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Physical activity and quality of life among adults in Maiduguri, Nigeria

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ABSTRACT

Background: Engaging in sufficient physical activity (PA) improves health and quality of life (QOL) across all ages.

Objective: The objective of this study was to determine the relationship between demographic variables, PA and QOL among adults in Maiduguri, Nigeria.

Methods: A total of 390 apparently healthy male and female adults (age range =18–65 years) in Maiduguri participated in the study. PA level was assessed with the International Physical Activity Questionnaire-Short Form. Health-related QOL was assessed using the physical and mental components summary scales (PCS & MCS) of the MOS Short Form-12 health survey questionnaire. Pearson's correlation was used to explore the relationships between age, PA and QoL of the participants.

Results: The mean age of the participants was 29.51±10.12 years. About half of the participants were males (52.8%) and employed (54.4%). Age was inversely correlated with total PA (r= -0.13, *P*<0.001) and PCS (r= -0.32, *P*<0.001). Total PA was negatively correlated with PCS (r= -0.13, *P*= 0.010) but positively with MCS (r= 0.17, *P*= 0.001). There was significant difference in total PA (*P*<0.001), PCS (*P*<0.001) and MCS (*P*<0.05) between female and male, and also between the employed and unemployed. Also, there was significant difference in PCS (*P*<0.001) and MCS (*P*= 0.003) between participants with higher education and those with non-formal education.

Conclusion: Significant relationships were found between demographic variables, PA and QOL components among the participants. These results affirm that PA is important to improving the QOL of adults in Maiduguri.

Keywords: Physical Activity, Exercise, Quality of Life, Lifestyle, Health Behaviour

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Introduction

Physical activity has been defined as any bodily movement produced by contraction of the skeletal muscles that result in energy expenditure[1]. Physical activity involves but not limited to gym workouts. Physical activities such as climbing stairs, walking, running, dancing, playing games and sports, or planned in the form of activities of daily living are associated with physical, functional, social and general psychological well-being and quality of life[2].

Sever al health benefits of physical activity have been documented; these include decreased risk of cardiovascular disease, diabetes, hypertension, cancer and all cause mortality[3]. Other benefits include maintenance of physical fitness, healthy weight, and building and maintaining healthy bone density and muscle strength[4]. According to a report, a 30-minute moderate intensity physical activity for at least five days/week is recommended

to improve and maintain health[5]. However, physical activity may be accumulated during the course of the day as studies have indicated regular physical activity improves functional status and quality of life (QOL) in adults[6,7].

QOL is a subjective assessment of how satisfied/dissatisfied an individual is with his/her life in terms of symptom experience, functional status, and subjective state of physical and mental well-being[8]. In order to inform decision making, QoL has been integrated into evaluation of quality of service delivery, cost effectiveness analysis and health outcome in both research and clinical practice[9,10]. Health-related quality of life (HRQOL) refers to the subset of QOL that deals with individuals' perception and subjective evaluation of their health and well-being within their unique cultural environment[11]. Physical activity has a beneficial effect on the QOL of apparently healthy individuals[12,13]. It has been found that persons who meet the World Health Organization (WHO) recommendation for the amounts of physical activity had better HRQOL than their less active counterparts[14].

Studies have shown that physical activity impactspositively on QOL in persons with various disease conditions[15,16] and in older adults[17]. Also, physical activity in form of endurance and/or resistance training exercise is positively associated with HRQOL, irrespective of age, health and activity status[13]. However, majority of the studies on the relationship of physical activity and QOL were conducted in the industrialised societies and there is dearth of literature from this part of the world. Understanding the relationship of physical activity and QOL among adults in Nigeria is important to effective public health promotion in the country. Therefore, the primary objective of this study was to determine the relationship between PA and HRQOL in apparently healthy adults in Maiduguri, the capital city of Borno State in the North-eastern Nigeria. Also, the differences in PA and HRQOL were examined among the participants with different sociodemographic factors.

Materials and Methods

Study area, design and participants: This community-based cross-sectional survey was carried out in Maiduguri Metropolis of Borno State, North-eastern Nigeria. The participants were apparently healthy men and women aged 18-65years. Those with history of any underlying illness such as diabetes, hypertension, cardiovascular disorder etc were excluded. Participants were recruited through house to house visit in the various wards.

Sampling technique: A multistage sampling technique was used to select participants for this study. The sampling was done in three (3) stages. In the first stage, based on logistics, 20% of the available fifteen (15) wards in Maiduguri Metropolis were randomly selected. Thethree (3) randomly selected wards were *Maisandari*, *Hausari* and *Shehuri* north. Six localities were randomly selected from the three (3) wards to include two (2) localities from each ward in the second stage. The randomly selected localities were; *Kululluri, Sulemanti, Fezzan, Zango, Nimeri korongoso and Nimeri awasulum*. In the last stage, from each of the selected localities, convenientsampling method was employed to enroll the eligible and willingparticipants at their various homes.

Procedures and measures: Written informed consent forms were issued to the enrolled participants and the copies of thequestionnaire were administered on them. Socio demographic form was used to collect information on the participants' age, gender, marital, employment &educational status. The short self-administered, last week version of the International Physical Activity Questionnaire (IPAQ-SF) was used to assess participants' PA. The instrument enquires about the time spent being physically active in the last seven days, and measures vigorous-intensity activities, moderate-intensity activities (walking not included), walking and sitting activities. These activity categories may be treated separately to obtain the activity pattern or multiplied by their estimated value in metabolic equivalents (METs) and summed to gain an overall estimate of total

physical activity in a week[18]. One MET represents the energy expended while sitting quietly at rest and is equivalent to 3.5 ml/kg/min of VO_2Max.[5] The MET intensity used to score IPAQ questions in this study were vigorous (8METs), moderate (4METs) and walking (3.3 METs)[16]. The test–retest reliability (ICC= 0.33-0.73) and concurrent validity (ρ =0.78-0.92) of the Hausa version of the IPAQ-SF in Nigeria were good and acceptable[19].

The Medical Outcome Survey Short Form-12 (SF-12) health survey questionnaire was used to assess HRQOL of the participants. This instrument contains twelve items in which the participants who were willing to take part in the study were expected to respond appropriately and the corresponding scores recorded. The SF-12 was originally developed as a short alternative to the SF-36. It has been found to be valid, reliable, and its responsiveness determined with an accuracy of at least 90% in measuring the physical and mental health summary measures[20].

Ethical consideration: Ethical Committee of the University of Maiduguri Teaching Hospital, Maiduguri gave approval for this study. The study protocol was explained to the participants and participation was voluntary.

Data Analyses

Data entry and analyses was done using IBM SPSS software version 21. To ensure proper entry and avoid missing or data entry error all variables were cross-checked and cleaned at the time of data entry. Data computations for both the physical activity and QOL variables were done under strict guidelines of the respective tools. Descriptive statistics of mean and standard deviation, frequencies and percentages were used to summarise socio-demographic factors, and to describe the PA & HRQOL values appropriately for categorical and numerical variables. Independent t-test was used to compare mean differences in PA and HRQOL by gender and employment status. One-way ANOVA was employed to assess the mean difference in PA and HRQOL among educational statuses. Scheffe's procedure was used for the post-hoc multiple comparison to probe significant main effects. Pearson's product moment correlation was used to determine the relationship between age, PA & HRQOL of the participants. The level of significance was set at α=0.05.

Results

A total of 390 apparently healthy adults participated in this study. The mean age and body mass index of the participants were 29.51±10.12 years and 24.05±3.95 kg/m^2 respectively. Majority of the participants were male 206 (52.8%), married 200 (51.3%) and employed 210 (54.6%) as shown in Table 1. The mean total PA and physical component score (PCS) and mental component score (MCS) of the QOL domains of the participants were 4918.79 ± 4328.75 MET-min/wk, 54.21 ±4.76 and 49.60 ±6.62 respectively.

Table 1: Sociodemographic variables of the participants

Variables	Frequency (n)	Percentage (%)
Gender		
Male	206	52.8
Female	184	47.2
Marital Status		
Single	188	48.2
Married	200	51.3
Divorced	2	0.5
Employment Status		
Employed	212	54.4
Unemployed	178	45.6
Level of Education		
Higher education	95	24.4
Lower education	211	54.1
Non-formal education	84	21.5

Table 2 shows the comparison of PA & QOL components by gender. Males were significantly (P = 0.001) more physically active than females in all PA components except moderate PA. While the females had significantly (P = 0.001) higher score on the Physical Component of QoL than males, the males had significantly (P = 0.001) higher score on the mental Component of QoL than the females.

Table 2: Comparison of mean difference in PA and QOL components among Gender (n=390)

Variables	Mean(SD)	Mean Difference (95%CI)	t-statistic* (df)	*P*-value
Vigorous PA (MET-min/wk)		-1953.61(-2594.39,-1312.83)	-5.99(388)	<0.001
Female (184)	1200.17(2401.24)			
Male (206)	3153.79(3793.70)			
Moderate PA (MET-min/wk)		-182.79(-518.97,153.39)	-1.07(388)	0.286
Female (184)	1727.15(1594.88)			
Male (206)	1909.94(1762.81)			
Walking (MET-min/wk)		-676.31(-876.16,-476.46)	-6.65(388)	<0.001
Female (184)	505.78(765.12)			
Male (206)	1182.09(1173.87)			
Total PA (MET-min/wk)		-2812.71(-3630.25,-1995.17)	-6,76(388)	<0.001
Female (183)	3433.10(3325.14)			
Male (206)	6445.82(4683.57)			
Physical component summary		2.46(1.55,3.38)	5.28(388)	<0.001
female (184)	55.51(4.27)			
male (206)	53.05(4.89)			
Mental Component Summary		-7.46(-8.56,-6.37)	-13.44(388)	<0.001
Female (184)	45.66(5.61)			
Male (206)	53.12(5.36)			

PA= physical activity, QOL- quality of life, MET= metabolic equivalent, *Independent t-test was applied

Table 3 shows the comparison of PA and QOL by employment status. The employed were significantly (P<0.05) more physically active than the unemployed in all PA components. While the employed had significantly (P = 0.001) lower score on the Physical Component of QoL than unemployed, the employed had significantly (P = 0.001) higher score on the mental Component of QoL than the employed.

Table 3: Comparison of mean difference in PA and QOL components among Employment status (n=390)

Variables	Mean(SD)	Mean Difference (95%CI)	t-statistic* (df)	*P*-value
Vigorous PA (MET-min/wk)		2017.70(1377.34,2658.06)	6.20(388)	<0.001
Employed (212)	3152.98(3743.36)			
Unemployed (178)	1135.28(2407.48)			
Moderate PA (MET-min/wk)		408.88(73.94,743.83)	2.40(388)	0.017
Employed (212)	2010.32(1717.36)			
Unemployed (178)	1601.44(1624.82)			
Walking (MET-min/wk)		241.85(31.82,451.87)	2.26(388)	0.024
Employed (212)	973.39(1163.20)			
Unemployed (178)	731.54(898.58)			
Total PA (MET-min/wk)		2668.43(1844.07,3492.80)	6.36(388)	<0.001
Employed (212)	6136.69(4807.69)			
Unemployed (178)	3468.26(3120.09)			
Physical component summary		-3.13(-4.03,-2.23)	-6.83(388)	<0.001
Employed (212)	52.78(5.35)			
Unemployed (178)	55.91(3.21)			
Mental Component Summary		1.86(0.55,3.17)	2.79(388)	0.006
Employed (212)	50.45(6.41)			
Unemployed (178)	48.59(6.74)			

PA= physical activity, QOL- quality of life, MET= metabolic equivalent, *Independent t-test was applied

Comparison of mean difference in PA and QOL components among educational status of the participants is presented in Table 4. There was no difference observed in walking (F= 1.36, *P*= 0.258) and total PA (F= 1.18, *P*= 0.309) between various educational statuses. However, post-hoc multiple comparison test using Scheffe's procedure showed significant difference between higher vs. non-formal education in vigorous PA (F= 4.67, *P*= 0.011), moderate PA (F= 4.97, *P*= 0.008), PCS (F= 6.70, *P*= 0.009) and MCS (F= 3.72, *P*= 0.028). Also, significant difference was found in PCS between lower vs. non-formal education (F= 6.70, *P*= 0.003).

Table 4: Comparison of mean difference in PA and QOL components among three Educational statuses (n=390)

Comparisons	Mean Difference (95%CI)	F-statistic* (df)	*P*-value
Vigorous PA (MET-min/wk)		4.67(2,378)	
Higher vs. Lower education	-596.25(-1605.13,412.64)		0.349
Higher vs. Non-formal education	-1511.24(-2734.19,-288.29)		0.011
Lower vs. Non-formal education	-914.99(-1968.44,138.46)		0.104
Moderate PA (MET-min/wk)		4.97(2,378)	
Higher vs. Lower education	334.56(-172.17,841.29)		0.269
Higher vs. Non-formal education	768.49(172.24,1400.73)		0.008
Lower vs. Non-formal education	451.93(-77.19,981.04)		0.267
Walking (MET-min/wk)		1.36(2,378)	
Higher vs. Lower education	-93.03(-413.44,227.39)		0.775
Higher vs. Non-formal education	-257.29(-645.69,131.11)		0.267
Lower vs. Non-formal education	-164.26(-498.83,170.30)		0.484
Total PA (MET-min/wk)		1.18(2,378)	
Higher vs. Lower education	-345.71(-1668.34,958.91)		0.803
Higher vs. Non-formal education	-982.04(-2574.39,610.31)		0.318
Lower vs. Non-formal education	-627.33(-1998.98,744.32)		0.532
Physical Component Summary		6.70(2,378)	
Higher vs. Lower education	0.07(-1.36,1.49)		0.993
Higher vs. Non-formal education	2.16(0.44,3.89)		0.009
Lower vs. Non-formal education	2.09(0.61,3.58)		0.003
Mental Component Summary		3.72(2,378)	
Higher vs. Lower education	0.95(-1.05,2.95)		0.504
Higher vs. Non-formal education	2.65(0.23,5.07)		0.028
Lower vs. Non-formal education	1.70(-0.38,3.79))		0.135

PA= physical activity, QOL= quality of life, MET= metabolic equivalent, *One-way ANOVA test was applied followed by Post-hoc multiple comparison test Scheffe's procedure

Age was inversely correlated with vigorous PA (r= -0.12, *P*= 0.021) and total PA (r=-0.13, *P*<0.001). Age also correlated inversely with PCS (r= -0.32, *P* = 0.001). PCS was inversely correlated with vigorous PA (r= -0.24, *P*<0.001) and total PA (r= -0.13, *P*= 0.010). Meanwhile, MCS was positively and significantly correlated with all the PA components except moderate PA (r= 0.09, *P*= 0.082). The detailed relationship between the age, PA & QOL components is shown in Table 5.

Table 5: Relationship between age, physical activity & quality of life components

	Age	Physical Component Summary	Mental Component Summary
Vigorous PA (MET-min/wk)	-0.12* (0.021)	-0.22* (<0.001)	0.10* (0.041)
Moderate PA (MET-min/wk)	-0.06 (0.281)	0.05 (0.302)	0.09 (0.082)
Walking (MET-min/wk)	-0. 09 (0.069)	-0.10 (0.058)	0.19* (<0.001)
Total PA (MET-min/wk)	-0.13* (<0.001)	-0.13* (0.010)	0.17* (0.001)
Physical Component Summary	-0.32* (<0.001)		
Mental Component Summary	0.03 (0.539)		

PA=physical activity, MET= metabolic equivalent, *Indicates significant correlation at $P<0.05$

Discussion

Physical activity has been found to be associated with enhanced QOL in previous studies[21,22]. Results of the present study demonstrated an inverse relationship between physical activity and the PCS of the QOL and positive correlation with MCS of the QOL.

McAuley et al.[7], supported the suggestion that physical activity had a direct influence on self-efficacy and, in turn, indirectly influence QOL through indicators of physical and mental health status. Moreover, self-efficacy has been shown to be a strong predictor of QOL[23].

Thus, self-efficacy as an important mental health status indicator has been identified as a consistent psychological determinant of QOL in the context of physical activity and QOL relationship[6].

It could be that self-efficacy, though not assessed in the present study, is an important mediator of the positive relationship found between PA and mental component of QoL.

Age was found to be inverselyrelated to PA in this study. This is consistent with the report of a meta-analysis that examined link between PA and healthy well-being in adults[22]. Theinverse correlation explains the fact that PA level decline with age. Similarly, age had a negative relationship with the PCS of the QOL. This suggests that younger adults may have better QOL than their older counterparts. Our findings on relationships of age with both PA and PCS of QOL are partly inconsistent with the result of a study where a significant positive relationship was found between PA and QOL in both younger and older adults.[6] It could be that QOL was stronger in the younger participants in the present study because they were more physically active than the older counterparts. Social determinant such as gender is associated with physical activity at both individual and population levels. In the present study, consistent with most evidence, males were more physically active than females.

White et al.[6], stress the need to explore the relationships among PA and indicators of QOL such as educational status. Although there were no findings for comparison, in the present study comparison between three categories of education showed significant difference between participants that attained higher level of education compared to those with non-formal education in both vigorous and moderate PA. However, no any

difference was found in walking and total PA between the groups. The findings of significant differences could be because participants with higher levels of education may be more aware of the benefits of PA in improving overall health and QOL, thus engaging in regular PA. This is buttressed further by the better QOL in both components amongst respondents with higher levels of education compared to the non-formal education category.

This study found significant difference between employment status across all PA and QOL components. The finding shows that employed participants engaged in PA more than the unemployed. This is contrary to results of Prohaska et al.[24], who observed that low levels of physical activity participation reported by adults of high socioeconomic status may be due to sedentary life style. However, our finding is comparable to that of Hallal et al.[25], which showed direct correlation between socioeconomic status and activity level. Hallal et al.[25], concluded that the results reflect the probability that occupational activities are a more important component than physical recreational activity in developing countries. In other words, the results of the present study showed overall physical activity among individuals in the employed group was greater than that of the unemployed group.

This study is not without limitations; because the study is cross-sectional there is problem with causality of associations hence, the results have to be interpreted with caution. Also, the use of self report method to assess physical activity and QOL could have introduced measurement errors and respondents bias into the study. However, the multistage random sampling technique used is the strength of the study.

Conclusion

The study found significant relationship between the PA and QOL components among the participants. Also PA and QOL components significantly differ among male, employed and higher levels of education compared with female, unemployed and non-formal education categories respectively. This indicates that PA has impact on QOL and overall health and well-being. Future studies need to determine whether different types of physical activity differentially affect QOL. Further identification of other factors that might map onto physical and health status outcomes is called for in order to further understand the complex relationship between physical activity and QOL.

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