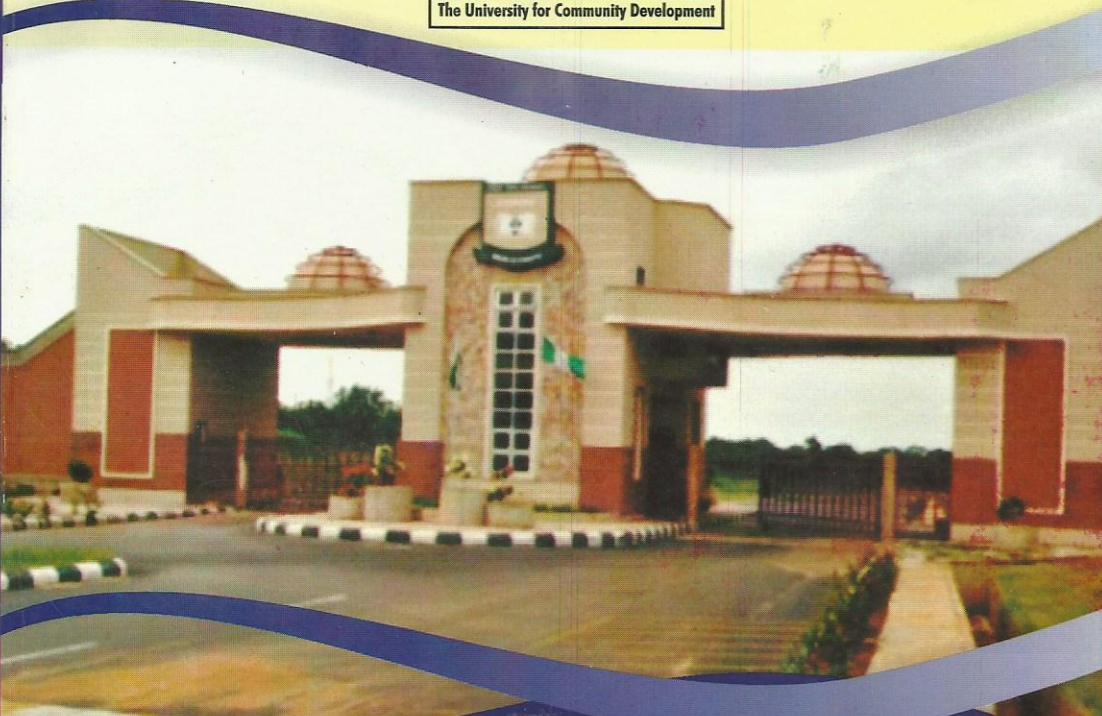


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HEALTH BENEFITS OF PHYSICAL ACTIVITY AND EXERCISE ON MUSCULOSKELETAL AGING OF THE AGED PEOPLE IN IKORODU LOCAL GOVERNMENT AREA OF LAGOS STATE

DOMINIC, O.L¹; *BABA, DARE A¹; ABOLARIN, J.A¹; AJADI M. T²
AND ONIYANGI, S. O¹

Department of Human Kinetics and Health Education, Faculty of Education,
University of Ilorin, Ilorin, Nigeria.

Department Of Physical And Health Education, Kwara State College Of Education, Ilorin

Corresponding author

E-mail: babadare2010@yahoo.com

08062346210 or 08056678085

Abstract

This study examined health benefits of physical activity and exercise on musculoskeletal aging of aged people in Ikorodu Local Government Area of Lagos State. A stratified random sampling technique was used to select one hundred (100) aged people from Ikorodu Local Government Area of Lagos State. A researchers' structured questionnaire scrutinized by experts in the fields of exercise physiology and health education was used for the study. A reliability value of 0.78 correlation coefficient was obtained with the use of test-retest method. Descriptive research survey was adopted for the study. In all, three research hypotheses were formulated and tested at 0.05 alpha level of significance. Data collected were analysed by the use of chi-square (X^2) statistical method. The result of the study showed that physical activity is beneficial to maintenance and promotion of musculoskeletal health of the aged people. Also, exercise has much benefit on improved musculoskeletal health of sedentary aged people. Based on these finding, the study recommends that seminars, workshops and symposia should be organized by health care providers to educate aged people on the implications and consequences of living sedentary life. It is also recommended that group registration and participation should be organized by exercise experts to motivate, promote and encourage participation of aged people.

Introduction

Aging is a normal biological process which can be affected by conditions such as inactivity or the environment (Leeders, 2003; Taylor & Johnson, 2008; Johnston, 2008). According to America College of Sports Medicine (2009), aging is a complex process which involves many variables such as genetics, lifestyle factors and chronic diseases that interact with one another and greatly influence the manner in which we age. Reduced functional ability has also been traced to human biological changes associated with aging and reduced physical activity (Young, Stokes & Crowe, 1984) participation in regular physical activity combining both aerobic and strength exercise has been found also to produce a number of favourable responses that contribute to

healthy aging (ACSM, 1998). Physical activity according to Australia Institute for Health and Welfare (2007) is any bodily movement produce by skeletal muscles that result in expenditure above resting level. According to Taylor and Johnson (2008), physical activity is referred to bodily movement that enhances health. Bean (2004) defines physical activity as the ability to carry out daily tasks with vigour and voluntary movements that burn calories. It is a set of activities that get the body moving such as gardening, walking the dog, taking the stairs instead of elevator. Sedentary lifestyle of older adults involves activities that do not increase energy expenditure substantially above the resting level as sleeping, sitting, lying down, watching television and so on (Cavil, 2006).

The lifestyle of individual is a determinant factor for having lower biological age in relation to the chronological age. Chronological age can be classified into young, middle age (45-65 years), and old age (65 years and above) (Johnston, 2008). Universally, according to Gerontologists, old age can further be classified as 'young old' (65-74 years), old (75-84 years), old-old (85-99 years), and oldest old (100 years and above) (Johnston, 2008). Taylor and Johnson (2008) reported that someone who is 65 years of age may have a biological age of 45 years and this is based on their fitness and health status; thus showcasing the importance of regular exercise in promoting health when looking at the association between chronological age and biological age. However, above 60 percent of older adults have been discovered to be inactive and are unable to benefit from regular exercise and subsequently, have difficulty with Activity of Daily Living (ADL) (American College of Sports Medicine, 2009).

A well planned and regular exercise programme is established to be an effective intervention and modality to reduce or prevent a number of functional declines associated with aging (ACSM, 2009). The health benefits of physical activity for older adults are well documented. It is no gainsaying that regular exercise and physical activity are important to the physical, psychological as well as mental health of almost everyone including older adults (Blair and Kohl, 1995; Johnston, 2008). Being physically active have been shown to help people to continue to do the things they enjoy especially older adults. Studies show that regular exercise and physical activity can reduce the risk of developing some diseases and disabilities that develop as people grow older. For example, results of studies show that people with arthritis, ear disease or diabetes benefit from regular exercise, so also people with high blood pressure (HBP), body balance problems or difficult walking enjoy themselves better after regular routine exercise (Blair and Kohl, 1995; Johnston, 2008).

Aging causes loss of musculoskeletal capacity (Castaneda, 2000). Aging usually leads to physical functional decline which is often the major factor that leads to loss of independence in older person. Therefore, manufacturing physical functioning is an important pre-requisite for preserving independence in later life. Many studies have shown that being physically active is associated with less morbidity and mortality (National Heart Foundation, 2005, 2007). In Australia National Heart Foundation (2005) newsletter, it was established that an active lifestyle in later life helps prevent the typical age-related decline in functional capacity which results from partly inactivity rather than intrinsic effect of aging.

Heart Foundation (2005) highlighted that physical activity benefits include improvement in functional capacity, skeletal muscle oxidative enzyme activity, skeletal muscle capillarisation, muscle mass, muscle fibre area, muscle strength and function. However, functional capacity does not only decline with age but it is also worsened by inactivity that results into reduction in muscle strength and flexibility, muscle mass, lung function culminating into unpaired mobility leading to unpaired ability to perform activities of daily living, resulting to increase risk of falls (Hearth Foundation, 2005).

Several factors are found to contribute to disease development in the musculoskeletal system and these include age, obesity, previous injury at a joint and faulty joint alignment as well as genetic factor (Kiltgaard Mantoni, Schiaffino, 1990). The primary musculoskeletal changes that take place as we aged include a decrease in muscle mass cause by a reduced number of contractile elements, a decrease in the number and size of type II muscle fibres; a decrease in motor unit number (Kiltgaard Mantoni, Schiaffino, 1990); an abnormal grouping of type I fibres (Grimby, Danneskiold Samsoe, Hvid, 1982) and a decrease in bone mineral density (osteoporosis) (Burr, 1997). These structural changes are associated with a diminished ability to partake in ADL. Researchers suggest that the use of concurrent resistance (single or multiple sets) training and stretching can have a positive effect on musculoskeletal function and maintain or enhance numerous aspect of independent living (Evans, 1995; Evans, 1999). Sixty percent (60%) of older adults are confirmed to be inactive (Canada's PA Guide for Older Adults, 2009) and sitting or lying long period is a serious risk (WHO). The guide listed declines in bone strength, muscle strength; heart and lung fitness and flexibility as disastrous to health and well being of people. The stiffer the joints become the more the pain and reduction in mobility and independence. Bone lose minerals and strength as people aged and serious bone loss is a problem for about Eighty five (85%) of older people which can be prevented with strength activities, aqua fitness programmes, walking, folk or line dancing.

Canadian Society for Exercise Physiology (1998) have identified the risk factors for sustaining musculoskeletal injuries as aging (above 30 years) structural faults in the musculoskeletal system as a result of misalignment of bones in a joint, overstretching of ligaments with a cartilage and bone excessively compressed, excessive body weight leading to high compressive forces especially during weight bearing activity. Furthermore a lifestyle of physical inactivity and exercise is the fifth factor found to lead to multifarious disease and ailment in older adult (Taylor and Johnson, 2008).

Falls are responsible for ninety percent (90%) of hip fractures and sixty percent (60%) vertebral fractures and osteoporosis. This is called degenerating joint because, it is characterized by degenerating articular cartilage (Australia Association for Osteoporosis, 2004); others include arthritis and sarcopenia. Arthritis and association musculoskeletal condition (MSK) are the leading cause of disability in Australia and affects nearly one in five Australian. Disability associated with these conditions occurs as a result of multiple physical and functional impairments. Impairments such as pin, joint stiffness, reduced muscle strength and aerobic fitness can lead to reduced performance and participation in activities of daily living such as

hopping, working and engagement in social activities.

Ayoade (2012) citing Maxinmin Agha (2001) concluded that physical activity contributed a lot to the improvement of old people's health by improving stamina, and condition of health and increasing flexibility, muscular quality and quantity. He was also reported to have quoted Shepherd (1998) that physical activity can protect the individual against a number of chronic diseases of old age. Ayoade (2012) reiterated that Udoh (2000) and Depp and Jeste (2006) affirmed that exercise benefit pulmonary and circulatory functions, helps in preservation of bones, maintain body weight, relieves depression and anxiety and enhances self esteem. Exercise is a tool to help older adults to overcome their disabilities and improve all aspects of health and quality of life.

Obesity is one of the most preventable risk factor for development and progression of knee osteoarthritis and has also been linked to development of hip and hand osteoarthritis (Leena, Longrong, September & Dorthy, 2005). Aerobic exercise even when low intensity is effective in improving functional status in pain and aerobic capacity in people with knee osteoarthritis (American Geriatrics Society 2001; Brosseau, 2003). Progressive resistance training may also reduce pain in older adults (Latham, 2001; Been, 2004). It has been found that physical activity does not cause disease progression in osteoarthritis but alleviate the condition.

Rheumatoid arthritis is an auto immune disease; for some unknown reason, the body's natural immune system begins to attack its own healthy joint tissue, resulting in inflammation and subsequent damage to the joint, cartilage and bone. The effects of this joint inflammation are pain, warmth, redness and swelling (genetic factors).

Sarcopenia, the progressive decrease of the number and size of muscle fibres resulting in decrease of skeletal muscle mass and thus lean body mass is a process termed as sarcopenia (Mercksharp and Dohme Corp, 2010). Loss of muscle (sarcopenia) is a process that starts around age 30 and continues throughout life. In this process, the amount of muscle tissue and the number and size of muscle fibre gradually decrease. The result of sarcopenia is a gradual loss of muscle mass and strength. This mild loss of muscle strength places increase stress on certain joints (such as the new) and may predispose a person to arthritis or falling aging cause loss of musculoskeletal capacity.

Physical inactivity makes one's body age faster and staying physically active is beneficial by helping older adults to keep moving and staying strong and independent. To stay independent, older adults need to be able to reach, bend, lift, carry and move around easily hence the significance of physical activity and exercise for the improvement of the musculoskeletal health (Canadian Society for Exercise 2011). Physiological activity provides bone with the stress that they need in order to grow normally and become strong. Progressive resistance training has been established to contribute to maintenance of bone mass in older people especially for patients who are at risk for fracture. Other benefits include the improvement of muscle mass, strength, balance and reduce risk for falls (Bean 2004). Active lifestyle in later life helps to prevent the typical age related decline in functional capacity which is partly due to inactivity rather than an intense effect of ageing and also reduce the risk of disability and hospitalization, improve quality of life and

allow individual ability to retain their independence.

Many other health benefits associated with musculoskeletal fitness includes reduced coronary risk factors, increased bone mineral density (reduce risk of osteoporosis), increase flexibility, improved glucose tolerance, and greater success in completion of activities of daily living (ADL). With aging, the performance of daily tasks can become a challenge. Additionally, falls, bone fractures and the need for institutional care indicate a musculoskeletal weakness as we age (Robert, Gordon & Art, 2001). Strength and balance activities help to keep the muscles strong and also the bones, reduce bone loss and improve balance and posture. Also, flexibility activities help to keep the muscles and joints healthy so as to stay mobile (Canada's Physical Activity Guide for Older Adults, 2000).

Research Questions

The following research questions were formulated for the study:

1. Does physical activity have any significant benefit on musculoskeletal aging of aged people in Ikorodu Local Government Area of Lagos State?
2. Does exercise have any significant benefit on sedentary lifestyle of aged people in Ikorodu Local Government Area of Lagos State?
3. Do the physical activity and exercise have any significant benefit on prevention of musculoskeletal problems affecting aged people in Ikorodu Local Government Area of Lagos State?

Research Hypotheses

In carrying out the study, the following hypotheses were drawn and tested:

- i. Physical activity will not have significant benefit on musculoskeletal aging of aged people in Ikorodu Local Government Area of Lagos State.
- ii. Exercise will not have significant benefit on sedentary lifestyle of aged people in Ikorodu Local Government Area of Lagos State.
- iii. Physical activity and exercise will not have significant benefit on prevention of musculoskeletal problems affecting aged people in Ikorodu Local Government Area of Lagos State

Methodology

The survey method of descriptive design was used for the study. The target population consisted of older adults between 50 65 years and above in Ikorodu Local Government of Lagos State of Nigeria. It has been established that mortality age has reduced. The simple random sampling technique was used to select a sample of 100 respondents. The questionnaire was developed by the researchers and the content validity was established by experts in the field of exercise physiology and health education and half was used to obtain reliability r of 0.78 to make the instrument usable. The questionnaire was administered to older adults and three research assistants were used due to the peculiarity of the respondents. The questionnaires were collected immediately after completion. The inferential statistical method of chi-square (X^2) was used to describe and analyse the data collected. The level of significance was established at 0.05

Results

The respondents used for this analysis consisted of 43 older adults who fell within the age range

of 50-54 years, 33 within 55-59 years, 15 within 60-64 and 9 fell within 65 and above. 54% are males while 46% are females. Majority were civil servants sixty eight (68%) and only thirty two (32) traders.

Hypothesis 1: Physical activity will not have significant benefit on musculoskeletal aging of aged

people in Ikorodu Local Government Area of Lagos State.

Table 1: *Chi-square (X^2) of benefit of physical activity on musculoskeletal aging of aged people.*

S/No	Items	No	Df	Calculated X^2 value	Critical value	Decision
1.	Physical activity and exercise reduced risk of fracture or breaking of bones	100	12	38.52	21.03	Hypothesis rejected
2.	Physical activity and exercise reduce risk of falls and improve balance					
3.	Physical activity and exercise strengthens muscles and bones					
4.	Physical activity and exercise combat stiffness and increase flexibility					
5.	Lack of exercise and inactivity leads to decline in bone strength					

P-value $0.05 = < 21.03$

The finding from analysis in table 1 above shows calculated chi-square (X^2) of 38.52 against the critical value of 21.03 with degree of freedom of 12 at 0.05 alpha level of significance. Since the calculated value is greater than the critical value, the above stated hypothesis is hereby rejected. This means that engagement in physical activity has much benefit on promotion and improvement of musculoskeletal health of aged people.

Hypothesis 2: Exercise will not have significant benefit on sedentary lifestyle of aged people in Ikorodu Local Government Area of Lagos State.

Table 2: *Chi-square (X^2) of benefit of exercise on sedentary lifestyle of aged people.*

S/No	Items	No	Df	Calculated X^2 value	Critical value	Decision
1.	Lack of exercise and inactivity is dangerous to one's health	100	9	18.16	16.12	Hypothesis rejected
2.	Lack of exercise and inactivity significantly contribute to joint pains like arthritis					
3.	Inactivity and lack of exercise increase death rate					
4.	Lack of exercise and inactivity leads to decline in ear function					

Significant at P-value = $0.05 < 16.92$

The result of analysis of tested hypothesis two (2) reveals calculated chi-square (X^2) value of 18.16 against the critical value of 16.92 with degree of freedom of 9 at 0.05 alpha level of significance. Since the calculated value is greater than critical value, the stated hypothesis is hereby rejected. This means that the involvement of aged people in mild and moderate exercise have much benefit on improvement of health of sedentary aged.

Hypothesis Three (3): Physical activity and exercise will not have significant benefit on prevention of musculoskeletal problems affecting aged people in Ikorodu Local Government Area of Lagos State

Table 3: Chi-square (X^2) on benefit of physical activity and exercise in prevention of musculoskeletal problems affecting aged people.

S/No	Items	No	Df	Calculated X^2 value	Critical value	Decision
1.	Walking and jogging at least 30 minutes for 3 5 days per week prevent body weaknesses	100	12	29.32	21.03	Hypothesis rejected
2.	Engaging in weight lifting exercise at least 30 minutes for 3 5 days per week improve muscle tone and prevent muscle rigidity					
3.	Playing of games like badminton, table tennis at least 30 minutes for 3 5 days per week improve musculoskeletal health of aged people					
4.	Engaging in fitness exercise help the aged to maintain their musculoskeletal health					
5.	Playing team games such as basketball at least 30 minutes for 3 5 days per week by the aged improve strong bone					

Significant at P value = $0.05 < 21.03$

Table three (3) above shows calculated chi-square (X^2) value of 29.32 against the critical value of 21.03 with degree of freedom of 12 at 0.05 alpha level of significance. Since the calculated value is greater than critical value, the above stated hypothesis is hereby rejected. This means that involvement of aged people in physical activity and exercise prevents musculoskeletal problems to which they are being prone.

Discussion of Findings

The result of analysis of tested hypothesis one (1) in table 1 revealed that physical activity is more beneficial to maintenance and promotion of musculoskeletal health of the aged people. This finding is in line with the finding of Canadian Society for Exercise Physiology (1999) which asserted that physical inactivity makes one's body to aged faster, while staying physically active is beneficial by helping the older adults to keep moving and staying strong and independent. This finding is corroborated by Ayoade (2012) citing maximum-Agah (2001) that physical activity contributed a lot to the improvement of old people's health by improving

stamina, and condition of heart and lung, increases flexibility muscular quality and quantity.

The findings from analysis in table two (2) show that exercise have much benefit on improvement of musculoskeletal health of sedentary aged people in Ikorodu Local Government Area of Lagos State. This finding agreed with the finding of Depp and Jeste (2006) in Ayoade (2012) that exercise is a tool to help older adults overcome their disabilities and improve all aspects of healthy and quality of life. American College of Sports Medicine (2009) supported this finding that a well planned and regular exercise programme is established to be an effective intervention and modality to reduce or prevent a number of functional declines associated with aging.

The result of analysis of tested hypothesis three revealed that physical activity and exercise have much benefit on prevention of musculoskeletal problems affecting aged people in Ikorodu Local Government Area of Lagos State. This finding is in line with Ayoade (2012) citing Shepherd (1998) that physical activity can protect the individual against a number of chronic diseases of old age. He also cited Udoh (2000) that exercise benefit pulmonary and circulatory functions. It also helps in preservation of bones, maintains body weight, relieves depression and anxiety and enhances self esteem.

Conclusion and Recommendations

It has been revealed from finding of the study that engagement of aged people in physical activity and exercise is beneficial to promote and improve their musculoskeletal health. The findings from the study also revealed as follows.

- Engagement of aged people in physical activity helps in improvement of their musculoskeletal health.

- Involvement of sedentary aged people in mild and moderate exercise improves their musculoskeletal health.

- Physical activity and exercise contribute to preventing musculoskeletal problems affecting aged people.

Based on the above conclusion drawn from the study, the following recommendations are made:

Health care providers in the health centres, fitness units, Sportss and recreational centres should organise seminars, workshops and symposia to educate aged people on the implication and consequences of living a sedentary life.

Group registration and participation should be organized by exercise experts to motivate, promote and encourage participation of aged people in mild and moderate exercise that promote their musculoskeletal health and well being.

All aged people should endeavour to at least observe three to five minutes endurance walk to improve their physical and physiological body functions.

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