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Socio-demographic, health-related and physical environmental correlates of physical activity among urban-dwelling Nigerians in early old age

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Abstract

Physical activity (PA) of adults in early old age and its association with quality of life (QoL) and satisfaction with neighbourhood was investigated in some Nigerian urban settings. Structured questionnaire containing scales for QoL domains (self-rated health, life satisfaction, subjective happiness, and psychological wellbeing), satisfaction with neighbourhood and international physical activity questionnaire-long form was used to obtain information from 850 adults aged 50-65 years. Prevalence of high (>1500 MET-min/week) and moderate (600-1500 MET-min/week) PA was 16.4 and 25.6%, respectively. It varied with socio-demographic characteristics (high, 8.7-42.1%; moderate, 25.5-53.7%). High PA prevalence was greater among self-employed respondents than other workers (42.1 *vs* 18.4-23.2%; *P*=0.000). Low PA was more prevalent among respondents with higher education (53.7 *vs* 27.8-32.8%; *P*=0.000) and satisfactory income (36.0 *vs* 28.0%; *P*=0.000). Occupation and transport contributed significantly more (X^2=29.89; *P*=0.000) to PA than housework and leisure which was the least. Leisure walk was the most prevalent (66.6%) leisure-time PA. Significant associations occurred between PA and QoL (β, 0.14-0.69; *P*=0.000-0.013) domains except life satisfaction. Respondents' satisfaction with neighbourhood congestion, security and sanitation were related to PA (β, 0.20-0.47; *P*=0.000-0.024). Physical activity can be enhanced by improving the QoL and physical environment of older adults in urban settings.

Keywords: Leisure-time, Housework, Occupation activity, Transport activity, Neighbourhood, Quality of life, Older adults

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1. Introduction

The population of elderly people in Nigeria and sub-Saharan Africa is growing (Velkoff and Kowal, 2006; Togonu-Bickersteth and Akinyemi, 2014) hence the need to begin preparation for their welfare by enacting policies that will enhance healthy ageing. According to (WHO, 2010) "Many less developed nations will need policies that ensure financial security of older people, and that provide the health and social care they need, without the same extended period of economic growth experienced by ageing societies in the West". The care for the elderly in the traditional African system has always been within the extended family system. However, the system is under severe strain due to poor economic condition that is worsened by lack of employment for adult children in African cities (Togonu-Bickersteth and Akinyemi, 2014). The result is that many developing countries' elders live in abject poverty that is worsened by significant prevalence of communicable and non-communicable diseases (WHO, 2010). Unlike in high income countries where social security and community care centres exist for older adults (Zarem, 2010), care for the elderly is largely undertaken by the family in Nigeria and many sub-Saharan African countries except South Africa. State pension exists for adults aged 60+ (women) and men aged 65+ in South Africa irrespective of their employment records (Case and Deaton, 1998). In Nigeria and other sub-Sahara countries only workers employed by Government or organized private sector receive pension either by the defined or contributory scheme. The vast majority have no social security at old age. This worrisome situation is an impetus for seeking ways to reduce the impending burden as the population of people over 60 years grows in sub-Sahara Africa.

One of the ways the burden of old age can be alleviated is to promote life styles that facilitate healthy ageing in order to reduce the cost of medical care. Engagement in physical activities promotes good health as several studies have documented. Succinctly, for elderly people, they include positive association with cognitive function (Fabre et al., 1999; Lautenschlager et al., 2008; Rolland et al., 2010), retarding coronary heart disease and cancer of the colon (Shaper et al., 1991; Morris et al., 1990), promoting cardiovascular status, strength and functional capacity (Netz et al., 2005) and improving psychological well-being (Philips et al., 2001). Although measurement methods differed, the result of a systematic literature search by Sun et al. (2013) showed that activity levels among elderly people across the world ranged from 2.4 to 83.0%. Based on data from 122 countries, Hallal et al. (2012) inferred that physical activity in high-income countries was predominantly leisure based. However, they could not ascertain the pattern of physical activities in low- and middle-income countries, which includes sub-Sahara countries, because of insufficient data. Hallal et al. (2012) concluded that 31% of adults worldwide tend to be inactive and that the trend is increasing. This is worrisome because of the benefits associated with physical activity.

Although data from sub-Saharan Africa is limited, physical activity in traditional African rural setting could be considered high because of farming, hunting and fishing, which continues till old age and when physical disabilities set in (Assah et al., 2011; Ejechi, 2013). However, information on other forms of physical activity among urban-dwelling older adults in Nigeria and indeed sub-Saharan Africa is limited. Indeed it is arguable that mordernisation introduced physically inactive life in Africa because of white collar and paid jobs where people sit in offices or remain in shops all day. Urbanization may have further compounded the problem by increasing the population of physically inactive people. One of the few reports from Nigeria indicated that 25-27% of Nigerians were physically inactive (Abubakari and Bhopal, 2008). Another reported

that 68.6% of adults in a Nigerian city were physically active (Oyeyemi et al., 2013) while Akarolo-Anthony and Adebamowo (2014) reported low levels of leisure time activity among residents in another Nigerian city. Adeniyi et al. (2011) examined the relationship between physical activity and depression among Nigerian adolescents while Oyeyemi et al. (2014) investigated the perception of built environmental factors and physical activity among adolescents in Nigeria. These investigations did not specifically target older adults hence the need for researches on the physical activity of elderly Nigerians in their living environment.

The environments people live tend to have influence on their readiness to participate in physical activities as studies from different parts of the world have shown (Bolívar et al., 2010; Ding et al., 2011; Li et al., 2005; Piro et al., 2006; Shibata et al., 2009; Giehl et al., 2012; Moran et al., 2014; Oyeyemi et al., 2012, 2014; Solomon et al., 2013). Succinctly, these reports indicated that crime, fear of violence, traffic density, road pavement, walkways, congestion, parks and enjoyable scenery influence engagement in physical activity. The reports also showed that friendliness of neighbours, sporting arena or recreational facilities also influence engagement in physical activities particularly leisure. These information emanated from investigations conducted mainly in high-income countries. Apart from the works of Oyeyemi et al. (2012, 2013, 2014) cited above, there is paucity of information from sub-Saharan Africa on the physical activity levels of older adults, and the relationship between physical activity and the living environment.

Arising from the foregoing are: (1) there is insufficient information on the level of physical activity among elderly people in low-income countries including Nigeria; (2) the living environment (neighbourhood) of the elderly people in relation to physical activity is yet to be sufficiently researched in low-income countries; and (3) background quality of life (QoL) variables (self-rated health, life satisfaction, subjective happiness, psychological well-being) are rarely considered as factors that can influence the physical activity of older adults. It is against this background that the study was conducted to: ascertain the level of physical activity of urban-dwelling Nigerians in early old age; and assess the association between their physical activity, and satisfaction with neighbourhood environment and QoL. The information from the study may help in the formulation of policies that can promote healthy ageing; and also contribute to filling the gaps in the literature on physical activity and ageing in sub-Sahara Africa.

2. Method

2.1. Data source

A structured questionnaire was used to obtain the data for the study from adults in early old age (50-65 years) living in five major towns of oil rich Delta State of Nigeria. The questionnaire contained questions on socio-demographic background (age, gender, marital status education and self-rated economic status), and measures of physical activity and satisfaction with neighbourhood environment. The questionnaires (1000) were randomly distributed at 200/town in the five towns. However, 850 were returned with all the questions attended to as instructed. They were administered by assistants that could interpret in the local language for illiterates. The consents of the respondents were sought before administering the questionnaires.

2.2. Measures

The "usual week" format of the long form international physical activity (interview version) questionnaire (IPAQ-LF) (Booth, 2000) was used to determine respondents' level of physical activity. IPAQ-LF measures the frequency and intensity of physical activities across four domains: occupation, transport, housework and leisure. Both categorical and continuous scores can be derived for analyses by computing metabolic equivalents (MET-minutes/week). Based on focused group discussions, a list of common leisure-time physical activities was drawn up for the purpose of identifying the most prevalent leisure activity. The list contains the following activities: strength training, stretching, treadmill, fast walk, leisure walk, cycling, tennis/badminton, swimming and jogging/running. Respondents were requested to tick "Yes" or "No" against one or more of these activities, which they undertake. The frequency or duration of the activity was not required. With respect to the environment, respondents were requested to rate their satisfaction with each of the environmental variables listed in Table 1 on a scale of 10: 1 (very dissatisfied) to 10 (very satisfied). Life satisfaction was measured with the scale of Diener et al. (1985) while subjective happiness was by the scale developed by Lyubomirsky and Lepper (1999). Psychological well-being was measured with the scale of Ryff and Keyes (1995) while the 5-point scale (poor, fair, good, very good, excellent) routinely used in health assessments was used for self-rated heath.

2.3. Data analyses

The IPAQ guidelines for scoring were used to classify the respondents' physical activity level as low (<600 MET-min/week), moderate (600-1500 MET-min/week) or high (>1500 MET-min/week). Thereafter Chi square statistics was used to determine the relationship between the socio-demographic characteristics of the respondents and physical activity levels. The MET-min/week scores were calculated for each of the four domains of IPAQ-LF and summed up to obtain total physical activity. The relationship between total physical activity and quality of life domains (self-rated health, life satisfaction, subjective happiness, and psychological well-being) or neighbourhood environment factors (Table 1) was analysed by multiple linear regression. The relationship between the MET-min/week score of each of the four IPAQ-LF domains and the neighbourhood environment factors was ascertained by correlation analysis. Friedman and Wilcoxon signed-rank tests were performed to ascertain the differences in the MET-minute/week scores of the four IPAQ-LF domains. SPSS version 21 was used for the statistical analyses.

3. Results

The distribution of the respondents by socio-demographic characteristics is presented in Table 2. Those living with spouse were more than trice those without spouse while the public service workers were nearly half the sample size. Male respondents were slightly more than half the sample population while those rating their economic status as unsatisfactory were slightly more than 60%. There were no marked differences in the distribution of respondents within the other variable categories (Table 2).

Table 1. Adopted variables for measuring satisfaction with neighbourhood environment

Neighbourhood variables	Maximum Points
Layout	50
Topography (hilly, valley level)	
Walkways	
Road	
Footpaths	
Enjoyable scenery (parks, lawns)	
Congestion	30
Busy streets	
Traffic	
Spaces between buildings	
Security	30
Crime rate	
Fire fighting station	
Street lights	
Recreation	30
Sporting facilities	
Gymnasium	
Clubs	
Shops	20
Supermarkets/stores	
Open market (mammy market)	
Neighbourhood friendliness	10
Sanitation	
Waste disposal	
Refuse dump location	20
Total	190

The physical activity of the respondents was generally low with the prevalence of high and moderate activity being less than 20 and 30%, respectively when all respondents were considered (Table 3). However, Chi square analyses indicated that the prevalence of physical activity levels among the respondents was significantly associated with their socio-demographic characteristics except with age and those living with or without spouse (Table 3). Although prevalence of high physical activity tended to decline with advancing age, chi square analyses indicated that it was not significant. A greater prevalence of moderate and high physical activity was found among males than females (Table 3). Respondents with tertiary education had higher prevalence of low and high physical activity while others with lower education dominated the moderate physical activity level (Table 3). Prevalence of moderate and high physical activity was greater among self-employed and private sector workers than retirees or public service respondents (Table 3). Low and moderate physical activity was more prevalent among satisfactory economic status respondents while high physical activity was dominated by respondents who rated their economic status as unsatisfactory (Table 3). Leisure walk was the most prevalent leisure-time physical activity while the least was treadmill (Figure 1).

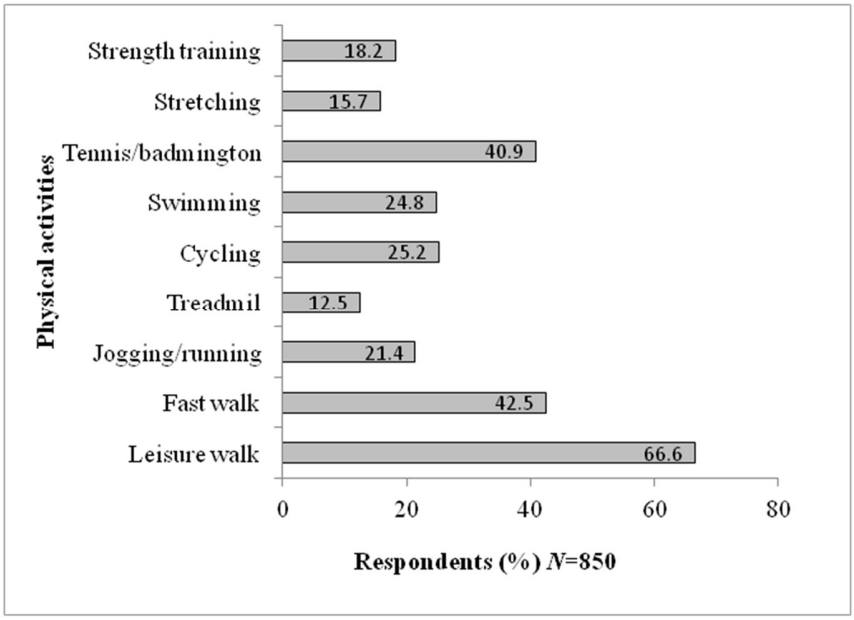

Figure 1. Participation in leisure-time physical activities among adults in early old age

Table 2. Socio-demographic characteristics

Variables		Respondents	
		N=850	%
Age	50-55	350	41.2
	56-60	290	34.1
	61-65	210	24.7
Gender	Male	450	52.9
	Female	400	47.1
Marital status	Living with spouse	660	77.6
	Living without spouse	190	22.4
Education	None	180	21.2
	Primary	238	28.0
	Secondary	244	28.7
	Tertiary	188	22.1
Occupation	Public service	360	42.4
	Private sector	190	22.4
	Self-employed	164	19.2
	Retiree	136	16.0
Self-rated economic	Not satisfactory	525	61.8
status	Satisfactory	325	38.2

Friedman and Wilcoxon tests revealed significant differences between the physical activity domains (Table 4). Although there was no significant difference between occupation and transport physical activity domains, both domains significantly enhanced total physical activity better than housework or leisure domains (Table 4). Leisure had the lowest physical activity (Table 4). All the quality of life domains except life satisfaction were significantly associated with physical activity as indicated by regression analysis (Table 5). The relationship between psychological well-being and physical activity was the strongest as indicated by the magnitude of β coefficient and significance. With respect to neighbourhood environment, satisfaction with security, congestion and sanitation were significantly positively associated with physical activity while others were not (Table 6). As indicated by the β coefficient magnitude and significance, the association between satisfaction with sanitation and physical activity was the strongest (Table 6).

Table 3. Prevalence of physical activity levels among respondents and the relationship with their socio-demographic characteristics

Socio-demographic variables			**Physical activity level [n(%)]**			X^2
		N	**Low**	**Moderate**	**High**	
All respondents	NA	850	408(48.0)	303(25.6)	139(16.4)	
Age	50-55	350	140(40.0)	124(35.4)	86(24.6)	7.32
	56-60	290	110(38.0)	118(40.7)	62(21.3)	
	61-65	210	92(43.8)	85(40.5)	33(15.7)	
Gender	Male	450	157(34.9)	207(46.0)	86(19.1)	78.82*
	Female	400	261(65.3)2	104(26.0)3	35(8.7)	
Marital status	Living with spouse	660	31(35.0)	03(45.9)	126(19.1)	0.79
	Without spouse	190	60(31.6)	91(47.9)	39(20.5)	
Education	None	180	50(27.8)	94(52.2)	36(20.0)	49.98*
	Primary	238	73(30.7)	125(52.5)	40(16.8)	
	Secondary	244	80(32.8)	131(53.7)	33(13.5)	
	Tertiary	188	101(53.7)	48(25.5)	39(20.7)	
Occupation	Public service	360	189(52.5)	94(26.1)	77(21.4)	53.24*
	Private sector	190	79(41.6)	67(35.3)	44(23.2)	
	Self-employed	164	37(22.6)	58(35.4)	69(42.1)	
	Retiree	136	70(51.5)	41(30.1)	25(18.4)	
Self-rated	Not satisfactory	525	147(28.0)	188(35.8)	190(36.2)	29.29*
economic status	Satisfactory	325	117(36.0)	147(45.2)	61(18.8)	

*P=0.000

Table 4. Comparison of respondents' physical activity by IPAQ-LF domains

Domains	MET-min/week		
	Median	Min.	Max.
Occupation	515[a,b]	170	2125
Transport	505[a,c,d]	165	1600
Household	320[b,c,e]	130	660
Leisure	225[b,d,e]	90	400
***P**	0.000		

**Friedman test (X^2=29.89) and multiple comparison by Wilcoxon tests (Bonferroni adjustment, P=0.012): P=[a]0.339; [b,d]0.000; [c]0.004; [e]0.006*

Table 5. Multiple linear regression analyses of the relationship between quality of life domains and physical activity (MET-min/week)

Wellbeing domain	β coefficient	Significance (*P*)
Self-rated health	0.237	0.002
Life satisfaction	0.146	0.062
Subjective happiness	0.140	0.013
Psychological well-being	0.690	0.000

The results of the correlation analyses of the association between each of the four physical activity domains and satisfaction with neighbourhood environmental variables is presented in Table 7. Significant associations occurred between satisfaction with layout and all but occupation physical activity domain. Although no significant association was found between satisfaction with shops and any of the domains, the magnitude of the correlation coefficient between shops and leisure or transport were not markedly different from those that were found statistically significant (Table 7). Significant relationships were also found between satisfaction with neighbourhood friendliness, recreation or security and leisure-related physical activity; and between sanitation and household or leisure physical activity domains. Transport physical activity was significantly associated with only neighbourhood layout and congestion although the correlation coefficient magnitude with respect to shops was comparatively high (Table 7).

Table 6. Multiple linear regression analyses of the association between satisfaction with neighbourhood environment factors and physical activity (MET-min/week)

Neighbourhood environment	β coefficient	Significance (*P*)
Layout	0.127	0.149
Congestion	0.234	0.007
Security	0.205	0.024
Recreation	0.039	0.535
Shops	0.021	0.718
Neighbourhood friendliness	-0.088	0.070
Sanitation	0.478	0.000

Table 7. Correlation analyses of the association between satisfaction with neighbourhood environment and domains of IPAQ-LF*

Neighbourhood environment	Correlation coefficient (r_s)			
IPAQ domain:	Occupation	Transport	Housework	Leisure
Layout	0.21	0.52***	0.25**	0.49***
Congestion	0.15	0.30**	0.22	0.13
Security	0.24	0.16	0.23	0.46***
Recreation	0.10	0.10	0.09	0.42***
Shops	0.11	0.20	0.12	0.21
Neighbourhood friendliness	0.08	0.13	0.14	0.31**
Sanitation	0.09	0.11	0.29**	0.28**

**Met-min/week; **P<0.05; ***P<0.01*

4. Discussion

Going by WHO (2010) recommended minimum of 500 MET-min/week, over 40% of the respondents can be regarded as physically inactive socio-demographic variations notwithstanding. The implication is that many respondents are likely to be vulnerable to poor health challenges as they grow older. This is predicated on the reports that physical activity influences physical function and can predict mortality among older adults (Cooper et al., 2011; Guralnik et al., 1994). In addition, disability in late life and death are associated with physical activity levels (Hirsch et al., 2012). Urbanisation and changes in life style due to modern trends predisposed people hitherto physically active as farmers, fishermen, traders or pastoralists to physically inactive life styles. The physical inactivity may have also been promoted by the availability of automobiles which reduced trekking by traders or farmers. It is difficult to compare the findings here with other studies on physical activity in Nigeria (Abubakari and Bhopal, 2008; Akarolo-Anthony and Adebamowo, 2014; Oyeyemi et al., 2013) because older adults were not the focus of these studies. Adults in early old age were targets of the study, because physiological functions may not yet be in serious decline. This view is supported by the non-significant decline of physical activity from 50 to 65 years. Thus information on the relationship between their QoL or neighbourhood environment and their physical activity before late life can be useful in health promotion campaigns given the demographic transition in sub-Sahara African countries (Velkoff and Kowal, 2006).

The non-significant decline in the prevalence of physical activity with advancing age is in contrast with world-wide reports (BHFNC, 2012; Sun et al., 2013). However, this can be attributed to the limited age span (50-65 years) covered. The gender difference observed is consistent with previous findings that men tend to be more active than women (Philips et al., 2001; Hallal et al., 2012; Sun et al., 2013). It is common knowledge that the African traditional setting does not usually encourage women to undertake activities that are physically demanding except farm work and trading. Trading tends to make them physically inactive because they remain in their shops/stores all day.

The results suggest that self-employed respondents were the most physically active. This is understandable because the group includes craftsmen, artisans, roadside automobile technicians, transporters ("blue collar" jobs) and small scale business men whose income largely depend on their manual daily activity. On the other hand public service workers (mostly "white collar") do less physically-demanding jobs and normally wait for salaries. Despite their high physical activity, self-employed respondents tended to rate their economic status as unsatisfactory. This is not consistent with reports that "blue collar" jobs, poor education and low economic level are associated with low physical activity especially leisure, while it is the reverse for higher education and high economic level (Allen and Morey, 2010; Barnes and Schoenborn., 2003; Bolívar et al., 2010; Cooper et al., 2011). However, having higher education or satisfactory economic status did not enhance physical activity in this Nigerian setting as the findings indicated. Highly educated people and high income earners are likely to be more involved in white collar jobs that entail less physical activity. Walking or cycling for transport-related physical activity also tends to be minimal for high income earners. Leisure-related physical activity that could have raised the physical activity level of well educated and high income earners was found to be generally low. Leisure walk was the most prevalent leisure physical

activity undertaken by the respondents and the IPAQ MET value for walking (3.3) is low. It is plausible that the generally low leisure-time physical activity may be due to limited income because over 60% of the respondents reported unsatisfactory economic status. In addition it has been reported that many Nigerians live below poverty line (Bakare, 2014; Yusuf, 2005) hence they have to work for long hours in order to earn more money thereby leaving little or no room for leisure. However, this would require further investigation before any conclusion can be drawn. Low level leisure activity was also found among Nigerian adults living in Abuja the Nigerian capital (Akarolo-Anthony and Adebamowo, 2014). Similarly, a report on physical activity across 22 African countries showed that leisure time physical activity was rare (Guthold et al., 2011). The study further showed that occupation and transport were the main contributors to physical activity levels as this investigation also revealed.

The positive association between self-rated health, psychological wellbeing or subjective happiness and physical activity was not unexpected because a happy, confident and healthy person is most likely to go out with neighbours and friends for recreational activities or work diligently. Persons with chronic diseases or disabilities are not likely to be substantially physically active. In addition psychological variables which include enjoyment of physical activity, self-motivation, fitness for physical activity and confidence have been shown to be correlates of participation in physical activities (Sallis and Owen, 1999; Trost et al., 2002). On the hand, one could be satisfied with life without being presently happy or healthy, because life satisfaction is based on retrospective life experience. This partly explains the absence of an association between life satisfaction and physical activity.

Satisfaction with neighbourhood layout, congestion, sanitation and security was related to physical activity as has been observed in several investigations across the world (Booth et al., 2000; Li et al., 2005; Piro et al., 2006; Sibata et al., 2009; Bolívar et al., 2010; Giehl et al., 2012; Solomon et al., 2013). In contrast to the findings presented in these reports, neighbourhood friendliness and recreation were not related to total physical activity in this study. However, it correlated with leisure-time physical activity. Esprit de corps occurs in many Nigerian neighbourhoods reminiscent of the traditional African communal or extended family system. Indeed it is a common to hear Nigerians say; “east or west, home is the best”. The correlation of leisure activity with respondents’ satisfaction with neighbourhood layout, security, recreation, friendliness and sanitation suggests that these areas can be targeted for physical activity promotion campaigns. Sanitation is of particular concern, because many urban areas in sub-Sahara Africa are characterized by refuse dumps, poor and blocked drainages that exude offensive odour, and roads with many pot holes (Boadi et al., 2005; Morakinyo et al., 2012; Olotuah, 2010; Owoeye and Ogundiran, 2014). This is likely to discourage physical activities such as leisure walk, jogging and cycling. Congestion can be an impediment to walking and cycling for leisure and transport physical activities. This inference is buttressed by the finding that congestion correlated with transport physical activity. Housework physical activity as a correlate of sanitation or neighbourhood layout is understandable, because residents have to clean the environment of their homes. In Nigeria many local administrations introduced compulsory monthly environmental clean-up exercises for residents.

A limitation of the study is the cross-sectional approach used. A longitudinal study that follows up the impact of low, moderate or high physical activity on the quality of life of the respondents in the same setting

may provide information for more definite conclusions. Also a conclusive position on the disposition of elderly Nigerians to physical activity cannot be taken because the study did not encompass sub-urban-dwelling older adults. Be that as it may, the study has demonstrated the importance of the physical environment, particularly layout and sanitation, as targets for intervention programmes.

5. Conclusion

The findings of this study indicated that more than 40% of the respondent adults in early old age did not meet the minimum physical activity requirement recommended by WHO (2010). Those that met the requirement were mainly self-employed respondents thereby suggesting that white collar workers tended to be inactive, their higher education status notwithstanding. Consistent with studies across the world, women were less physically active than men. Leisure-time physical activity was the lowest among the physical activity domains hence neighbourhood factors (layout, sanitation, congestion, security) that facilitate leisure need to be improved. Thus good QoL and healthy ageing can be promoted by an attractive neighbourhood physical environment that enhances physical activity.

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