

EFFECT OF KYPHOSIS ON PHYSICAL FUNCTION AND ENTREPRENEURSHIP AMONG RETIRED OLDER COMMUNITY-DWELLERS IN ENUGU STATE

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Abstract

This paper determined the effect of kyphosis on physical function and entrepreneurship among retired older community-dwellers in Enugu state with a view of improving physical abilities and financial independence after retirement. To guide the study, three specific objectives and one postulated hypothesis were utilized. A retrospective longitudinal research design was employed. A sample size of 340 participants (20 participants from each local government area in Enugu state; 17 (LGA) precisely) was studied. Data were collected using measurement, interview and observation schedule. Mean scores, standard deviation, frequency, percentage, t-test and Pearson product moment correlation (r) were the statistical tools used. It was found that greater magnitude of kyphosis is associated with age and could lead to decline in physical function and decreased entrepreneurship ability among retired elderly. Therefore, it was recommended that early recognition and prevention of kyphosis may improve physical function and entrepreneurship among retired older community-dwellers in the 21st century and beyond.

Keywords: entrepreneurship, kyphosis, physical function, elderly

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Introduction

Preserving functional independence in later life requires that an elderly individual has the physical ability to carry out the usual activities of daily life which includes entrepreneurship. Entrepreneurship according to Sherief (2005) is self rewarding, self satisfying and self reliant focusing on man's ability to diversify his ideas and brainstorming in order to solve his problems including financial problems. Retired workers are not excluded from such opportunities. Health educators, politicians as well as other scientists have now recognized that ageing is associated with some of the greatest social, economic and health challenges of the twenty-first century across the globe (Axel, Karsten & Hendrik, 2005). Ageing as noted by Dhaar and Robbani (2008) is inevitable in human life and has remained a key determinant for mandatory retirement from the civil service.

With ageing, kyphosis, an anterior curvature in the thoracic spine also known as an abnormal backward curvature of the spine, tends to progress (Kado, Huang & Karlamangla, 2013). Greater degrees of kyphosis in the thoracic spine are prevalent in older persons (Wendy, Mei-Hua, Lane, Kristine & Deborah, 2013). Those who are affected by greater magnitude of kyphosis are

more likely to suffer from functional limitation that affects the usual activities of daily living (Huang, Cummings & Kado, 2010). For example, it has been reported in multiple cross-sectional studies that elderly with greater magnitude of kyphosis have difficulty reaching overhead and performing heavy housework and also scored lower on basic activities of daily living scale than did their erect counterparts (Ryan & Fried, 1997; Cortet, Houvengel, Puisieux, Roches, Garnier & Delcambre, 1999). Furthermore, the elderly with greater magnitude of kyphosis have demonstrated difficulty performing physical function tasks including rising from a chair without the use of their arms, balancing on a narrow base of support, walking on level ground and stair climbing (Balzini, Vannucchi & Benvenuti, 2003). These physical functions increase the risks of falls, fractures, disabilities, and mortalities (Katzman, Vittinghoff & Kado, 2011) thus, highlighting the importance of determining whether kyphosis, a potentially modifiable risk factor (Benedetti, Berti, Presti, Frizziero & Giannin, 2008): predicts worsening physical function and entrepreneurship over time.

Literature evidence has shown that greater magnitude of kyphosis predicted

longer performance times on the Timed up and Go test over a mean 4.4 years in a sample of older women with low hip bone mineral density (BMD) (Katzman, Vittinghoff, Ensrud, Black & Kado, 2011). These findings were independent of other significant predictors of worsening physical function including age, health status, grip strength, body mass index, change in hip bone mineral density, arthritis, gait speed and new vertebral fractures (Katzman, et al., 2011). Given that this was the first longitudinal assessment of the effects of kyphosis on physical function over time and the sample was restricted to older women with low hip bone mineral density, it is of interest to determine whether greater magnitude of kyphosis predicts greater decline in physical function and entrepreneurship among the retired older community-dwellers irrespective of their bone mineral density in this twenty-first century.

To achieve this, the researchers retrospectively assessed the effect of kyphosis at baseline characteristics of the study sample in self-reported, objectively measured and other measured physical function (ability) over an average follow-up of Two [2] years in healthy, retired older community-dwellers in Enugu state.

Statement of the Problem

Maintaining optimum health (graceful ageing) after retirement has remained an ideal

plan for all workers in different sectors. Unfortunately, with ageing, kyphosis tends to progress. It is still unknown whether kyphosis predicts worse physical function and entrepreneurship in later life. Literature evidence has shown that there are no known ways or means to avoid kyphosis in later life.

However, this study focused on determining the effect of kyphosis in physical function and entrepreneurship among the retired older community-dwellers in Enugu state. From the literature reviewed, no study of this kind has been conducted among the retired elderly and this is the gap the researchers want to fill. The findings of the study could be useful to both employers of labour and the employees in different sectors including the politicians, sociologists, health educators, economists as well as other scientists.

Purpose of the Study

The purpose of the study was to determine the effect of kyphosis on physical function and entrepreneurship among the retired older community-dwellers in Enugu state. Specifically, the study examined the:

1. baseline characteristics of the study sample;
2. mean baseline kyphosis by age;
3. association of age and effects of kyphosis in physical function and entrepreneurship among the retired

older community-dwellers.

Hypothesis

There is no significant difference on the effect of kyphosis in physical function and entrepreneurship among the retired older community-dwellers according to gender at .05 level of significance.

Methodology

The study adopted a retrospective longitudinal research design. A sample size of 340 participants was drawn using multi-stage sampling procedure. In the first stage, cluster sampling was employed to select 17 local government areas in Enugu state. Each local government formed a cluster. In the second stage, purposive sampling procedure was used to select 2 rural communities from each local government. The choice of using purposive sampling was to ensure that only rural communities were sampled. This resulted to 34 rural communities sampled. In the third stage, simple random sampling was used to select 10 retirees (5 males and 5 females) from each of the sampled rural communities. This yielded a total of 340 participants used for the study.

Data were collected using measurement, interview and observation schedules. Self-reported functional status, objectively measured physical function and other measurements were determined. Self-

reported functional status was defined based on questions from the 1984 National Health Interview Survey Supplementation on ageing (Fitti & Kovar, 1987) administered at baseline. Participants were asked about their ability to perform six activities: walking two blocks outside on level ground, walking down 10 steps, climbing up 10 steps without stopping, preparing meals, shopping and doing heavy housework. In objectively measured physical function, gait speed was tested over a 6-M course according to a Standard Protocol (Bohannon, 1997). Participants were asked to walk at their usual pace, and it was recorded in metre/ second. Isometric grip strength (kilograms) was measured in both hands at each visit using a hand-held isometric dynamometer and a standard protocol. Timed chair stand was measured as the time (seconds) to rise from a chair five times without the use of arms according to a standard protocol (Bohannon, 2006). Participants were instructed to rise from a 16-inch height chair and sit down as quickly as possible five times, keeping their arms folded across the chest.

Other measurements were achieved by asking all the participants to provide information on basic characteristics including age and educational level, self-reported overall health status (poor, fair, good and excellent) and history of medical conditions including Parkinson's disease, stroke,

hypertension, diabetes, and osteoarthritis at baseline. Participants answered questions regarding health behaviours including smoking (current versus past or never), alcohol use (average number of drinks per week) and physical activities over the past years. Participants were also asked to report the frequency and duration of their participation in leisure time, sport activity and household chores. While wearing light clothing without shoes, height and weight were measured and body mass index was calculated in kilograms/ meter. Data generated were analyzed using mean scores, standard deviation, frequency and percentages.

Results

Table 1: Baseline characteristics of the study sample

Baseline characteristics (n= 340)	Mean \pm SD or N (%)
Age (yrs)	69.3 \pm 4.0
Body mass index (kg/m ²)	26.3 \pm 4.4
Education (>12 yrs), n (%)	144 (42.4)
Arthritis, n (%)	202 (59.5)
Current smoker, n (%)	29 (8.4)
Alcohol user (drinks in past 12 months), n (%)	258 (75.8)
Prevalence of vertebral fracture, n (%)	52 (15.2)
Self-reported health, fair/poor (%)	34 (9.9)
Functional status (0-18 points)	0.4 (1.0)
Gait speed (m/s)	1.1 (0.2)
Grip strength (kg)	23.1 (4.0)
Timed chair stands (s)	11.1 (3.3)

Data in Table I showed that the participants have average mean scores of age 69.3 (SD=4.0) years; Body mass index of 26.3 (SD=4.4). Approximately 90% of the participants reported good health and 42% had a high school or longer education. Prevalence of arthritis was high (60%) and approximately 15% had a prevalent vertebral fracture. Participants had a baseline mean self-reported health, fair/ poor score of 9.9%; functional status 0.4 (SD=1.0), gait speed of 1.1 m/s (SD=0.2), grip strength of 23.1 kg (SD=4.0), and timed chair stands of 11.1 seconds (SD= 3.3).

Table 2: Mean baseline kyphosis by age (N = 340)

Age strata (yrs)	Number of Participants	Mean Kyphosis by age
65 – 69	45	13.24
70 – 74	110	32.4
75 +	185	54.41

Data in Table 2 showed age strata of the participants and their mean kyphosis. Between the ages of 65-69 years, there were 45 participants with a mean kyphosis score by age of 13.24. Between the ages of 70-74 years, there were 110 participants with a mean kyphosis score by age of 32.4. Between the ages of 75 years and above, 185 retired elderly participated with a mean kyphosis score of 54.4.1

Table 3

Data Showing Association of Age and Effect of Kyphosis on Physical Function and Entrepreneurship among the retired older community-dwellers (N = 340)

S/N	Effect of kyphosis	65-69yrs	70-74yrs	75yrs+	r-value	P-value	Decision
		\bar{x}	SD	SD	SD		
1.	Physical function	2.77	.952	2.67	.910	2.64	.973 .340 .117 Low
2.	Entrepreneurship	2.54	.939	2.42	.999	2.45	1.00 .510 .169 Moderate
	Grand values	2.66	.946	2.55	.955	2.55	.987 .425 .143 Moderate

Scale (r-value interpretation): very low association = .00-.19; low association = .20-.39; moderate association = .40-.59; high association = .60-.79; very high association = .80-1.00

Data in Table 3 showed that the grand r-value of .425 with P-value of .143 which falls between .40 - .59 implies that the association of age and effect of kyphosis on physical function and entrepreneurship is moderate. It was also shown in the Table that low association exists on age and effect of kyphosis on physical function (r = .340, P-value = .117) while moderate association exists on entrepreneurship (r = .510, P-value = .169). The Table further showed the age differences in the means responses of the participants as follows: Physical function; from 65 to 69 years (X = 2.77, SD = .952); from 70 to 74 years (X = 2.67, SD = .910) and from 75 years and above (X = 2.64, SD = .973) and Entrepreneurship; from 65 to 69 years (X = 2.54, SD = .939); from 70 to 74 years (X = 2.42, SD = .999) and from 75 years and above (X = 2.45, SD = 1.00) respectively.

Table 4
Summary of t-test Statistical Analysis of No Significant Difference on the effect of kyphosis on physical function and entrepreneurship among the retired older community-dwellers according to Gender (n = 340)

Gender	Mean ± SD	t-cal	d.f	P-value
Male	15.20 3.118	.752	340	.454
Female	15.72 3.647			

Data in Table 4 showed that differences exist on the mean scores of the female and male participants. The female participants have higher mean score of 15.72 (SD=3.647) than their male counterparts with 15.20 (SD=3.118) with a t-calculated value of .752. The null hypothesis of no significance differences on the effect of kyphosis in physical function and entrepreneurship among the retired older community-dwellers according to gender was therefore accepted since the p-value of 0.454 is greater than 0.05 level of significance.

Discussion of Results

Data in table 1 presented the baseline characteristics of the study sample indicating the mean scores and standard deviations as well as frequency and percentages. From the table, it was clearly observed that irrespective of the participants' good health status, high education level and bone mineral density, greater baseline kyphosis proceeded long-term decline in physical function, particularly in measures of lower extremity function. This is in line with Ryan and Fried (1997); and Haung, Barrett-Connor, Greendale and Kado (2006), who observed that greater magnitude of kyphosis is associated with slow gait speed, low grip strength, and slow timed chair stand. The findings also agreed with the findings of Takahashi, Ishida and Hirose (2005), who examined the association of trunk deformity with a reduction in outdoor activities of daily living and life satisfaction in community-dwelling elderly. Their results showed that accentuated kyphosis alters the centre of the body mass that may impair the ability to move from sit to stand. The result also supported the studies of Guralnik, Ferrucci and Pieper (2000) whose findings indicated that lower extremity function and functional disability are associated with increased magnitude of kyphosis.

Data in Table 2 showed the mean baseline kyphosis by age and table 3 presented the association of age and effects of kyphosis on physical function and entrepreneurship among the participants. The findings revealed that the association of age and effect of kyphosis on

physical function and entrepreneurship is moderate. Specifically, the result revealed that low association exists on age and effect of kyphosis on physical function while moderate association exists on entrepreneurship. These findings were not surprising but expected and were in line with the findings of other researchers as shown below.

The results supported the studies of Cortet, Houvenagel, Puisieux, Roches, Garnier and Delcambre (1999) which showed that greater magnitude of kyphosis is associated with ageing. It was also in agreement with Kado, Huang and Karlamangla (2013) who examined the factors associated with kyphosis progression in older women. Their findings revealed that kyphosis, an anterior curvature in the thoracic spine progresses with age. The implication of these findings is that those who are affected by greater magnitude of kyphosis will suffer decline in physical functions and limitation in entrepreneurship ability mostly in this twenty-first century and beyond.

Data in Table 4 showed that differences exist on the mean scores of the female and male participants. The female participants have higher mean score of 15.72 (SD=3.647) than their male counterparts with 15.20 (SD=3.118) with a t-calculated value of .752. The expected result was in line with the findings of Wendy, et al. (2013) who

studied kyphosis and decline in physical function over 15 years in old community-dwelling women. Their findings revealed that greater magnitude of kyphosis is associated with gender. They stated that older women tend to develop kyphosis more often than their male counterparts. The null hypothesis of no significance differences on the effect of kyphosis on physical function and entrepreneurship among the retired older community-dwellers according to gender was therefore accepted since the p-value of 0.454 is greater than 0.05 level of significance.

Implications of the Study for Health Education/Educators

Maintaining physical function and entrepreneurship is an important prerequisite for preserving independence after retirement particularly in the twenty-first century. The elderly needs financial securities to cope effectively with ageing complications; and physical abilities/strength to function on daily basis. This calls for urgent attention or concern in proffering solutions to prevent cases of kyphosis in later life. Achieving these could serve as sure ways of promoting optimum health and embracing healthy ageing for all in the twenty-first century and beyond.

Conclusion

Based on the literature reviewed and the major findings of the study, it was concluded that kyphosis develops with age.

Secondly, the association of age and effect of kyphosis on physical function and entrepreneurship is moderate. Greater magnitude of kyphosis could lead to decline in physical function and entrepreneurship among the retired older community-dwellers in the twenty-first century. Older women develop greater magnitude of kyphosis more often than their male counterpart.

Recommendations

Based on the findings of this study, it was recommended that early recognition and prevention of kyphosis may improve physical function and entrepreneurship among the retired older community-dwellers in the 21st century and beyond. This could be achieved through routine physical health examination. Secondly, African governments, private sectors and institutions should develop a pre-retirement programme that would expose their employees to different entrepreneurship skills that will make them entrepreneurs after retirement. This will help the retired workers not to depend only on pension for their financial needs. Thirdly, employers of labour and African governments should develop and encourage routine physical exercise programmes for all workers in active service. It is established that physical exercise promotes health and prevents disabilities in old age.

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