area has been rejected.

DISCUSSION

The first objective of the study was to investigate the effect of recreational activities on body composition of adolescents in secondary schools in Gboko Local Government Area. The findings revealed that recreational physical activities have a significant effect on body composition of adolescents in secondary schools in Gboko Local Government Area [(MD= -17.15, 95%CI [-12.33 – -9.79]), (t (398) = -11.07, p<0.05)]. The study revealed that physical activity can produce significant changes in Body Mass Index (BMI), and is an important factor in the control of excess weight in adolescents. Recreational physical activity at high frequency, duration, and intensity control and promote greater energy expenditure and used body fat as the main substrate, resulting in a significant reduction of fat mass. This study showed that the increased physical activity (PA) in the intervention conditions improved muscle mass of the participants which has a significant positive effect on BMI, waist circumference, and fat free mass, and overall body composition. This finding is in congruence with that of Mak et al., (2010) who designed a study to investigate the relation between health-related physical fitness and weight status in Hong Kong adolescents. The study found that BMI was only correlated with sit up and sit-and-reach tests. Decreasing performance (p for trend < 0.05) was observed from normal weight to overweight and obese. This signifies the effect of recreational physical activity on body composition measures. Lia et al., (2011) also conducted a study to evaluate concomitant changes in motor coordination and health-related physical fitness of Taiwanese children with and without DCD over a three-year period. The study found that the TD group showed significant long-term changes in BMI and long jump while the DCD group showed significant increases in BMI values. Conversely, Yadav (2012) carried out a study to compare the health related physical fitness among boys studying in different school of Mathura. His study

found no significant differences in body composition and physical exercise.

The second objective of the study was to investigate the effect of recreational physical activities on cardiovascular fitness of adolescents in secondary schools in Gboko Local Government Area. The findings revealed that recreational physical activities have a significant effect on cardiovascular fitness of adolescents in secondary schools in Gboko Local Government Area [(MD = -10.15, 95%CI [-10.71 – -9.59]), (t(398)=-35.96, p<0.05)]. The findings revealed that recreational physical activities result in an increase in the efficiency of oxygen transport within the body. By lowering the resting heart rate (HR), and the HR at sub maximal loads, the heart pumps more blood with every heartbeat. This increases the VO2Max capability. This finding is in agreement with that of Nwimo (2008) who assessed the health-related physical fitness of 64 10-year and 64 11-year old randomly selected primary school boys in Okwuato, Aboh Mbaise of Imo State, Nigeria. The study found that the exercise group had a better cardiorespiratory endurance index (M = 7.98) as measured from the 1.6km run-walk than the non-exercise group (M = 6.75). Mak et al., (2010) also designed a study to investigate the relation between health-related physical fitness and weight status in Hong Kong adolescents. The study observed a decreasing oxygen tolerance (p for trend < 0.05) between physically active adolescents and non-physically active obese adolescents for a 9-minute run. This is an indication that physical activity has a significant role to play in the cardiovascular fitness of adolescents.

The third objective of the study was to investigate the effect of recreational physical activities on muscular strength of adolescents in secondary schools in Gboko Local Government Area. The findings revealed that recreational activities have a significant effect on muscular strength of adolescents in secondary schools in Gboko Local Government Area [(MD = -0.65, 95%CI[-1.54 – 0.25), (t(398)= -1.43, p>0.05)]. The study revealed significant post-test improvements in One-minute push-ups carried out by the participants. Participation in recreational physical activities, such as concurrent strength–resistance and/or strength–power exercises improves the muscle performance capacity of adolescents in muscle strength tests. This finding is in line with that of Nwimo (2008) who assessed the health-related physical fitness of 64 10-year and 64 11-year old randomly selected primary school boys in Okwuato, Aboh Mbaise of Imo State, Nigeria. Results of the study showed muscular strength, of the exercise group differed from those of non-exercising group and the differences were significant (p < .05).

The fourth objective of the study was to investigate the effect of recreational physical activities on muscular endurance of adolescents in secondary schools in Gboko Local Government Area. The finding of the study revealed that recreational activities have a significant effect on muscular endurance of adolescents in secondary schools in Gboko Local Government Area [(MD = -12.11, 95%CI [-13.24 – -10.99]), (t (398) = -21.17, p<0.05)]. The study found that recreational activities in form of One-minute, bent-knee sit-ups promote increase in muscle strength. The study also observed a significant difference in the muscular endurance of the exercise group and the non-exercise group. This finding agrees with that of Zhua et al., (2011) who investigated the associations between obesity and motor coordination ability in Taiwanese children with and without developmental coordination disorder (DCD). Their study found total scores on muscular endurance subtest were significantly higher in the study group when compared against the control group.

The last objective of the study was to investigate the effect of recreational physical activities on flexibility of adolescents in secondary schools in Gboko Local Government Area. The finding of the study revealed that

recreational activities have a significant effect on flexibility of adolescents in secondary schools in Gboko Local Government Area [(MD = -12.11, 95%CI[-13.24 – -10.99]), (t(398)= -21.17, p<0.05)]. The study found improvements flexibility after the application of the in sit and reach physical activity program. This indicates the occurrence of maximum movement in the joints on the expense of the group of muscles working on these joints. This finding is in line with that of Reyes et al., (2003) who compared the physical fitness of school children resident in an urban Colonia and in a rural indigenous community in Oaxaca, southern Mexico. They observed differences in flexibility (sit and reach) in the study group and the control group. Nwimo (2008) also assessed the health-related physical fitness of 64 10-year and 64 11-year old randomly selected primary school boys in Okwuato, Aboh Mbaise of Imo State, Nigeria. Results showed muscular strength, muscular endurance and flexibility of the study group differed from those of the control group and the differences were significant ($p < .05$).

CONCLUSION

This study investigated the effect of recreational physical activities on health related components of physical fitness of adolescents in secondary schools in Gboko Local Government Area of Benue State. The study established that participation in regular recreational physical activity has important health implications for children, adolescents and adults; it is one domain of health and wellness over which each individual has a great degree of control. The results suggest that recreational physical activity improves all the health related components of physical fitness in adolescents. Improvements in recreational physical activity therefore are equated with improvements in health status.

RECOMMENDATIONS

1. Human performance laboratories should be provided and where available should be made functional by school administrators and/or government which will enable secondary school adolescents to train outside the compulsory training sessions in schools to maintain an ideal health-related components of physical fitness (Body composition, cardiorespitory fitness, flexibility, muscular strength and muscular endurance).
2. The training programme of the secondary school adolescents should be designed in line with the provisions of the regulatory bodies of three times of physical activity per week accumulating not less than 60 minutes of aerobic physical activity programme to improve the cardiorespiratory fitness of the students.
3. Since conditioning and aerobic physical activities were found to have positive gain on the development of muscular strength, school curriculum planners should include conditioning activities in the school teaching/learning programmes. This could also go a long way in improving the general health of adolescents.
4. Recreational activities make adolescents more flexible. Adolescents should strive to improve their flexibility through these exercises in order to be more agile and active in carrying out their daily activities.

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