

Association Between Leisure-Time Physical Activity and Socio-Demographic Characteristics Among Employees of a South-western University in Nigeria: A Cross-Sectional Study

Akintayo ND,¹ Fadare AE,¹ Ojedoyin OO,¹ Idowu OA¹

ABSTRACT

This study assessed the leisure-time physical activity levels and socio-demographic factors associated with meeting the World Health Organization (WHO) recommended physical activity guidelines among university employees in Nigeria. We conducted a cross-sectional study among 385 university employees. The leisure-time physical activity data were self-reported, including the participants' activities, session duration, and frequency. Sufficient LTPA was defined as at least 150 minutes of moderate and/or vigorous intensity per week and was estimated according to gender, age, education, and class of employment, years of experience. Data was analyzed using Chi-square and logistic regression. The overall proportion of those who met the WHO aerobic activity recommendations was 79.7%, and those who met muscle strengthening recommendations were 31.9%. Gender ($X=4.049$, $p=0.044$), academic qualifications ($X=4.391$, $p=0.036$), and years of experience ($X=14.662$, $p=0.001$) were associated with meeting the recommended aerobic LTPA levels. Only sex was associated with meeting muscle-strengthening LTPA levels ($X=5.246$, $p=0.022$) and meeting the WHO physical activity recommendation ($X=4.386$, $p=0.028$). Males had greater odds of meeting the recommended aerobic (OR: 0.539, 95%=0.321-0.904) and combined aerobic-muscle strengthening guidelines (OR: 0.605, 95%=0.386-0.949). In addition, those who had more years of experience had greater odds of meeting the recommended aerobic activity guidelines (OR: 0.395, 95%=0.234-0.667). This study highlighted that male gender and those with more years of experience are more likely to meet the recommended physical activity guidelines. These findings indicate a need for gender-sensitive programmes to increase the leisure time physical activity levels of female university employees in Nigeria.

Keywords: WHO, Physical activity guideline, Leisure-time, Employees, University

INTRODUCTION

Insufficient leisure-time physical activity (LTPA) continues to be a major cause of death worldwide.¹ LTPA is widely recognized as a major component in preventing and managing several chronic diseases.² The WHO suggests that adults should engage in ≥ 150 minutes of moderate to vigorous physical activities. Additionally, they should perform muscle-strengthening exercises at least twice a week for optimum health benefits.³ Despite the numerous

benefits of LTPA, such as reduced risks of chronic diseases and mortality, adults are still not meeting the World Health Organization (W.H.O.) recommended physical activity (PA) guidelines globally.⁴⁻⁶ According to recent estimates, more than 25% of individuals worldwide do not engage in the WHO's recommended levels of PA.^{7,8}

Working-class age brackets are vulnerable to the negative consequences of insufficient LTPA, as their capacity to work depends on their physical activity levels, fitness status, and overall health status.^[9] Adults spend more than 60% of their active waking hours at work, with most time being spent being sedentary.¹⁰⁻¹² In addition, several studies have indicated that time devoted to working negatively impacts people's

Department of Physiotherapy,¹ Faculty of Basic Medical Sciences, Redeemer's University, Ede, Osun State, Nigeria

*Corresponding Author: akintayon@run.edu.ng

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participation in LTPA.^{13,14} Among employees of diverse professions, insufficient physical activity is linked to negative consequences including reduced work productivity, absenteeism, reduced quality of life, increased healthcare costs, and lower life expectancy.¹⁵ For instance, Nigerian university employees spend long hours at work, and engage in low levels of LTPA; these may adversely affect their health and lead to poor job performance.¹⁶

Recently, Peng *et al.*¹⁷ in a study on sociodemographic factors, leisure time physical activity, and mortality reported that sociodemographic factors such as age, sex, race/ethnicity and socioeconomic status were associated with LTPA and mortality. Previous studies have established that social determinant, including socio-demographic variables, are associated with the intensity and level of physical activity.^{18,19} Further, Luo and Zhong,²⁰ reported that sociodemographic variables such as age, gender, and socioeconomic status were associated with physical activity levels. It was also revealed in the study done by Fuentealba-Urra and colleagues,²¹ that gender and socioeconomic status greatly influence the physical activity of the general population. Considering in and outside the school system, adolescent women were seen to be less physically active compare to their male counterparts.^{22,23} A study done by Safi *et al.*²⁴ among university employees in the United Kingdom, showed that sociodemographic variable such as gender has an influence on their physical activity level with males engaging more in moderate to vigorous PA compared to females. Similarly, sociodemographic variables such as job roles did not influence the PA levels in the university workplace.

University workplace plays a pivotal role in society, considering the importance of LTPA with the increasing trend in the prevalence of physical inactivity and its associated consequences such as obesity,

hypertension, heart diseases, diabetes, and musculoskeletal disorders in Nigeria, conducting studies to identify the socio-demographic characteristics associated with LTPA can be useful in planning effective intervention and monitoring efforts to promote LTPA among university employees.

Therefore, this study aimed to investigate the association between LTPA and sociodemographic characteristics of Nigerian university employees. We hypothesize that gender, age, academic qualification, and years of experience were the determining sociodemographic factors in the practice of LTPA and that they constitute together, the predictors of LTPA level in Nigerian University employees.

MATERIALS AND METHODS

Study design/study population

This was a cross-sectional study conducted between May and August 2023. The study population was the Employees (comprising academic and non-academic staff) of Redeemer's University, Ede, Osun State. Redeemer's University is a faith-based privately owned University in Nigeria. The university was established in 2005 and commenced academic activity on October 11, 2005. The university currently has a student population of more than 6000 and a staff strength of more than 700 excluding all forms of casual workers. The university presently has eight faculties and in addition, international reputable institutes.

Inclusion criteria: These were male and female university employees of the University.

Exclusion criteria

1. These were those who refused to give informed consent.
2. Casual workers were excluded because of certain characteristics such as inconsistent hours, a lack of benefits and experience that uniquely

differentiate them from permanent employees.

Sampling technique/Sample size

The study was conducted at Redeemer's University among employees comprising both academic and non-academic staff. The employees were selected through a convenience sampling technique. Respondents that met the inclusion criteria and gave their informed consent participated in the study. The study involved a total of 385 employees, both academic and non-academic, of the university. The sample size was calculated using the Taro and Yamane formula,²⁵ $n = N / (1 + N(e)^2)$, and the total sample required for this calculation was 269.

Data collection tool

1. **Socio-demographic data:** This form was used to obtain information such as age, gender, academic qualifications, working hours each week, class of employment, and years of experience from the participants.

2. **The 'Leisure Time Physical Activity Questionnaire' questionnaire** adapted from Murphy et al.²⁶ in a study on LTPA among U.S. Adults with arthritis was used to obtain information regarding LTPA; the level of aerobic activity (active, insufficiently active/inactive), the level of strengthening activities and adherence to W.H.O. recommendation guidelines. The questionnaire was divided into 3 segments (vigorous aerobic activity, moderate aerobic activity, and muscle strengthening), and the series of questions asked was prefaced with the following: The next questions are about physical activities (exercise, sports, physically active hobbies, etc.) that you may do in your leisure time.

Vigorous Aerobic Activity: Participants were asked: How often do you do vigorous leisure-time physical activities for at least 10 minutes that cause heavy sweating or large increases in breathing or heart rate? those who reported at least once were asked about time period (day/s

per week) for which they were reporting and the duration of these activities (About how long do you do these vigorous leisure-time physical activities each time?)

Moderate Aerobic Activity: Following the questions about vigorous activity, participants were asked: How often do you do light or moderate leisure-time physical activities for at least 10 minutes that cause only light sweating or a slight to moderate increase in breathing or heart rate? Similar to the questions about vigorous activities, those who said at least once were then asked about time period and duration.

Muscle Strengthening: Participation in muscle strengthening was ascertained with: How often do you do leisure time physical activities specifically designed to strengthen your muscles such as lifting weights or doing calisthenics? (Include all such activities even if you have mentioned them before.) Those who reported at least once were asked about time period (day/s per week) for which they were reporting.

Scoring

(i) **For LTPA:** Respondents who agree that they engage in leisure time physical activity by writing how often they do in a week, make the population that engages in physical activity during leisure time.

(ii) **For level of aerobic activity (active, insufficiently active, and inactive):** Respondents would report frequency and duration of leisure time moderate and vigorous aerobic activity during a usual week. Weekly moderate equivalent minutes would be calculated by summing moderate- and vigorous-intensity minutes, where 1 minute of vigorous-intensity physical activity is equivalent to 2 minutes of moderate-intensity physical activity. Respondents would be classified as active if they engage in more or equal to 150 minutes of moderate-intensity equivalence activity (i.e. meet aerobic physical activity guideline), insufficiently active if they engaged in some moderate-

intensity equivalent activity but did not meet the active definition, and inactive if they reported no moderate-intensity equivalent activity that lasted more or equal to 10 minutes. Those engaging in more than 300 minutes of moderate-intensity equivalent activity each week would be classified as highly active. For the sake of our analysis, we classified those that were active and highly active together into one group of active.

(iii) **For level of muscle-strengthening activities:** Respondents would report participation in leisure time physical activities specifically designed to strengthen their muscles (e.g. lifting weights, doing calisthenics) two or more times weekly would be classified as meeting the muscle strengthening guideline.

(iv) **For adherence to W.H.O. recommendation guidelines:** Fully meeting guidelines is meeting both aerobic activity and muscle strengthening guidelines.

Statistical analysis

Data analyses were carried out using SPSS software (IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY, USA: IBM). The data were summarized using descriptive statistics such as the mean, standard deviation, and frequency. The associations between independent variables (gender, age, academic qualification, job role, years of experience) and dependent variables (aerobic activity level, muscle strengthening activity) were examined using chi-square tests and logistic regression. The statistical analysis was performed with a 95% confidence interval, and the level of significance was set at $p < 0.05$.

Ethical consideration

The study was approved by the ethics committee of Redeemer University, Ede, on 13th July 2023 (reference number RUN/REC/2023/024). The consent required for the distribution of the study questionnaire at the university was equally obtained from the

heads of the departments. Thereafter, the individual consent of the involved employees was obtained. The purpose of the study was explained to the participants through a letter attached to each copy of the questionnaire. The questionnaire was self-reported. The questionnaire was distributed to the employees by hand and collected via the same means.

RESULTS

A total of 385 university employees participated in this study. The participants' ages ranged between 18 and 55 years of age. There were 202 (52.5%) males and 183 (47.5%) females. All are shown in Table 1. Most of the respondents (307, 79.7%) met the WHO aerobic activity guidelines. Only 123 (31.9%) of the respondents met the muscle-strengthening guidelines. All are shown in Table 2.

Factors associated with physical activity (aerobic activity, muscle strengthening, or both)

The following socio-demographic characteristics sex ($p=0.044$), academic qualification ($p=0.036$), and years of experience ($p=0.001$) were associated with the LTPA (aerobic) levels of the respondents. Only gender was associated with the LTPA (muscle strengthening) of the respondents ($p=0.022$). Additionally, only sex was associated with meeting the WHO physical activity recommendation (both aerobic and muscle strengthening) ($p=0.028$). Using binary logistic regression analysis, variables with a p -value < 0.05 were included in the final equation. Male individuals had greater odds of meeting the recommended aerobic guidelines (OR: 0.539, 95%CI=0.321-0.904). In addition, those who had more years of experience had greater odds of meeting the recommended aerobic activity guidelines (OR: 0.395, 95%CI=0.234-0.667). Male individuals had greater odds of meeting the

WHO physical activity guidelines (aerobic and muscle-strengthening) (OR: 0.605, 95%CI=0.386-0.949). (Table 3 & 4)

Table 1: Frequency distribution of all the participants

Variable	Categories	Frequency	Percent (%)
Gender	Male	202	52.5
	Female	183	47.5
Age	18 - 35	104	27.0
	36 – 55	224	58.2
	> 55	57	14.8
Academic qualification	Degree/P G	326	15.3
	SSCE/ND	59	84.7
Job role	Teaching	193	50.1
	Non-teaching	192	49.9
Years of Experience	≤ 10 years	262	68.1
	> 10 years	123	31.9

PG=Postgraduate; SSCE = Secondary School Certificate Examination; ND=National

Table 2: The proportions of participants who met or did not meet WHO physical activity guidelines (aerobic, muscle strengthening, aerobic and muscle strengthening guidelines)

Variable	Frequency	Percentage (%)
Aerobic classification		
Did not meet the guideline	78	20.3
Met the guideline	307	79.7
Muscle strengthening classification		
Did not meet the guideline	262	68.1
Met guideline	123	31.9
Both Aerobic and muscle strengthening classification		
Did not meet the guideline	274	71.2
Met the guideline	111	28.8

(Meeting guideline = at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity physical activity per week, or an equivalent combination; of muscle-strengthening activities at least 2 times a week)

DISCUSSION

To the authors' knowledge, this is one of the few studies to evaluate the LTPA levels (aerobic activity level, muscle strengthening, and both) of university employees in Nigeria. This study aimed to examine the LTPA levels of university employees and to find the association between sociodemographic characteristics and the meeting of the physical activity recommendation guideline. The key findings revealed that the large proportion of the university employees met at least 150 minutes of moderate and/or vigorous intensity LTPA per week while only smaller proportion met the muscle-strengthening activities guideline of at least 2 times or more. Conversely, the proportion of the university employees that met both aerobic and muscle strengthening recommendation was low. The findings of this study also revealed a significant association between the aerobic activity levels of the respondents and their gender, academic qualifications, and years of experience. Only sex was associated with meeting muscle-strengthening LTPA levels and meeting the WHO physical activity (both aerobic and muscle strengthening combined) recommendation. The findings from this study also showed male individuals, those with more years of experience and those with degree and/or post graduate qualifications had greater odds of meeting the recommended physical activity guidelines.

According to the results of this study, a low proportion (28.8%) of Nigerian higher institution employees met the WHO physical activity recommendation (at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity physical activity per week, or an equivalent combination and at least 2 times of muscle-strengthening activities per week). The explanation could be the nature of their work, which necessitates some moderate to high level of sedentariness and inadequate awareness of the muscle-strengthening component of the WHO physical activity

Table 3: Leisure-time physical activity levels according to sociodemographic characteristics

Aerobic					
Variable	Categories	LTPA (aerobic) levels		X ²	p-value
		Insufficient	Active		
Gender	Male	33	169	4.049	0.044*
	Female	45	138		
Age	18 – 35	20	84	0.774	0.679
	36 – 55	44	180		
	> 55	14	43		
Academic qualification	Degree/PG	72	254	4.391	0.036*
	SSCE/ND	6	53		
Job role	Teaching	45	148	2.238	0.135
	Non-teaching	33	159		
Years of Experience	≤ 10 years	39	223	14.662	0.001*
	> 10 years	39	84		
Muscle Strengthening					
Variable	Categories	LTPA (Muscle strengthening) levels		X ²	p-value
		< 2 times per week	≥ 2 times per week		
Gender	Male	127	75	5.246	0.022*
	Female	135	48		
Age	18 – 35	66	38	2.445	0.294
	36 – 55	153	71		
	> 55	43	14		
Academic qualification	Degree/PG	224	102	0.426	0.514
	SSCE/ND	38	21		
Job role	Teaching	138	55	2.119	0.145
	Non-teaching	124	68		
Years of Experience	≤ 10 years	98	41	1.014	0.314
	> 10 years	88	35		
Both Aerobic and Muscle strengthening					
Variable	Categories	Not Meeting PA Guideline	Meeting PA Guideline	X ²	p-value
Gender	Male	134	68	4.836	0.028*
	Female	140	43		
Age	18 - 35	73	31	1.184	0.533
	36 – 55	157	67		
	> 55	44	13		
Academic qualification	Degree/PG	236	90	1.553	0.213
	SSCE/ND	38	21		
Job role	Teaching	143	50	1.613	0.204
	Non-teaching	131	61		
Years of Experience	≤ 10 years	181	81	4.402	0.111
	> 10 years	93	30		

* Indicates level of significance at $p < 0.05$; PG=Postgraduate; SSCE = Secondary School Certificate Examination; ND=National Diploma

recommendation guidelines. Employees often do not meet the WHO-recommended guidelines due to lack of motivation,²⁷ time

constraints,²⁸ and a lack of motivation from employers to participate in physical leisure activities.²⁹

Table 4: Binary logistic regression showing the association between LTPA levels and participants' sociodemographic characteristics

Aerobic Variable	P	O.R (95% C.I)
Gender		
Male	0.045*	0.599 (0.362 – 0.990)
Female		1.00
Academic qualification		
Degree/PG	0.042*	2.504 (1.035 – 6.060)
SSCE/ND		1.00
Years of experience		
≤ 10 years	0.001*	0.377 (0.226 – 0.627)
> 10 years		1.00
Muscle Strengthening Variable	P	O.R (95% C.I)
Gender		
Male	0.023*	0.602 (0.389 – 0.931)
Female		1.00
Both Aerobic and Muscle Strengthening Variable	P	O.R (95% C.I)
Gender		
Male	0.029*	0.605 (0.386 – 0.949)
Female		1.00

* Indicates level of significance at $p < 0.05$;
OR=odds ratio; C. I= Confidence interval

The reported aerobic physical activity levels (at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity physical activity per week, or an equivalent combination) in this study are high (79.7%). This might be due to increasing awareness of the negative consequences of physical inactivity and to the recent modern development of the university environment,

which allows for easy performance of physical activity. A study by Safi *et al.*²⁴ revealed that the number of university employees in the UK exceeded the recommended aerobic physical activity guidelines. In addition, a similar study performed among shop attendants in Uganda showed that a high proportion of the population studied met the WHO physical activity recommendation, mostly through work-related moderate-intensity physical activity.³⁰ In addition, this study's LTPA level is greater than the one reported by Oyeyemi *et al.*³¹ (78%), and the global average (76.8%), as reported by Sallis *et al.*³²

We found that gender was associated with meeting the WHO physical activity recommendation. This study revealed that more male participants met the recommended guidelines than did their female counterparts. This finding is supported by previous studies that revealed that males engaged more in moderate-vigorous leisure time physical activity than did their female counterparts who tended to perform more light- to moderate-intensity PA.^{24,33,34} Innovative strategies should be devised to increase LTPA levels, especially those targeting the female population among higher institutional employees.

According to the results of this study, a significant association was found between academic qualifications and the LTPA levels of the participants. This study showed that those with a higher level of education, such as having a degree or postgraduate degree, have greater odds of meeting the full WHO physical activity recommendation, unlike their counterparts with lower levels of education, such as the SSCE, ND, and NCE. This is supported by the results of earlier cross-sectional studies showing that the prevalence of those who engage more in leisure-time physical activity is high among those with higher education qualifications, which could be due to exposure during years of study and

more awareness of the WHO recommendation guidelines.³⁵

This study also revealed that those with more years of working experience (> 10 years) have greater odds of meeting the recommended aerobic activity guidelines. This outcome is similar to that of the study by Kunene and Taukobong,³⁶ where it appeared that those with > 5 years of experience are more active than those with ≤ 5 years of working experience. The explanation could be that with more experience comes increasing knowledge and focusing more on one's health, which necessitates the need to be more physically active.

In addition, this study revealed that job roles (teaching or non-teaching) in the university system have no influence on employees LTPA level. This outcome is supported by previous studies where no significant difference was found between PA level of both teaching and non-teaching staff.^{24,37} This could be due to the fact that both teaching and non-teaching employees operate within same shared environmental and organization context thereby reducing variation between job roles. Also, compared to the general workforce, university employees may have less variation in education level, income, and health awareness, which reduces differences across job types in health behaviours like physical activity.

Clinical Implication

Gender and academic qualifications and years of working experience are important predictors of meeting physical activity recommendation guideline. Interventions such as structural changes (like creating accessible stairwells and bike racks), program-based strategies (like team challenges and co-curricular activities), and motivational techniques (like informational banners, email prompts), targeted at improving university employee's health especially their physical activity levels should take these three factors (gender, academic qualifications, and years of

working experience) into consideration when designing such programmes/interventions.

Limitations

The findings of this study may have limitations because of the use of self-report questionnaires, which are subject to recall bias. Additionally, because of the cross-sectional nature of the study, cause-effect could not be established, but we applied the causation rule of temporality. Future research should complement self-reported LTPA measurement with objective measures such as accelerometers, this will help reduce the incidence of recall bias and provide more accurate insights into participants leisure time physical activity levels.

Conclusion

Informed by the principle of sociodemographic determinants, the findings from this study have shown that both gender and academic qualifications and years of working experience could strongly influence the leisure time physical activity levels of university employees and meeting WHO physical activity recommendation guidelines. Therefore, public health interventions designed to increase population LTPA levels should take into account the interaction of these factors.

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