Structured Exercise Programmes In Promoting Healthy Body Composition In Youths With Intellectual Disabilities

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Abstract

Background: This study was designed to investigate the extent to which structured exercise programmes affect body composition components in persons with intellectual disabilities who are a subgroup of socially vulnerable persons. **Materials and Methods:** The study was built around some components and derivatives of body composition which are muscle mass, percentage body fat, body weight, and body mass index. The pretest-posttest randomized control group design was employed in the study. It was conducted using 18 persons with mild to moderate intellectual disabilities purposively drawn from a home for the disabled in Benin City. Their ages were between 14 and 19 years. The participants were randomly assigned to either experimental or control group with 9 persons randomly assigned to each of these groups. The experimental group was subjected to a 25 to 30-minute structured exercise programme three times a week for ten weeks. Tested variables were measured using the Omron BF511 body composition monitor. Data generated from the study were analyzed with mean, standard deviation and independent samples t-test using the Statistical Package for Social Science (SPSS) application (version 20). **Results:** Results showed three out of the four tested variables to be statistically significant (body weight: $p<0.05$; body mass index: $p<0.05$; percentage body fat: $p<0.05$), with only one (muscle mass: $p>0.05$) to be statistically insignificant. **Conclusion:**It was recommended from the findings from this study that structured exercise programme should be a regular part of the activities of persons with intellectual disabilities in order to address their social vulnerability

Key words: Body composition, structured exercise programmes, intellectual disabilities

Introduction

The incidence and attendant consequence of excess body fat is gradually increasing in contemporary societies. This may be attributable to increase and improvement in technology which, in turn, increases sedentary lifestyle; and heightened preference for "fast foods" and snacks. In recent times, cases of poor body composition and the negative effects of such condition are more noticeable across a larger percentage of the population in any given society. This trend is common among people of all caste, and cuts across ages, gender and classes. While persons with apparently healthy functionality have been found to have poor body composition, the incidence is even more common among some specific group of socially vulnerable persons such as persons with intellectual disabilities (ID).

Persons with ID are among the group of persons regarded as socially vulnerable persons as a result of the limitations imposed by their

disability on their health condition which reduces their functionality and coping skills, and puts them at disadvantage in the society. Studies have shown that persons with ID are prone to develop poor body composition as compared to their apparently healthy counterparts (1,2). Though persons with intellectual disability are naturally prone to develop poor body composition, the situation becomes worse when such persons are kept in a home for disabled persons. This has the tendency to further reduce their level of physical activity that has already been compromised by the poor physical and physiological condition imposed by disability. This situation has been demonstrated in some studies (3,4) where it was shown that persons with intellectual disability who reside in homes for the disabled are at higher risk of developing conditions relating to excess body fat such as cardiovascular diseases and pulmonary diseases. Reports from these various studies have evidently revealed that confinement to a home for persons with intellectual disabilities further compounds their already deteriorated functionality through reduction in physical activity. This has the effect of negatively affecting the body composition of the affected persons and thus hampers their ability to develop sports-based practices.

Academic interests in the adaptive capabilities of persons with intellectual disability have, in recent times, increased. The reason for this is largely connected with the ever-increasing campaign for the demonstration of inclusive disposition towards all persons with any form of disability under all circumstances. This academic interest has given birth to the development and introduction of methods and materials for addressing the various nature of disabilities among special persons as against their apparently healthy counterparts. Such methods and materials include devices and procedures specially tailored for the assessment of special persons, and specially designed exercise programmes that can fit into the specific physical and physiological competencies of persons with disabilities. These methods and materials are expected to help address the myriad of secondary health challenges that may result from the disabilities of affected persons while attempting to improve the level of functionality of such persons. Though research effort in the adaptive capabilities of persons with intellectual disability is still scanty, few studies (5-8), have shown that persons with intellectual disability also respond to exercise training programmes in the same way as apparently healthy persons. Some of these studies have shown a positive link between exercise programmes and some components and derivatives of body composition like muscle mass, percentage body fat, body weight, and body mass index among persons with physical disabilities and intellectual disabilities. However, in spite of these promising trends regarding the effects of exercise on the physical fitness status of persons with disabilities, most of these affected persons still do not get the opportunity or the encouragement to engage in exercise programme, a situation that might lead to the onset of body composition problems.

Socially vulnerable persons in general and persons with intellectual disability in particular suffer conditions that put them at a disadvantage in comparison to their apparently healthy counterparts. These conditions could be physical, physiological, psychological, social, or economic. It could be a combination of various conditions as well. For persons with intellectual disability, their subnormal cognitive development has some attendant negative effects on their physical development which renders them, in most cases, intellectually and physically disabled. This condition tends to hamper their participation in physical activities thus leading to incidence of poor body composition; a case that can affect the development of sports-based skills and their health. The condition may become worse when the affected persons are confined to homes where little or no provision is made for exercise training programmes. This is true of many homes for the disabled. A look at these homes reveals that efforts at caring for persons with disabilities only revolves around the provision of the barest means of livelihood with no provision for physical fitness programmes. This can result in physical inactivity and increased

body fat thus reducing the health status of affected persons and their ability to develop sports-based practices. Report from previous studies have called for the need for more studies to focus on the impact of physical exercise on the body composition of persons with intellectual disabilities population, and those that aim at identifying the impact of alternative interventions (9,10). While studies on the effects of exercise programmes on the body composition of persons with intellectual disabilities are scanty in foreign literature, such studies, to the best of the researchers' knowledge, are non-existent in Nigerian literature. It is against this backdrop that this study sets to investigate the effects of structured exercise training programme on healthy body composition parameters which include the muscle mass, percentage body fat, body weight and body mass index, of persons with intellectual disability with a view to bridging the gap in both knowledge and research efforts in improving health and functionality of persons with intellectual disabilities and resultantly develop sports-based practices.

Methods and materials

Participants

The sample for the study was made up of 18 participants with mild to moderate intellectual disabilities. The participants were purposively selected from a population of 27 persons who suffer different degrees of intellectual disabilities in a home for disabled persons in Benin City.

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria for determining severity of disability as contained in the fifth edition, was used to select the participants and those who were found to demonstrate intellectual disability traits that are consistent with mild to moderate intellectual disabilities were selected for the study. The 18 participants were selected using predetermined inclusion and exclusion criteria. Inclusion criteria were expression of consent to partake in the study, availability for the study, non-involvement in any regular sports or fitness programme within the last four weeks; and demonstration of sign of ill health other than their present level of intellectual disability. Exclusion criteria for the study included a demonstration of noticeable signs of somatic diseases, general illness or any illness that placed the participant on drug therapy as at the time of the study, and an affirmative response to any of the items in the Physical Activity Readiness Questionnaire (PAR-Q).

The age range of participants for the study was 14 to 19 years in general. The participants were randomly assigned to either the experimental or the control group with 9 persons randomly assigned to each of these groups. The ages of participants in the experimental group ranged from 15 years to 19 years with a mean age of 16.6, while the age range of participants in the control group was 14 years to 19 years with a mean age of 16.7.

Procedure

This study involves pretest posttest randomized group design. The experimental group was subjected to a 25 to 30-minute structured exercise programme three times a week for ten weeks while the control group was not subjected to any exercise training. The variables tested included muscle mass and percentage body fat while body weight and body mass index readings were also taken. The intervention programme used in the study included exercises such as jogging on the spot, shuttle run, lunges, sit-ups, modified push-ups, planks, jump squats, side stepping, box jumps, jumping jack, banana jump, windmill, bridge, sit and reach, ladder drills, dance session, and ball toss/catch. The exercise programme was implemented at a frequency of three days per week (Tuesdays, Thursdays, and Saturdays) and an intensity level of mild, through moderate, to vigorous, with due consideration of the conditions of the participants. The duration of the programme was 20 minutes for week 1 to week 3, 25 minutes from week 4 to week 6, and 30 minutes from week 7 to week 10. Exercise intensity was determined by gradually increasing number of repetitions within a set per unit of time. Each exercise session was preceded by five minutes

warm up session and followed by five minutes cool down session.

Research instruments

Variables in the study were measured using the Omron BF511 body composition monitor manufactured by Omron Health Care, Kyoto, Japan. This device is designed to measure and display skeletal muscle mass, body fat percentage, body weight, and body mass index (BMI). All tests were conducted early in the morning before participants had any food or drink and before the rise of the sun as a result of the researchers' understanding of the sensitivity of the device used for the research to minute changes in physiological and environmental variables. This was done to minimize influences of food and drink and temperature on body fluid which are known to greatly influence the result from bioelectrical impedance devices.

Statistical analyses and results

Data generated from the study were analyzed using mean, standard deviation, and independent samples t-test, and the results are presented in Tables 1 to 5

Results

Anthropometric profiles of participants are presented in Table 1. The table shows the experimental group has age range of 15 to 19 years with a mean age of 16.6 years. It can also be observed that the age range of participants in the control group was 14 to 19 years with a mean age of 16.7 years. The mean height, weight, and BMI of participants in the experimental group were 1.55, 59.56, and 24.79 respectively while those of control group participants' 1.59, 58.67, and 23.01 respectively.

Table 2 shows the mean and standard deviation of all the tested variables of muscle mass, percentage body fat, body weight and body mass index of young persons with intellectual disability. The table also shows that there is no significant difference in muscle mass between participants in the experimental group compared to those in the control group of persons with intellectual disability, ($t = 1.947$, $p = 0.069$). The result implies that physical fitness training programme did not elicit a significant change in body mass of participants in the experimental group compared to those in the control group. However, there is significant differences in the percentage body fat, body weight and body mass index of young persons with intellectual disability in the experimental group when compared with those in the control group in this study. The implication of this result is that structured exercise programme as implemented in this study resulted in significant changes in the percentage body fat, body weight and body mass index of young persons with intellectual disability.

Table 1: Sociodemographic and Anthropometric profiles of the participants

Variables	N	Experimental Group Mean± SD	Control group Mean ±SD
Age (years)	18	16.56	16.67
Weight (Kg)	18	59.56	58.67
Height (m)	18	1.55	1.59
BMI (Kg/m^2)	18	24.79	23.01

Table 2: Independent t-test analysis of the participants (experimental and control groups)

Variables	Mean	Std. Deviation	T	Df	Sig. (2-tailed)
Muscle mass	4.7778	.83333	1.947	16	.069
Percentage Body fat	4.7778	.83333	3.050	16	.008
Body weight	1.7778	.66667	4.707	16	.000
Body mass index	1.7778	.66667	3.578	16	.003

p=0.05

Discussion

This study aimed at determining the effects of structured exercise programme on the healthy components of persons with mild to moderate intellectual disabilities. The findings from the study has demonstrated that there is a positive link between some components and derivatives of body composition and structured exercise programmes among persons with intellectual disabilities. Findings from this study have revealed a positive significant effect of exercise training on the body weight of persons with intellectual disability. This finding is agreement with the findings of (6,8), who observed a significant reduction in body weight among intellectually disabled persons due to structured physical activities. The present study's finding has also showed a positive significant difference following exercise training programme in the body mass index of persons with intellectual disabilities, this finding is in tandem with the observations of Thompson et al (11) who observed a positive correlation between physical activities and body mass index among special population. In addition, the outcome of the present study on the positive effects of structured exercise training programme on the percentage body fat of the studied participants is buttressed by the position of Frey et al (11) whose study reports also demonstrated a positive link between exercise and percentage body fat.

However, the study did not establish a link between exercise programme and muscle mass as the difference in means between the two groups compared was not statistically significant. This finding was not in consonance with the position of English and Paddon-Jones (7) who argued that exercise programmes can increase muscle mass. The difference between the findings of this study and the results from the study conducted by English and Paddon-Jones may be attributed to the difference in the duration of the intervention programme (7).

Conclusion and Recommendations

The findings in this study have concluded that structured exercise programme has positive effects on body composition parameters of persons with intellectual disabilities. It therefore means that such exercise programme can be designed in line with the specific needs and abilities of persons with intellectual disabilities to bring about a positive change in such variables as body weight, body mass index, and percentage body fat. Based on the findings from this study, it is recommended that rehabilitation professionals should incorporate structured exercises training programmes into the regular activities or holistic care of persons with intellectual disabilities in homes and schools for the disabled.

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