RELATIONSHIP BETWEEN THE PHYSICAL ACTIVITIES LEVEL, FUNCTIONAL STATUS AND QUALITY OF LIFE OF GERIATRIC INDIVIDUALS

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SUMMARY

Background: Physical performance depends largely on the musculoskeletal system because adequate muscle and bone strength are necessary requirements for full functioning in the activities of daily living. Physical inactivity adversely affect muscle function and bone strength and resultant physical performance including the overall quality of life of geriatric individuals.

Objective: This study was designed to establish the relationship between the level of intensity of physical activity, basic activities of daily living, instrumental activities of daily living and quality of life of geriatric individuals.

Methods: This study was a cross-sectional study involving 394 geriatric individuals with no cognitive impairment. A self administered standardized questionnaire which assessed the socio-demographic parameters, level of intensity of physical activity, basic activities of daily living, instrumental activities daily of living and quality of life of the geriatric individuals was used. Descriptive and inferential statistics were used in data analyses.

RESULTS: Statistical analysis of the relationship between the level of intensity of physical activity, quality of life, basic and instrumental activities of daily living were found to be significant, $P < 0.05$.

Conclusion: The study demonstrated that an increase in physical activity/exercise level is associated and is a prerequisite for optimal functioning of the musculoskeletal system which is demonstrated in the performance of basic and instrumental activities of daily living.

Keywords: Physical Activity, Exercise, Geriatric, Musculoskeletal system, activities of daily living, quality of life.

INTRODUCTION

Age related limitations in physical functioning are growing public health priorities. Physical function limitation is a threat to the independence and quality of life of geriatric individuals and has substantial social and economic effect (Talposki, 2006). The geriatric individuals are the largest consumer of health care, more than half of this population had been reported in 1997 to be having one or more disabilities. One third had at least one severe disability and approximately one sixth had difficulties with activities of daily living (ADL). Almost half of all adult hospital beds are filled with patient 65years of age and older (Kessler, 1983).

Aging is a complex process involving many variables (e.g genetic, lifestyle factor, chronic diseases) that interact with one another, greatly influencing the manner in which we age. Increasing the level of regular physical activity (both aerobic and strengthening exercises) had been known to elicit a number of favorable responses that contribute to healthy aging especially in the area of the musculoskeletal system (Mazzeo et al, 2001; Samsoe et al, 1984). Physical activity had been demonstrated to improve the efficiency of musculoskeletal system and thus reduce decline in function in older adults (Ebrahim and Kalache 1990).

Physical disability is often characterized by the inability to independently carry out essential activities of daily living such as bathing, dressing, transferring, toileting, shopping for groceries or personal items, preparing meals, cleaning, and housework. The performance of these activities requires physical actions and depends on some level of physical performance (strength, flexibility, balance, endurance and coordination). Physical performance depends in large part on the musculoskeletal system because adequate muscle and bone strength are necessary requirement for full function. Two of the factors that may adversely affect muscle function and bone strength and resultant physical performance are poor nutrition and physical inactivity. Studies have suggested that increased physical activities are associated with higher level of physical functioning among elderly population. Interventions that promote healthy lifestyle change had delivered considerable benefit within this ever increasing and vulnerable population.

About 35% of non-institutionalized persons older than 65years of age describe themselves as being limited in some type of activity. Some results from disuse of muscles and joints. Immobility has been described as a major cause of disuse of muscles and joints (Bortz 1982; Redeker et al, 2002). The physiological changes associated with exercise however translate into practical benefits (Chandler and Hadler, 1996; Mc Auley et al, 1993;Karani et al, 2001) such as increase in blood flow, endurance, flexibility, strength, range of motion, oxygen uptake, neurological function and decrease in blood pressure, resting heart rate, bone loss and peripheral body fat. Exercise goals for improving musculoskeletal efficiency and integrity in geriatric individuals emphasis on maintaining flexibility, balance, strength, endurance and coordination (Lord et al 1994).

These are referred to as the "building blocks" of physical functioning. They are integrated to form a hierarchy of ability ranging from basic level of integration in which they are coordinated to execute specific physical movement such as sitting up, standing, walking and gripping, to the second level of integration in which these movement are coordinated into more complex task which constitute the activities of daily living such as dressing bathing, feeding, writing and climbing stair. At the third and highest level of integration, the basic building blocks are coordinated with cognitive and effective resources to carry out functioning in occupational and social roles (Rima et al, 2005; Samsoe et al, 1984).

Musculoskeletal Disorders are significant public health problem due to their high impact on disability, personal suffering and their direct and indirect costs to the health care system (Rima et al, 2005; Talposiki et al, 2006). They are the leading cause of functional impairment in the older patient (Abrams et al, 1990; Loeser et al, 2003). Being rarely fatal and not curable, these disabling problems are chronic (Mazzeo et al, 1998).

With the growing population of the number of individuals 65 years and over, it is imperative to determine the extent and mechanisms by which physical activity\exercise can improve health, functional capacity, quality of life and independence in this Geriatric population (Ebrahim and Kalache, 1990; Mazzeo et al, 1998). Consequently awareness should be created to this geriatric population on the need for improvement of physical activity level hence the need for researchers especially in public health in Nigeria to engage more on studies related to the population group. This study is designed to focus on the relationship between the level of intensity of physical activity\exercise and the functional status of geriatric individuals. It also assesses the quality of life of these geriatric individuals with respect to their physical activities/exercises levels.

METHODS

This study is a cross sectional survey. The study population comprised of 394 geriatric individuals from age 65 and above who were residing in various parts of Lagos. They were elderly persons in family settings and Elderly peoples' homes. The geriatric individuals selected were those with no cognitive impairment who can comprehend instructions read from questionnaire either by them or to them. Subjects were recruited into the study as they were available.

All data were kept confidential as no names were required from participants. Their individual consent was sought verbally before administration. However the permission to administer the questionnaire in the old people's homes was taken from the management of these institutions before administration of the questionnaires. All participants signed consent forms to express their willingness to participate in this study.

Procedures

A standardized questionnaire was used. It has 5 sections- socio-demographic section, rapid assessment of level and intensity of physical activities section, basic activities of daily living assessment section, instrumental activities of daily living assessment section and quality of life assessment section. Rapid assessment of physical activity Questionnaire rated the geriatric individuals in their physical activities levels such as sedentary, under active, under- active regular-light activities, under-active regular and active individuals. Six basic activities of daily living skills assessed were: bathing, toileting, feeding, dressing, continence and transferring (Kadex, 1983). Independence performance of each skill attracts one point with a total of 6 points for full functioning, dependency or inability to perform the skills attracts 0 point. A score of 4-5 points is rated as moderate functioning and 1-3 points as poor functioning.

The instrumental activities of daily living were assessed in eight different skills which were shopping, food preparation, ability to use telephone, ability to handle finance, laundry, mode of transportation, housekeeping and responsibility for own medication. Independent

performance of these eight functions attracts 8 points for full functioning, 5-7 points for moderate functioning and 0-4 for poor functioning. Dependency in performance of these activities attracts 0 point. The quality of life was rated from the subject's reports on their quality of life coupled with the rating of the quality of life scale as assessed by the researchers, this ranges from 1 to 7, 1 being very poor, 2 for poor, 3 for fairly poor, 4 for fair, 5 for good, 6 for very good and 7 for excellent quality of life.

The questionnaires were administered to the geriatric individuals on contact. Individuals who were educated and who easily understood questions asked in the questionnaire were left to complete them and later return them on the next visit to their various places of residence while the contents of the questionnaire were read to the geriatric individuals who were not educated to obtain their response. In this case, the questionnaires were collected immediately after being filled. 20 pretests were done among geriatric individuals residing at Idi-Araba Area of Lagos State.

Data analysis

Both descriptive and inferential statistics were used to analyse the data obtained .Computer analysis of the obtained data was also done using SPSS version 11 , P values, chi square values and the frequency of distribution of the demographic parameters, for the data collected were realized from this analysis.

RESULTS

From the analyzed data 42% of the studied geriatric individuals fell within the age range 65-74 years (young-old), 50.5% were within the age range 75-84years (middle-old) while 5.3% fell within age range 84+ (old – old). Tables 1-3 below show the relationship between physical activities level, quality of life, basic and instrumental activities of daily living.

Table 1: Relationship Between Physical Activities Level and Functional Ability in the Basic Activities of Daily Living

Physical Activity Level	Basic Activities						Total
	Full Function		Moderate Function		Poor Function		
	frequency	%	Frequency	%	Frequency	%	
Active	135	42.9	3	4.5	1	8.3	139
Sedentary	45	14.3	5	7.5	8	66.7	58
Under active	13	4.1	9	13.4	1	8.3	23
Under- active regular-light activities	54	17.1	12	17.9	2	16.7	68
Under-active regular	68	21.6	38	56.7	-	-	106
Total	135	100	67	100	12	100	394
Chi-Square Tests							
	Value	df	pvalue				
Pearson Chi-Square	87.071	8	0.001				

Table 2: Relationship Between Physical Activities Level and Functional Ability in the Instrumental Activities of Daily Living

Physical Activity Level	Instrumental Activities of daily living						Total
	Full Function		Moderate Function		Poor Function		
	frequency	%	Frequency	%	Frequency	%	
Active	100	72.5	33	17.6	6	8.7	139
Sedentary	-	-	40	21.4	18	26.1	58
Under active	1	0.7	10	5.3	12	17.4	23
Under- active regular-light activities	16	11.6	32	17.1	20	29.0	68
Under-active regular	21	15.2	72	38.5	13	18.8	106
Total	138	100.0	187	100.0	69	100.0	394
Chi-Square Tests							
	Value	df	pvalue				
Pearson Chi-Square	164.533	8	0.001				

Table 3: Relationship Between Physical Activity Level and Quality of Life of the Geriatric Individuals

Physical Activity Level	Quality of Life														Total
	Fairly		Poor		fairly Poor		Excellent		Good		Very Good		Very Poor		
	freq-uency	%	freq-uency	%	freq-uency	%	fre-quency	%	fre-quency	%	fre-quency	%	fre-quency	%	
Active	17	17.3	2	22.2	4	16.7	22	53.7	68	49.6	26	31.0	0	0	139
Sedentary	43	43.9	6	66.7	2	8.3	-	-	5	3.6	1	1.2	1	100	58
Under active	2	2.0	-	-	7	29.2	5	12.2	7	5.1	2	2.4	-	-	23
Under- active regular-light activities	18	18.4	1	11.1	7	29.2	5	12.2	28	20.4	9	10.7	-	-	68
Under-active regular	18	18.4	-	-	4	16.7	9	22.0	29	21.2	46	54.8	-	-	106
Total	98	100	9	100	24	100	41	100	137	100	84	100.0	1	100	394

Chi-Square Test

	value	df	pvalue
Pearson Chi-Square	199.567	24	0.001

DISCUSSION

An insight into the level of intensity of the physical activity of the geriatric individuals showed that 14.7% were sedentary, i.e rarely or never do any physical activity, 5.8% were under-active, i.e they do some light or moderate physical activities but not every week, while 17.3% were within under-active regular light activities level performing light to moderate physical activities every week but less than 20 minutes a day or 5 days a week, 26.9% were under-active regular performing vigorous physical activities but less than 20 minutes a day or 3 days a week. 35.5% were active, performing 30 minutes or more a day of moderate physical activities 5 days or more per week, or 20 minutes or more per day of vigorous physical activities for 3 days or more per week, this being the actual guideline specified by the Centers for Disease Control and Prevention. This is not in support of previous findings which rated most geriatric individuals as been sedentary in nature (Rantanon et al, 1992; Faulkner et al, 1990).

The statistical analysis of the relationship between the level of intensity of physical activity and the basic and instrumental activities of daily living was found to be significant, $P < 0.05$ respectively for both analysis, establishing an association between them. There was also a statistical association between the level of intensity of physical activities and the quality of life of these geriatric individuals, $P < 0.05$.

42.9% of the geriatric individuals who were at the active level demonstrated full functioning in their basic activities of daily living while 72.5% of them reported full functioning in their instrumental activities of daily living ,53% of this geriatric individuals at the active level of physical activities were found to report excellent quality of life. Most Of the sedentary geriatric individuals (66.7%) reported poor functioning in their basic activities of daily living skills while quite some proportion (43.9 %) reported fairly poor satisfaction with life as viewed from their quality of life assessment scale.

These results were in conformity with previous research findings which reported that increased level of exercise brings about improvement in strength, flexibility, balance, coordination and endurance (Mc Auley et al, 1993; Lord and Steel 1994; Karani et al, 2001; Suthers et al, 2004) all of which Halter and Reuben (2001) proposed to be useful model which forms the building blocks of physical functioning coordinated and integrated in the execution of complex tasks such as the basic activities of Daily living; dressing, bathing, feeding, transferring and toileting (Katz, 1983, Kresevic and Mezeg, 2003). They also propounded that this basic building blocks whose basis for improvement is exercise (Rantanon et al 1992; Karani et al, 2001) are coordinated with cognitive and affective resources which are also preserve in regularly exercising geriatric individuals (Mazzeo et al, 1998) to carry out functioning in occupational and social roles (Samsoe et al, 1984; Rima et al 2005) as demonstrated in the instrumental activities of daily living such as ability to use telephone, shopping, transportation, laundry, food preparation, ability to handle finance and responsibility for their medication (Lawton and Brody, 1969) Instrumental ADL tasks indirectly examine cognitive abilities as well because they require a certain level of cognitive skills to complete some of the tasks in the instrumental ADL. Involvement in regular exercise has been proven to provide a number of psychological benefits related to preserved cognitive function, alleviation of depression symptoms and behaviour, and an improved concept of personal control and self efficacy (Mazzeo et al, 1998).

The statistical association between physical activity level and quality of life can be explained by the conclusions from research findings (Murdo and Rennie, 1994; Smith and Serfass, 1981) that increased physical activity is essential to life, health and well being, and that the physiological benefits associated with regular exercise and physical activity brings about reduction in musculoskeletal disease risk factors and contribution to a more healthy and greatly improved quality of life (Homan et al, 1994). Quality of life is a subjective outcome which refers to satisfaction with life, personal environment and the achievement of personal goals and standard (Damton, 1995; Low et al, 2008). Exercise had been known to provide a number of psychosocial benefits related to alleviation of

depressive symptoms and behavior. The benefits associated with regular exercise and physical activity especially in the area of reduction in disease risk factors contribute to health and greatly improved quality of life (Homan et al, 1994).

There was significant difference in the association between the physical activities level and the basic/ instrumental activities of daily living including the quality of life in the different age range of the geriatric individuals studied. The young-old (65-74years) showed better functioning in their performance of basic and instrumental activities of daily living when compared to the middle old (75-84) and old-old (84^+) geriatric individuals recruited in this study. This can be viewed from the fact that although an increase in level of physical activity brings about an improvement in function, structure and quality of life of geriatric individuals as they undergo the ageing process, It does not totally halt the ageing process as chronological age increases further (Rantanon et al, 1992; Meltzer, 1994)

CONCLUSION

This study demonstrated that an increase in physical activity/exercise level is associated and is a prerequisite for optimal functioning of the musculoskeletal system which is demonstrated in the performance of basic and instrumental activities of daily living. Physical inability is often associated with inability to independently carry out essential activities of daily living skills. It therefore translates that a change in lifestyle from been physically inactive to been active will bring forth better functional independence and good quality of life in geriatric individuals.

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