Original Research Article

Prevalence and Predictors of Physical Inactivity in a Rural Poulation in Nigeria

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Abstract

Introduction: Physical inactivity is a major contributor to the overall burden of cardiovascular disease such as storke, coronary artery diseases and other non-communicable diseases like type 2 diabetes, breast cancer, and colon cancer while Physical activity is a key and important factor that contributes to decrease the risk of cardiovascular disease. The aim of this study is to determine the prevalence and predictors of physical inactivity in a rural population in Nigeria. *Methods:* A cross sectional rural population study involving 572 subjects aged 15 years and above. Socio-demographic data were obtained by face-to-face interview. Weight, height, waist circumference, hip circumference measurements were taken along with blood pressure measurements. Blood samples were taken for fasting blood sugar and lipid profile. *Results:* Five Hundred and seventy two had their data analysed with male to female ratio of 1:2.6. The overall mean age was 39.08±17.5 years. The overall prevalence of physical inactivity in this study was 3 % to 7.3% during commuting or working respectively with men being more active than females. The elderly age group of 70 years and above were more sedentary than all other age groups. Pearson correlation and Spearman' rho correlation analyses showed that smoking and BMI correlated with obesity. Linear regression analysis showed that smoking and BMI predicted presence of physical inactivity. *Conclusion*: Physical inactivity prevalence in this study is low with smoking and BMI being important predictors.
Keywords: Prevalence, Predictors, physical inactivity, rural, population.

INTRODUCTION

Physical inactivity is a major contributor to the overall burden of cardiovascular disease such as stroke, coronary artery diseases and other non-communicable diseases like type 2 diabetes, breast cancer, and colon cancer [1-3]. Physical activity therefore is a key and important factor that contributes to decrease the risk of cardiovascular disease [4]. Adequate physical activity involves aerobic use of large muscle groups at about 60% functional capacity for at least twice weekly for 90 minutes per week or engaging in at least 30 minutes of modest activity on most, preferably all days of the week. Modest activity is defined as any activity that is similar in intensity to brisk walking at a rate of about 3 to 4 miles per hour [5]. The activities can include any other form of occupational or recreational activity that is dynamic in nature and of similar intensity, such as cycling, yard work, household tasks, and swimming.

Overweight and obesity are major contributors to overall NCD associated mortalities [6]. World Health Organisation (WHO) in a bid to taming the menace of obesity and physical inactivity with an understanding of the health benefits of regular physical activity passed resolution WHA55.23 in 2002 [6-8] with subsequent development of appropriate steps aimed at tackling the issue of physical activity and health [9]. There is increasing rate of sedentary lifestyle among young people and even children with epidemiologic transition going on in sub-Saharan Africa. This concept of 'physical activity transition' is becoming endemic with its attendant complications especially in the 'westernised' cities and towns [10-14]. A work done about 15 years ago in Kenya among young students of 13 to 15 years showed a troubling high prevalence (40.9%) of sedentary habits [15] Muthoni Gichu et.al recently reported a prevalence of 7.7% in their study of the prevalence and predictors of physical inactivity levels among Kenyan adults[16]. Muthoni *et al*. further established that Physical inactivity was associated with female gender, middle age (30–49 years), and increasing level of education, increasing wealth index and low levels of High Density Lipoproteins (HDL) [16].

Work done by some Nigerian authors has shown prevalence rates of physical inactivity to be in the range of reported that 25-57 % [17]. Babatunde *et al*. in their survey of physical Inactivity in Nigerian Young Adults got a prevalence of 41% with higher prevalence rate found among women than men [18]. The Harvard alumni study showed an inverse relation between level of physical activity and the risk of premature death In the Harvard study, the most active men had about 50% the risk of death of the least active [4]. Leisure-time physical activity is also found to significantly reduce the risk of cardiovascular mortality [19]. A rise in the rate of physical activity has been found to be associated with a reduction in waist: hip ratio and a higher HDL-cholesterol in women [20]. It was also shown that increase physical activity was inversely associated with body mass index and percentage fat [21].

In Nigeria, most of the published works on physical inactivity level are mainly urban based with scarce resources on the rural pattern of physical inactivity. This study therefore is to determine the prevalence and predicators of physical inactivity among adult population of a rural community which may be of importance in policy formulations as even the rural Nigerian communities gradually undergo epidemiologic transition.

METHODOLOGY
This is a cross sectional study involving five hundred and seventy two adults in a rural community of the Etche-speaking tribe of Rivers state in the Niger Delta region of Nigeria.

OCCUPATION
The vast majority of the study population are involved in non-mechanised farming with cassava, maize, okro, pumpkin vegetable as their commonly planted crops. Non-agricultural workers are mainly teachers in the primary and secondary schools in the community and neighbourhood. Many women engage in petty trading but this is mainly limited to selling the farm products.

Questionnaire preparation and administration
The questionnaire which was designed to elicit socio-demographic data including age, gender, occupation, educational level, cigarette smoking, and alcohol consumption was administered by face-to-face interview. Physical activity was assessed with World Health Organization (WHO) Step questionnaire which was modified to fit into the activities peculiar to the rural community where this study was done. The activities were categorised into occupational, commuting and recreational. Level of physical activities were categorised into vigorous-intensity activities (which included activities that cause large increases in breathing or heart rate, sweating such as carrying or lifting heavy loads, digging or construction work, farming manually, chopping fire wood, wrestling etc.); moderate-intensity activities (which included activities that cause small increases in breathing or heart rate such as brisk walking, pounding, cycling, dancing etc) and sedentary activities(included sitting or reclining for most work time, storytelling, watching television, travelling most times by motor bike, car, bus etc).

Anthropometric, Blood Pressure Measrement and Blood Sample Collection
Anthropometric and blood pressure measurements were done according to standard practice [22]. Participant's heights were measured without foot wear and headdress to the nearest 0.1cm and their weight taken to the nearest 0.1 kg. Waist circumference was measured midway between the uppermost border of the iliac crest and the lower border of the costal margin (rib cage). Hip circumference was measured in a horizontal plane at the maximum width over the greater trochanter. Fasting blood sample was taken for both blood glucose and lipid analyses consistent with standard protocol [23-26].

Ethical consideration
Consent from the village Chiefs/Community and religious leaders were obtained. Consent from each study participant was also obtained for the study. Approval of the Ethics committee of the University of Port Harcourt Teaching hospital was obtained.

STATISTICAL ANALYSIS
Statistical analysis was done using Statistical Package for Social Sciences (SPSS Inc, Chicago, IL) version 17. Results were expressed as either mean values (standard deviation) or proportions. Comparison for statistical significance was by student's t test for Continuous variables and chi-square analysis for categorical variables. Epi info statistical package version 3.5.1 was used for chi-square for trend analysis. Pearson and Spearman' rho correlation test were used to determine the relationship between obesity and its possible risk factors. Logistic regression was also done. A p-value of ≤ 0.05 was considered statistically significant.

Definition of terminologies
For the purpose of this study, definition of terminologies was made;
1. Physical inactivity is defined as:
i Activity at work or leisure that is not vigorous or moderate in intensity for at least 10 minutes continuously for ≥ 3 days in a week OR
ii Not commuting by foot or use of bicycle (cycling) for at least 10 minutes continuously for ≥ 3 days in a week.

BMI was calculated as weight (kg)/height (m^2) [27].
Under weight- < 18.5 Kg/m^2
Normal Weight- 18.5 to 24.9 Kg/m^2
Overweight- 25 to 29.9 Kg/m^2

Obesity- > 30 Kg/m^2

Waist Circumference
Normal- <102cm for males, <88cm for females
Abnormal- ≥102cm for males, ≥88cm for females

Waist-hip-ratio
Normal - < 1 for males, < 0.9 for females
Abnormal ≥1 for males, ≥0.9 for females

Hypertension was defined using the JNC 7 (Joint National Committee on Prevention, Evaluation, and Treatment report) criteria of blood pressure ≥ 140/90 mmHg or self-reported antihypertensive medication use [28].

Diabetes mellitus was defined using fasting plasma glucose (FPG) ≥ 7.0 mmol/l (126 mg/dl) and individuals who were previously known to have diabetes based on history of drug medication were also classified to have diabetes.

Total cholesterol of > 6mmol/L, TG > 1.8mmol/L, HDL-C <1.0mmol/L and LDL-C ≥ 3mmol/L were taken as abnormal values.

RESULTS
Five Hundred and seventy two had their data analysed with male to female ratio of 1:2.6. The overall mean age was 39.08±17.5 years. Table I shows age and sex distribution of the study group.

Table-I: Age and sex distribution of study group

Age group (years)	OVERALL		MALES		FEMALES	
	Number	%	Number	%	Number	%
18-29	222	38.8	51	31.9	171	41.5
30-39	74	13.0	22	13.8	52	12.6
40-49	106	18.5	32	20.0	74	18.0
50-59	74	13.0	19	11.9	55	13.3
60-69	66	11.5	21	13.1	45	11.0
70 and above	30	5.2	15	9.3	25	3.6
Total	**572**	**100**	**160**	**28.0**	**412**	**72.0**

Physical activity history - Table II shows that less than 10% of the study group were sedentary at work with most persons commuting by foot or use of bicycle. The overall prevalence of physical inactivity in this study was 3 % to 7.3% during commuting or working respectively with men being more active than females. The elderly age group of 70 years and above were more sedentary than all other age groups.

Table-II: Prevalence of physical inactivity

Variable	Physical inactivity		
	At work %	Commuting %	During recreation %
Males			
18-29 years	0	0	5.9
30-39 years	0	0	22.7
40-49 years	0	0	31.3
50-59 years	0	0	63.2
60-69 years	14.3	4.8	90.5
≥70 years	40.0	33.3	100
Total	**6.6**	**3.7**	**43.1**
Females			
18-29 years	0	0	30.9
30-39 years	0	0	57.7
40-49 years	0	0	74.3
50-59 years	0	0	90.9
60-69 years	6.7	2.2	100
≥70 years	33.3	32.0	100
Total	**8.0**	**2.7**	**62.6**
Overall prevalence	**7.3**	**3.0**	**57.2**

Table-III: Gender differences in the means of systolic and diastolic blood pressure.

VARIABLES	TOTAL		MALES		FEMALES		P * value
	n	Mean±SD	n	Mean±SD	n	Mean±SD	
SBP (mmHg)	550	120.04±21.40	160	123.54±19.50	390	118.59±21.9	0.013
DBP(mmHg)	550	73.64±12.50	160	75.88±12.80	390	72.72±12.30	0.007

SBP = systolic blood pressure; DBP= diastolic blood pressure; n= number. P* = Significant.

Table-IV: Relationship of physical inactivity with risk factors for physical inactivity

VARIABLES	COEFFICIENT OF CORRELATION(r)	P value
Smoking	-0.098	0.05
BMI	-0.100	0.02

Table-V: Regression analysis of physical inactivity and correlates

VARIABLES	B	STANDARD ERROR	WALD	P value
Smoking	-0.759	0.39	3.88	0.04
BMI	-0.789	0.316	6.25	0.012

Pearson correlation and Spearman' rho correlation analyses (Table IV) showed that smoking and BMI correlated with obesity. Linear regression analysis, (Table V), showed that smoking and BMI predicted presence of physical inactivity.

DISCUSSION

The prevalence of physical inactivity in this study especially among the young and middle aged group is low similar to the documentations of Muthoni *et al.* in Kenya where a prevalence of 7.7% was reported [16]. It is however lower than the work of other authors both in Nigeria and the African continent [15, 17-18]. Physical activities were attributed to occupational and commuting than leisure activities similar to the findings by Forrest et.al in Benin City, Nigeria [17]. These comparative Nigerian studies were however urban studies among various professional groups who spend most of the work hours sitting and commute around mostly by vehicles. The findings of low prevalence of sedentary lifestyle in this study is not surprising as a large proportion of the study subjects were farmers who engage in active physical work including daily trekking to the farm, market, church etc.

In this study however, there was an increasing physical inactivity level with increasing age and the elderly age group of 70 years and above were more sedentary than all other age groups unlike the Benin study where no significant trend was observed across age groups. In this study, physical inactivity was found to be higher in women than men similar to the findings in other local and international studies [15, 17, 18, 29-34].

A rise in the rate of physical activity has been found to be associated with a reduction in waist:hip ratio and a higher HDL-cholesterol in women [20]. It has also been shown by previous authors that increase in physical activity was inversely associated with body mass index and percentage fat [21]. This agrees with the finding of this present study showing low prevalence of abdominal obesity with greater percentage of the participants having normal body weight similar to the work of Okesina and colleagues in rural Maiduguri [35]. In the Benin City study, physical activity, especially time walking or biking to work, was inversely correlated with weight, BMI, WHR, blood pressures, insulin, total cholesterol, LDL and HDL cholesterol, and triglycerides in men, while such correlations were not consistent in women. In multivariate analysis in men, an independent inverse association was seen between walking and BMI [17]. This finding in our study is unlike the Akpa el.al study in urban city of Port Harcourt with higher prevalence rate [36]. The difference may be partly related to the fact that whereas this present study is a rural study, the Akpa et al study was done in an urban, industrialised city of Port Harcourt with increasing rate of westernisation of lifestyle.

This inverse relationship between generalised obesity and high physical activities found in this study is linked to the occupation and other activities of this rural community such farming and household chores like pounding, chopping of fire woods including wrestling as a recreational activity.

In this study BMI and smoking were reported as predictors of physical inactivity. Both weight gain and weight loss are functions of energy balance, and prevention of weight gain can theoretically be achieved by changes in both dietary energy balance and physical activity [37-38].

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