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Effect of Exercise on The Body Composition of Adults in Mountain of Fire and Miracles Ministry, Ilorin

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ABSTRACT

The manifestation of chronic cardiovascular diseases is increasing every day, especially among adults. This could result from an unhealthy lifestyle and some underlying health conditions associated with increased body fat. Therefore, the study was conducted to ascertain the effect of exercise on the body composition of adults in Mountain of Fire and Miracles Ministry, Ilorin. The experimental research design of one group pretest-posttest was adopted for the study. The study population consisted of all religious leaders from Mountain of Fire and Miracles Ministries, Ilorin. Twenty (20) participants were selected for this study through the Systematic Sampling Technique. Consent of the participants was sorted, and health screening of the participants was conducted. FITT principle was followed for a duration of 8-weeks of exercise intervention. Standardized instruments (bioelectrical impedance analysis, non-elastic tape-rule, portable height-scale) were used to collect body composition parameters (% body fat, WHR, BMI). Data were analyzed using descriptive statistics of frequency counts and percentages to describe their body composition. In contrast, inferential statistics of paired t-test was used to analyze the hypotheses formulated, adopting a pvalue of 0.05 for statistical significance. The statistical package for social science (SPSS) software was used for data analysis. The findings revealed that a significant effect of exercise exists on the body mass index of adults in Mountain of Fire and Miracles Ministry, Ilorin. This study, therefore, concluded that there is a strong interaction between the body composition of adults and their physical activity level. It was recommended that there should be a frequent orientation on the need to participate in regular exercise to the general public.

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1. INTRODUCTION

Adulthood, an age characterized by increased economic demands and independence, is often accompanied by stress, decreased duration for leisure, and participation in physical activity, leading to sedentariness in many working populations and lack of sleeping hours. Sedentariness, nutritional pattern, sleeping pattern are some of the significant underlining lifestyle factors which could expose an individual adult to major life-threatening diseases such as diabetes, osteoporosis, and obesity in later life. World Health Organization (2016), classified adults into young adults (ranging from 20 to 40 years of age), middle adults (41 to 60 years of age), and late adults (61 years above). Many lifethreatening diseases become more prominent in late adulthood, even though some individuals manifest these diseases at the early stage of life. Indeed, some physical decline can be expected as a biological consequence of age, but much of what is called aging is due to years of physical inactivity (Ajisafe, 2009; Talabi, 2016). Those who remain physically active throughout life demonstrate much slower rates of physical decline than do the sedentary, and those who have been sedentary for many years can experience significant improvements through participation in physical activity.

According Recent polls have verified that most people believe regular exercise and good nutrition are beneficial to continued health and longevity (Corley et al., 2021; Stefan et al., 2017; Talabi, 2016). Those same polls have also shown that only one in five people exercise regularly. There are, of course, many reasons people do not exercise. Some of the reasons include: not having enough time, being too expensive, not having the right clothes or shoes, and so on (Akdeniz & van Veelen, 2021). Exercise, a planned and structured form of physical activity that has as its aim the attainment of physical fitness, has been used as a non-pharmacological tool to help slow down the onset of obesity, high blood pressure, diabetes, and all of the aging-induced diseases. There is a concern that exercise may provoke heart attacks in some people, particularly those unaccustomed to exercising (ACSM, 2013). However, even though exercise may be hazardous for a few people, lack of exercise is the actual danger for most. When performed regularly and over the long term, numerous studies have shown that exercise reduces the risk of coronary artery disease and heart attack by 35 percent to 55 percent (Bangalore et al., 2020). Talagala (2021), recommended at least 150 minutes of moderate-intensity physical activity per week to achieve health-related fitness. Some of the exercises an individual could engage in include; walking, calisthenics, running, team sports, and individual sports. Numerous studies show that vigorous exercise protects against hypertension or reduces cardiovascular risk (Vesa, 2020; Romero, de Sá Feitosa, 2021; ACSM, 2013). Exercise training improves cardiac performance and increases the resistance of the heart to ischemic injury (Wang et al., 2021).

Taking Exercise is sub-divided into aerobic exercise, anaerobic exercise, and flexibility exercises. Aerobic exercises are endurance exercises performed with the use of oxygen to improve cardiorespiratory endurance and health. Examples include walking, running, jogging, etc. On the other hand, Anaerobic exercise is the exercises involving short repetitions, performed without the use of oxygen, instead of making use of glycolysis and phosphor-creatine, and are mainly used for strength development. Examples include short meter dash sit-ups of short repetitions. Flexibility exercises are activities that improve the ability of a joint to maintain the movement necessary for carrying out daily tasks and physical activity, for instance, hamstring stretch. Exercises have been reported to have an impact on health. A major contributory factor determining the health of an individual is its body composition. Body composition is the percentage of body fat, fat-free mass, in the body (Bakinde, 2021). A high percentage of body fat is associated with obesity, one of the significant diseases battling

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the adult population (Nishida & Kumanyika, 2010). Non-fat mass includes bone, water, muscle, organs, and tissues. Body composition can be measured through different means such as bioelectrical impedance, skinfold measurements, waist circumference, hydrostatic weighing (Majumdar, 2009). To better evaluate body composition, it is safer to use two or more of these means of evaluation, with hydrostatic weighing having the highest bid to give the correct evaluation, even though expensive to set up.

This review uses the Body Mass Index (BMI), bioelectrical impedance (BIA), and waist to hip ratio to determine the participants' body composition. BMI, calculated as weight/height, is widely used as a relative weight index. BMI is a global index of nutritional status—used, for example, to categorize both overweight/obesity but its relation with body composition per se is controversial (Nishida & Kumanyika, 2010). BIA is relatively simple, quick, takes only a few minutes, and noninvasive, giving reliable body composition measurements with minimal intra- and inter-observer variability; the results are available immediately and reproducible with minimal intra- and inter-observer variability; the results are available immediately and reproducible with <1% error on repeated measurements (wells & fewtrell, 2006). BIA is a technique that applies an electrical current through the body to estimate muscle mass based on the current's conduction through the water since muscle has the most significant water composition of all body tissues. This technique became commercially available for the first time in the mid- 1980s and requires inexpensive, portable equipment, making it an appealing alternative to assess body composition in epidemiological studies. However, its validity is influenced by sex, age, and disease state (Dehgem & Merchant, 2008).

Waist to hip ratio (WHR) is the measurement that correlates the waist circumference to the hip circumference. Waist circumference (WC) is used as a risk assessment for metabolic syndrome, diabetes, and cardiovascular disease (CVD). WC consists of visceral fat area (VFA), subcutaneous fat area (SFA), muscle, intramuscular fat, viscera, and bone. WHO (2008) asserted that men should strive to maintain a waist circumference of 94 cm or less, and for women, the corresponding goal is 80 cm to maintain a health-fitness-related component. There are different submissions as to where to measure waist circumference appropriately. The WHO STEPS protocol for measuring waist circumference instructs that the measurement be made at the approximate midpoint between the lower margin of the last palpable rib and the top of the iliac crest (Ross, 2020). The United States (US) National Institutes of Health (NIH) protocol provided in the NIH Practical guide to obesity (NHLBI Obesity Education Initiative, 2000) that the waist circumference measurement should be made at the top of the iliac crest.

The researcher observed that the majority of the adult in the Mountain of Fire and Miracles Ministry indulged in physical inactivity that could predispose them to life-threatening diseases such as metabolic diseases, joint and skeletal problems, cardiovascular diseases, hypertension, and overweight.

Recent studies have verified that most people believe regular exercise is beneficial to continued health and longevity (Stefan et al., 2017; Talabi, 2016). These same studies have also shown that only one in five people exercise regularly. There are, of course, many reasons people do not exercise, some of which have been identified to be a lack of a well-defined exercise program. Hence, the imperative need for this study is to design an exercise intervention program and ascertain its effect on the body composition of adults in Nigeria. The objective of this study is to examine the effect of exercise on the body composition of adults in Mountain of Fire and Miracle Ministries. Two research questions are raised: What is the body composition (BMI, WHR, and BF) of adults in Mountain of Fire Ministry, Ilorin? What is the difference in the body composition (BMI, WHR, and BF) of male and female adults in

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Mountain of Fire Ministry, Ilorin? The hypothesis was tested at 0.05 level of significance; H01: There is no significant difference in the body composition of adults in Mountain of Fire Ministry, Ilorin, pre and post-exercise intervention.

2. METHODS

The experimental research design of One Group Pretest-Posttest will be adopted for this study. The one-group pretest-posttest design is a type of quasi-experiment. The outcome of interest is measured two times: once before and after exposing a non-random group of participants to a specific intervention/treatment. The weight of the participants is measured before the exercise. The population will consist of all religious leaders from Mountain of Fire and Miracle Ministries, Ilorin.

2.1 Participant

Twenty participants will be selected for this study through Systematic Sampling Technique based on the following inclusion/exclusion criteria:Their average age was 53 ±8.2 years. The majority of the participants were female, with 14 (70%), while 6 (30%) were male. Participants who failed to fill the screening form will be excluded. Participants who could not stand uprightly will be excluded from the exercise. Participants who are diagnosed with one or more underlying health conditions will be excluded from the exercise.

2.2 Instruments

The instruments to be used for data collection include among others, meter rule (to measure height of the participants), non-elastic tape rule (to measure waist and hip circumferences), body fat/ hydration monitor scale (to measure body weight and % BF) and data form. Other instruments like meter rule, body fat/ hydration monitor scale and none elastic tape rule will be calibrated and their conditions checked adequately before use. Prior to the main study, a pilot test will be conducted to assess, calibrate, and confirm other instruments' conditions like meter rule, body fat/hydration monitor scale, and none elastic tape rule. During this period, six research assistants will be appropriately trained for data collection, adequate preparations against any possible problem that might surface during data collection, and accustomed to ways of solving the problem.

2.3 Procedures

Body composition variables (BMI, WHR & BF) were measured according to the International Biological Program (IBP) guidelines through BIA. The participants were instructed to put away all personal effects by emptying their pockets, putting on light clothing, and taking off their shoes before taking the measurements in order to avert wrong readings of measurements. BMI was calculated using the formula; weight/height (m^2). BMI was rated according to WHO (2012), standard reference cut off as shown in table 1.

Tabel 1. WHO reference cut-off for BMI

Clasification	BMI Cut-off Points
Underweight	<18.50
Normal	18.50 - 24.99
Overweight	25.00 - 29.99
Obese class I	30.00 - 34.99
Obese class II	35.00 - 39.99
Obese class III	≥40.00

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Waist-to-hip ratio (WHR) was calculated in Table 1 as the ratio of waist circumference and hip circumference compared against norm reference cut-off in table two. Waist Circumference was measured to the nearest 0.1cm using non-flexible tape rule at the narrowest point between the bottom rib and the iliac crest in the mid-axillary plane. Hip Circumference was measured to the nearest 0.1cm around the most comprehensive portion of the buttocks above the gluteal fold using nonflexible tape rule. The tape was snug around the body parallel to the floor at the level at the measurement was taken for both waist and the hip. To calculate body fat; age, gender and height of the participants were configured into the Body Hydration Monitor Scale. The participants were instructed to mount it and place their feet on the aluminum sensor plates on the scale. It automatically read and calculated the variables using Bioelectric Impedance Analysis (BIA) technology. The body fat percentage of the participants was compared to the norm reference cut-off in table 2.

Table 2. WHR Reference cut-off

Healt Risk	Women	Men
Low	0.80 or lower	0.95 or lower
Moderate	0.81-0.85	0.96-1.0
High	0.86 or higher	1.0 or higher

Source: healthline.com

Table 3. Body fat Reference Cut-off

Classification	Women	Men
Low body fat risk	Under 15%	Under 5%
Ultra lean	15%-18%	5%-8%
Lean	18%-22%	8%-12%
Moderately lean	22%-30%	12%-20%
Excess fat	30%-40%	20%-30%
High body fat risk	Above 40%	Above 30%

Source: fitnescity.com

Table 4. Eight weeks exercises intervention program for the participant's exercise protocol

Week	Frequency	Intensity	Type	Time
1	2d/wk	Moderate (45-65% MHR)	i) warm-up exercise ii) workout: moderate-intensity aerobic exercise (jogging, aerobic dancing, jumping jack); flexibility exercises (active/passive stretching of arms, legs, and trunk); strength exercise modified push-ups x 3 sets, shoulder raise x 3 sets). Allexercises interspaced with rest intervals of 20 seconds iii) warm down exercise.	60 mins
2	2d/wk	Moderate (45-65% MHR)	i) warm-up exercise ii) workout: moderate-intensity aerobic exercise(jogging, aerobic dancing, lounges); flexibility exercises (active/passive stretching of arms, legs, and trunk); strength exercise (modified push-ups x 3 sets, shoulder raise x 3 sets). All exercises interspaced with rest	60 mins

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			intervals of 20 seconds iii) warm down exercise.	
3	3d/wk	Moderate (45-65% MHR)	i) warm-up exercise ii) workout: moderate-intensity aerobic exercise (jogging, aerobic dancing, lounges, hamstring curls); flexibility exercises (active/passive stretching of arms, legs, and trunk); strength exercise (tug of war x 3 sets, modified sit-ups x 3 sets). All exercises interspaced with rest intervals of 20 seconds iii) warm down exercise	60 mins
4	3d/wk	Moderate (45-65%MHR)	i) workout: moderate-intensity aerobic exercise (jogging, aerobic dancing, lounges, hamstring curls); flexibility exercises (active/passive stretching of arms, legs, and trunk); strength exercise (pushing against the wall x 3 sets, modified sit-ups x 3 sets). All exercises interspaced with rest intervals of 20 seconds warm down exercise.	60 mins
5	4d/wk	Moderate (45-65%MHR)	i) warm-up exercise ii) workout: moderate-intensity aerobic exercise (high knees, hamstring curls, aerobic dance); flexibility exercises (active stretching of arms, legs, trunk, and whole-body); strength exercise (body carrier x 3-5 sets, modified sit-ups x 3 sets). Allexercises interspaced with rest intervals of 20 seconds *warm down exercise.*	60 mins
6	*4d/wk*	*Moderate* (45-65%MHR)	i) *warm-up exercise* ii) workout: moderate-intensity aerobic exercise (jumping jack, jogging, aerobic dancing); flexibility exercises (active stretching of arms, legs, trunk and whole-body); strength exercises (body carrier x 3-5 sets, modified sit-ups x 3 sets, push-ups x 3 sets). All exercises interspaced with rest intervals of 20 seconds warm down exercise.	*60 mins*
7	*3d/wk*	*Moderate* (45-65%MHR)	i) *warm-up exercise* ii) workout: moderate-intensity aerobic exercise (jumping jack,jogging, aerobic dancing); flexibility exercises (active stretching of arms, legs, trunk, and whole-body); strength exercises (push-ups, tug of war). All exercises interspaced with rest intervals of *20*seconds	*50 mins*

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			warm down exercise.	
8	*3d/wk*	*Moderate* (45-65%MHR)	i) *warm-up exercise* ii)workout: moderate-intensity aerobic exercise (bump kicks, jumping jack, jogging, aerobic dancing); flexibility exercises (active stretching of arms, legs, trunk, and whole-body); strength exercises (sit-ups, shoulder raise, body carriers). All exercises interspaced with rest intervals of 20 seconds iii) *warm down exercise.*	50 to 60 mins

2.4 Data Analyses

The results of the administered researcher-designed questionnaire will be analyzed and interpreted using descriptive and inferential statistics. Frequency counts, percentages, mean score and standard deviation, will be used to answer research questions, while an independent t-test will be used to test for hypotheses, while hypotheses will be tested using an independent t-test. Data collected will be coded and analyzed using Product and service solutions for windows at 0.05 level of significance.

3. RESULTS AND DISCUSSION

This study divided the sample of Islamic boarding schools into three types. First, Sidogiri Islamic Boarding School became one of the pilots in Pasuruan Regency. Based on the results of the study, the characteristics of the Sidogiri Islamic Boarding School are types of Islamic boarding school with a traditional Islamic boarding school/salaf approach. The number of Sidogiri Islamic Boarding School students until June 2022 is 12,000 people, specifically male students. Meanwhile, the infrastructure of Sidogiri Islamic Boarding School consists of (i) mosques, (ii) classrooms, (iii) office space, (iv) libraries, (v) halls, (vi) student dormitories, and (vii) Islamic boarding school's business units. Funding for Islamic boarding schools is obtained from student fees, donors (community donations), and income from Islamic boarding school businesses. Sidogiri Islamic Boarding School has several business units that continue to be developed. These business units include (i) mini markets, (ii) cooperatives, (iii) bottled drinking water, and (iv) Sidogirimedia.

Second, Al Yasini Integrated Islamic Boarding School is an Islamic boarding school in Wonorejo District, Pasuruan Regency. Based on the study results, the characteristics of Al Yasini Integrated Islamic Boarding School are a type of Islamic boarding school with a combination Islamic boarding schools approach consisting of a traditional Islamic boarding schools education system and a modern Islamic boarding school. The number of students of Al-Yasini Islamic Boarding School until June 2022 is 3,050 students consisting of 1780 female students and 1270 male students spread across various formal institutions, who come from various regions from Java, Kalimantan, Sumatra, Sulawesi, Bali, and West Nusa Tenggara.

The infrastructure facilities of the Al Yasini Integrated Islamic Boarding School are complete; there are mosques, dormitories, school buildings, offices, halls, laboratories, sports fields, cooperatives, canteens, libraries, agricultural land, and Al Yasini Mart and others. The source of funding for Al-Yasini Islamic Boarding School comes from various sources, such as (i) student fees, (ii) donors, (iii) government assistance, and (iv) income from Islamic boarding school businesses. Al-Yasini Islamic Boarding School has Islamic boarding school's business units consisting of (i) Islamic boarding schools Cooperative (Kopontren), (ii) Al Yasini Savings

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and Loans Institute, (iii) Bottled Water Products (AMDK), and (iv) Snacks. Kopontren Al Yasini already has as many as ten branches across Pasuruan Regency.

Third, Al Inayah Islamic Boarding School is an Islamic boarding school in Purwosari District, Pasuruan Regency. Based on the study results, the characteristics of Al Inayah Islamic Boarding School are a type of Islamic boarding school with a combination Islamic boarding school approach consisting of a traditional Islamic boarding school education system and a modern Islamic boarding school. Al Inayah Islamic Boarding School education with a traditional or salaf approach uses the yellow book learning curriculum. Al Inayah, Islamic Boarding School's facilities, and infrastructure include mosques, male and female dormitories, school buildings, classrooms, computer rooms, student clinics, workshop and multimedia laboratories, minimarkets, and Islamic boarding school cooperatives.

Vocational School Al Inayah education focuses on the competence of business management or marketing skills, motor engineering, and multimedia. Students carry out business management or marketing practices by participating in Islamic boarding school businesses. Al Inayah Islamic Boarding School has an Islamic boarding schools' business, namely an Islamic boarding school cooperative (Kopontren). Al Inayahs Kopontren is an Islamic boarding school business entity and a means of Islamic boarding schools' independence and learning media and student work. Al Inayahs Kopontren is a learning medium for students to have soft skills after graduating from Islamic boarding schools. In addition, Al Inayah Islamic Boarding School has also received support from the government with the assistance of the East Java one pesantren one product (OPOP) program for the development of the Al Inayah Islamic Boarding School business so that it is expected to multiply. Thus, Al Inayah Islamic Boarding School has implemented an Islamic boarding school's economic empowerment program. Al Inayahs students already have skills and involvement in the Islamic boarding schools' business. The superior products of Al Inayah Islamic Boarding School engaged in consumption come from the work and innovation of students, which ultimately impacts the independence of Al Inayah Islamic Boarding School.

4. DISCUSSION

The study was conducted to determine the effect of exercise on the body composition of adults in the mountain of fire and miracle ministries, Ilorin. The participants consisted of 14 females and six maleswith an average of 53 ±8.2 years. The body composition characteristics considered for this study wereBody mass index (BMI), waist to hip ratio (WHR), and percentage body fat. The importance of physical activity is seen to be more widespread among the adult population. This is also in support of a reportby Mengesha, Roba & Ayele (2019). However, in participating in "regular exercise," many find the "regular" difficult as to the "exercise" itself.

No exercise is dangerous. Little is something (ACSM, 2016). This study shows that participating in an 8-weeks regular exercise has a significant effect in maintaining adults body composition. It muchmore helps in optimizing the body fat percentage both in male and female individual. This was according to a study conducted by Stefan, Cule, Milinovic, Juranko, & Sporis, (2017). In contrast, Radcliffe (2020) argued that there is no exact time for how long an exercise starts taking effects in thebody, for this depends on the initial fitness of the individual.

Quality of life decreases with age, diseases such as diabetes, osteoporosis, obesity is seen to be shared among the adults. The level of physical activity of an individual have a significant effect on their body composition, and thus can help slow down the

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ageing process of adults and susceptibility to these significant diseases. In every 4 adults do not meet the global recommended levels of physicalactivity (WHO, 2021). Having observed a level of sedentariness in her population, the researcher thought it wise to introduce an exercise programme in a group of selected adults to determine if a significant difference exists in their body composition variables before and after the treatment. The objective of this study was to examine the effect of exercise on the body composition (body fat, waistto hip ratio, body mass index) of adults in mountain of fire and miracles ministry, Ilorin.

The study commenced with a review of related literature through which knowledge of the concepts and interaction of variables were developed to establish the focus of the study. The researchdesign was experimental research design, the population included all adults from Mountain of Fire and Miracles Ministry, Ilorin. Systematic sampling technique was used to select 20 adults from Mountain of Fire and Miracles Ministry, comprising 14 females and six males with an average of 53 years. The researcher, with six research assistants, carried out the measurements and administered the test before and after the study after the participants' consent had been sought and the consent form duly signed. The instruments used for data collection were standardized instruments (bio- electric impedance, height scale, non-elastic tape rule) and a data form. The participants were well informed about the study, screening, and informed consent form before data were taken from them.Two research questions and one research hypothesis were tested using descriptive statistics of frequency and percentage to describe the body composition parameters. In contrast, inferential statistics of paired t-test was used to analyze the hypotheses formulated to determine the significant differences in adults' lifestyle and body composition in Mountain of Fire and Miracles Ministry, Ilorin,before and after the treatment. The statistical analyses were done at 95% confidence level or 0.05 alpha level (p-value)., the statistical package for social science (SPSS) 20.0 software was used.

5. CONCLUSION

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6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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