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Social correlates of aging and Quality of Life of older adults in rural and urban areas of Southwestern Nigeria: a comparative cross-sectional study

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Corresponding Author:	Taiwo A Obembe, MBBS MPH PHD University of Ibadan College of Medicine Ibadan, Oyo NIGERIA
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Abstract:	Introduction: Quality of Life (QoL) among older adults is an important area of concern that directly affects their health status and wellbeing. This study was conducted to assess and compare the social correlates as well as the QoL of older adults in selected locations of Oyo State, Southwest Nigeria. Methods: A comparative study of 958 older adults was conducted using a two-stage cluster sampling technique. A semi-structured, interviewer-administered questionnaire was used to elicit information on QoL and social security. QoL was assessed using a WHO QoL-BREF questionnaire. Twenty-six questions on a Likert scale of 1-5 gave a minimum and maximum obtainable score of 26 (20%) and 130 (100%), respectively. Qol was dichotomized into good or poor using an average of 3 and above (≥78/130; ≥60%) as good Qol and scores below 3 (<78/130; <60%) as poor Qol. Predictors of QoL were determined using logistic regression with level of statistical significance set at 95%. Results: Overall, rural respondents exhibited a higher QoL (63.89 + 15.9) compared to the urban counterparts (60.76 + 13.9). Rural respondents had significantly higher QoL scores in physical health (61.58 + 17.8) than their counterparts (58.62 + 15.4) (p=0.006). Urban older adults had higher scores in psychological and social relationship wellbeing though insignificant (p=0.599 and 0.806 respectively). Some significant predictors of good QoL included family setting (p=0.010), possession of assets (p<0.001) and health ratings (p<0.001). Conclusion: The QoL of older adults was above average while the social correlates found in the study included pension and external financial assistance from faith-based organizations (FBOs). In order for older adults to enjoy enhanced QoL, it is recommended that adequate social security should be put in place for them to enjoy financial support and societal integration.
Order of Authors:	James O Okediran, MBBS MSC FWACP
	Taiwo A Obembe, MBBS MPH PHD
	Ayodeji M Adebayo, MBBS MPH FWACP
Response to Reviewers:	The length of the introduction has been cut down as much as possible. Most of what is left in the introduction now are what previous reviewers suggested us to add under the previous editor that was assigned to the manuscript. Some of the suggestions included: Defining QoL and providing some background on QoL in local and global contexts Ensuring that operational definitions were provided for all our proposed variables. We believe that the recommendation to move some tables into the supplementary file as recommended in this revision will help to further contribute to trimming down the length of the entire manuscript. The methods have been rearranged in a structured form The IRB ethical approval number also has been provided. The tables have been reduced. (Tables 1b, 1c 1d and Table 2 have been moved to supplementary files and they are now Supplementary table 2,3,4 and 5 respectively)

	The table 5 (former table 6) has been revised to match the OR (LCL-UCL) heading with OR (95% CI.) The title has been revised to read: Social correlates of aging and Quality of Life of older adults in rural and urban areas of Southwestern Nigeria: a comparative cross-sectional study
Additional Information:	
Question	**Response**
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Ethics Statement Enter an ethics statement for this submission. This statement is required if the study involved: • Human participants • Human specimens or tissue • Vertebrate animals or cephalopods • Vertebrate embryos or tissues • Field research Write "N/A" if the submission does not require an ethics statement.	Ethical approval was obtained from the Ethics Review Committee of Oyo State Ministry of Health (AD:13/479). A letter of introduction, obtained from the Department of Community Medicine at University of Ibadan, was presented to all selected households. Written informed consents were provided to all recruited elderly persons. Elderly persons that were illiterate were requested to thumbprint the consent forms to signify approval. Ethical issues like confidentiality, right to decline interview at any stage and non-exposure to risk were fully discussed with each respondent before every interview session.

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Data Availability Authors are required to make all data underlying the findings described fully	Yes - all data are fully available without restriction

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Additional data availability information:	Tick here if the URLs/accession numbers/DOIs will be available only after acceptance of the manuscript for publication so that we can ensure their inclusion before publication.

Social correlates of aging and Quality of Life of older adults in rural and urban areas of Southwestern Nigeria: a comparative cross-sectional study

James O. Okediran[1¶], Taiwo A. Obembe[2,3*¶], Ayodeji M. Adebayo[1¶]

Running Title: Aging process in older Nigerian adults

1. Department of Community Medicine, Faculty of Clinical Sciences, College of Medicine, University of Ibadan

2. Department of Health Policy and Management, Faculty of Public Health, College of Medicine, University of Ibadan

3. Claremont Graduate University, School of Community and Global Health, California, USA

*Corresponding Author: TAO
Email: tobems17@yahoo.com

¶All authors contributed equally to this work.

Abstract

Introduction: Quality of Life (QoL) among older adults is an important area of concern that directly affects their health status and wellbeing. This study was conducted to assess and compare the social correlates as well as the QoL of older adults in selected locations of Oyo State in southwestern Nigeria.

Methods: A comparative study of 958 older adults was conducted using a two-stage cluster sampling technique. A semi-structured, interviewer-administered questionnaire was used to elicit information on QoL and social security. QoL was assessed using a WHO QoL-BREF questionnaire. Twenty-six questions on a Likert scale of 1-5 gave a minimum and maximum obtainable score of 26 (20%) and 130 (100%), respectively. QoL was dichotomized into good or poor using an average of 3 and above (≥78/130; ≥60%) as good QoL and scores below 3 (<78/130; <60%) as poor QoL. Predictors of QoL were determined using logistic regression with level of statistical significance set at 95%.

Results: Overall, rural respondents exhibited a higher QoL (63.89 $\pm$ 15.9) compared to the urban counterparts (60.76 $\pm$ 13.9). Rural respondents had significantly higher QoL scores in physical health (61.58 $\pm$ 17.8) than their counterparts (58.62 $\pm$ 15.4) (p=0.006). Urban older adults had higher scores in psychological and social relationship wellbeing though insignificant (p=0.599 and 0.806 respectively). Some significant predictors of good QoL included family setting (p=0.010), possession of assets (p<0.001) and health ratings (p<0.001).

Conclusion: The QoL of older adults was above average while the social correlates found in the study included pensions and external financial assistance from faith-based organizations (FBOs). In order for older adults to enjoy enhanced QoL, adequate social security should be put in place for them to enjoy financial support and societal integration.

Key words: Aging, Elderly, Quality of life, Rural and Urban, Social correlates, social security

Introduction

Industrialization, urbanization and improvement in medical care has resulted in global increase in life expectancy, leading to a sharp rise in the number of older persons [1,2]. The World Health Organization (WHO) defines older persons as those individuals above the age of 60 years [3,4]. The world's elderly population is increasing by about one million persons per month, and the percentage of elderly people in the world is expected to increase rapidly from the 9.5% in 1995 to 20.7% in 2050 and 30.5% by 2150 [5]. It is estimated that more than 60% of the world's elderly are found in developing countries, including Nigeria [6].

Health wise, older persons are prone to a number of non-communicable diseases (NCDs), which are currently responsible for roughly 60% of all deaths [7]. The most common chronic NCDs being cardiovascular disease, cancer, chronic respiratory diseases and diabetes [8]. A vast number of elderly population and the associated health problems have implications for health care and also quality of life. The effect is more in low- and middle-income countries where many public services are still focused on childhood and infectious diseases as well as reproductive health services [9,10].

Quality of Life (QoL) is an important health index for older adults in every country and according to the World Health Organization (WHO), quality of life is defined as as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns [11,12]. Felce and Perry define the quality of life as an overall general wellbeing that comprises objective descriptors and subjective evaluations of physical, material, social, and emotional wellbeing together [13].

At the global level, QoL among older adults is an important area of concern that reflects the health status and well-being of this vulnerable population [14]. Majority of older adults evaluate their quality of life positively on the basis of social contacts, dependency, health, material circumstances and social comparisons [15]. QoL of older adults is affected by problems related to fulfillment of basic requirements such as social relations, personal care, nutrition and accommodation. These are examples of social correlates affecting older adults [16].

Social security may be defined as constituting measures that enhance social capabilities and enables the vulnerable sections of the population to survive [17]. According to the International committee of the Red Cross, economic security is defined as the ability of individuals, households,

or communities to cover their essential needs sustainably and with dignity [18]. More relevant to this study, economic security is defined as a financial status where elders have sufficient income (pension, retirement savings and other sources) to cover basic and necessary living expenses [19].

Social protection can be defined as a set of policies and programmes seeking to reduce social and economic risk, to alleviate extreme poverty and deprivation, and to promote decent standards of living stemming in part from fair and equitable working standards [20]. Social security benefits are used as a main policy instrument to eradicate poverty, reduce income inequalities and enhance human capital and productivity [21]. The provision of minimum levels of income constitutes not only a necessity for survival but also an essential pre-requisite for the acquisition of education, health and nutrition [22].

Furthermore, an ageing population also brings with it increased expenditure on health care services, on home care and shelter of the elderly, and a greater demand for relevant skilled health care workers and health professionals to cater for senior citizens who are more prone to illness and problems of mobility [23]. The situation that the older adults face in Nigeria (whereby a dwindling base of working age people have to support a growing number of the elderly) is not quite different from what is obtainable in other sub-Saharan African countries where very few social security systems exist. Currently, only South Africa and Namibia currently have a social security system where persons aged 60 years and above are entitled to a monthly stipend [24]. The cushioned effects of economic and social security invariably facilitate greater lifestyle choices and resources to manage a crisis, should one occur [25].

Despite the aforementioned, QoL varies widely in literature. In a bid to assess the QoL and its determinants among older persons aged 60-90 years attending a general practice clinic in Southwest Nigeria, Fakoya et al (2018) found that 75.0% of its study population experienced poor QoL that was worsened with co-morbidites [26]. In another study, economic status was found to be the most consistent predictor of the four domains of QoL [27] . A study showed that Primary Health Care (PHC) has overlooked the needs of aging population [28] as most of its components largely concentrate more on maternal and child health [29]. The Sustainable Development Goals (SDGs) has also failed to emphasize the need for health development in older adults [30,31]. In order to enable health care systems cope with increasing demands of the elderly, and to avoid

reductions in the QoL, it is crucial to develop strategies that effectively address the burden of disability in older persons [32,33].

The health problems of older adults have attracted very little consideration by researchers and policymakers [34]. The speed of population ageing has important implications for government policies, such as health care, pension schemes and economic growth [35]. The demographic transition with ageing of the population is a global phenomenon which demands international, national, regional and local action [36,37]. The lack of social pensions has serious consequences on the wellbeing of the older persons [38]. It is thus critical to have an in-depth understanding about the health conditions of older adults, QoL and related socio-economic factors, considering that they constitute an increasing proportion of Nigeria's population [39].

Hitherto, the question of how to care for the growing numbers of the elderly, their concerns and needs are yet to feature prominently in major policy debates [40]. This study will therefore focus on the assessment of the social correlates, socio-economic security and QoL among older adults in a southwestern region of Nigeria. The information obtained from this research will be used to guide policy development to improve the health status, socio-economic security and quality of life of older adults not in Nigeria alone but in the greater sub-Saharan African region and low- & middle-income countries (LMIC).

Methods

Study design & Study Setting

A community-based comparative cross-sectional study was carried out in selected rural and urban Local Government Areas (LGAs) of Oyo State, Southwest Nigeria. Out of thirty-three LGAs within the state, twelve are urban; nine are semi-urban while twelve are located in the rural areas. Older adults constitute about 6% of the total population of the state [38]. Social welfare services for older adults are few both in the country generally as well as in Oyo state. There are mini clinics for widows and the aged in each of the 33 LGAs, two non-governmental elderly homes both located in Ibadan, and also a geriatric centre located in the University College Hospital, Ibadan, which is a tertiary health institution [41].

Study population

The study population comprised of older men and women aged 60 years and above [42] from households in the selected LGAs. The inclusion criteria were those who had been resident in the selected communities for at least 12 months and who were severely or mentally ill to grant interview were excluded.

Sample size and Sampling technique

A minimum sample size of 832 (416/group) older persons were estimated using the formula for calculating sample size for comparing two proportions [36].

$$n/group = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 [P_1(1-P_1) + P_2(1-P_2)]}{(P_1-P_2)^2}$$

P_1 was the proportion of elderly with good quality of life in a rural area of North central Nigeria (50.9%) [34] and P_2 of 65.9%, assuming a 15% difference between the rural and urban areas; $Z_{1-\alpha/2}$ was the standard normal deviate corresponding to the probability of type 1 error (α) at 5% at 1.96 and $Z_{1-\beta}$, the standard normal deviate at 90% statistical power, corresponding to the probability of making a type 2 error at 1.28). Adjustment was made for non-response rate of 10% and clustering effect by a design effect of 1.5. A two-stage cluster sampling technique was used. **Stage I:** An urban (Ibadan South-East local Govt Area) and a rural LGA (Surulere Local Government Area) were sampled by balloting from a list of urban and rural LGAs respectively. **Stage II:** A list of all the wards in the two LGAs was obtained and a ward was selected in each local government area (LGA) by balloting. From Ibadan Southeast local government area, ten settlements were identified in ward VI (Elekuro/Asanike) while a total of eleven settlements were listed out in ward V of Surulere local government area. Since cluster sampling method was utilised to select eligible respondents, all the eligible and consenting older adults present in the 10 settlements from the urban wards (480) and from the 11 settlements from the rural wards (478) were interviewed. Cluster sampling also meant recruitment of all older persons found in some households with more than two eligible older adults.

Study Instrument

A semi-structured, interviewer-administered questionnaire was used to obtain information on QoL of the older persons and availability of social security/protection. Questions that assessed respondents' QoL were adapted from the WHO Quality of life - BREF (WHOQoL BREF) on a 26 item-scale [43]. It was designed as a self-rating instrument that could also be interviewer-administered. The WHOQoL-BREF questionnaire has been shown to be a valid measure of QoL in older adults [44]. Validation [45] was conducted locally by ensuring that constructs adequately captured the variables appropriately during the pre-test for both urban and rural areas separately. An achievement of an internal reliability with a Cronbach alpha of 0.86 following a rule of thumb for acceptable reliability confirmed the reliability of the instrument. The WHOQoL-BREF consists of the following overall quality of life and health status, physical health and activities of daily living, psychological wellbeing, social and personal relationship and environmental wellbeing.

Data Collection

Five research assistants with a minimum qualification of Ordinary National Diploma (OND) were recruited and trained in sessions over a period of two days. They were trained on the content and method of administration of questionnaire and maintenance of ethical standards. A role play session took place on the second day of training to ensure mastery of the questions. The training helped to reduce inter observer variation that could have occurred with data collection. The research assistants were supervised regularly by the principal investigator on the field to ensure quality of data collection. The study instrument was pre-tested among elderly respondents in one rural (Orire LGA) and one urban LGA (Ibadan North LGA) among local government areas that were not part of the main study. The instrument was translated to Yoruba language and back translated to English language in order to maintain consistency in meaning by a native and an independent assistant with a Bachelor degree in arts and linguistics.

Study Variables

Social security/Social protection

This was measured using the senior financial stability index [46] which comprises of retirement assets, house budget, health expenses, home equity and housing. Questions were asked on assets they had, ownership of house, availability of health insurance, who caters for health care

expenditure (HCE) for those without health insurance, membership of a cooperative organization, availability of pension, presence of external financial assistance.

Quality of life among older adults

The 4-domains of the WHOQoL-BREF namely: physical, psychological, social relationship, and environmental health consists of 7, 6, 3, and 8 questions respectively while other remaining items pertain to general health items. Scores ranging between 1 and 5 were given for each item on a 5-point Likert scale (Very dissatisfied/not at all = 1, Dissatisfied/A little = 2, neither satisfied nor dissatisfied/moderately = 3, Satisfied/Mostly = 4, and Very satisfied/Completely = 5). The domain scores were scaled in a positive direction (i.e., higher scores denoted higher quality of life). The scoring of 3 questions (3, 4 and 26) which were negatively phrased were reversed (1=5, 2=4, 3=3, 4=2, 5=1) thus transforming them to positively phrased questions. The four domain scores denote an individual's perception of quality of life in each particular domain. For each individual, the mean score obtained from the items within each domain was used to calculate the individuals' domain score. These mean scores were then multiplied by 4 in order to make the domain scores obtained comparable with the scores used in the WHOQoL-100. This first transformation method converted scores to range from 4 - 20, comparable with the WHOQoL-100. The second transformation method converted domain scores to a 0-100 scale.

Twenty-six questions on a Likert scale of 1-5 gave a minimum and maximum obtainable score of 26 and 130, respectively. This corresponds to a scale of 20% and 100% (4-20). An average response of 3 gives 78/130 (60%). The dichotomy into good or poor QoL was achieved using an average response of 3 and above (≥78/130; ≥60%) on the Likert scale as good QoL and scores below 3 (<78/130; <60%) as poor QoL. The primary outcome variable was QoL while the independent variables were *s*ocio-demographics including age, sex, marital status, religion, location, educational status, health status and social correlates (Social security/Economic security/Social protection).

Data Analysis

The data collected was checked for errors, cleaned, entered into the computer and analyzed using IBM SPSS version 20. Data checking and cleaning was done daily to ensure that missing items were accounted for and improperly entered variables were corrected. Frequencies were generated

and presented using charts and tables. Categorical variables were summarized as proportions and compared between LGA. Continuous variables were summarized as presented as means and standard deviations. The association of the categorical variables with each of the quality-of-life measures was assessed with chi-square. T-test was used to test for the comparison of means between 2 groups. Binary logistic regression was used to identify the variables and factors that best predicted quality of life. Logistic regression models were fitted for urban and rural population. Results were reported using odds ratio, confidence intervals at 95% and level of statistical significance was set at 5%.

Ethical consideration

Ethical approval was obtained from the Ethics Review Committee of Oyo State Ministry of Health (AD:13/479). A letter of introduction, obtained from the Department of Community Medicine at University of Ibadan, was presented to all selected households. Written informed consents were provided to all recruited elderly persons. Elderly persons that were illiterate were requested to thumbprint the consent forms to signify approval. Ethical issues like confidentiality, right to decline interview at any stage and non-exposure to risk were fully discussed with each respondent before every interview session.

Results

In all, nine hundred and seventy (970) older persons were approached to participate in the study (Four hundred and eighty-five each in the rural and urban locations). An extra 69 respondents were appoached over the minimum sample size of 416 to make allowance for incomplete or improperly filled quesionnaires. Out of 970 respondents that were approached, 958 of those that consented (response rate of 98.7%) had properly filled questionnaires. Four hundred and seventy-eight (49.9%) of these respondents were recruited from the rural location, while four hundred and eighty (50.1%) were from the urban area.

Table 1 shows respondents' socio-demographic characteristics by location. Older adults in the rural area had a mean age of 69.1$\pm$7.5 years compared to respondents in the urban area witha similar mean age of 69.1$\pm$7.1 years. The highest proportion 555 (57.9%) of all respondents was in the age group of 60-69 years. The proportion of females was slightly higher in the rural area 273

(57.1%) compared to the urban area 248 (51.7%). Of the overall 958 respondents, 521 (54.4%) were females. With regards to marital status, 319 (66.7%) of the respondents were currently married with those in rural area more compared to urban area 271 (56.5%) and this difference was statistically significant (p=0.001). More than half 280 (58.6%) of the respondents in the rural area had no formal education compared to their urban counterpart 145 (30.2%). A significantly higher proportion 335 (69.8%) of respondents in urban area had primary education and above compared to 198 (41.4%) in the rural area (p<0.001). With regards to the family type most of the respondents were monogamous with a slightly higher proportion in the rural area 290 (60.7%) as compared to 284 (59.2%) in the urban area. With regards to number of living children, 511 (53.3%) were those with 0-4 children with a higher proportion in those in urban location 296 (61.7%) compared to those in the rural location 215 (45.0%) (p<0.001).

Table 1: Socio-demographic characteristics of older adults by location

Variable (N=958)	**Rural N=478** n (%)	**Urban N=480** n (%)	**Total N=958** n (%)	χ^2	**p-Value**
Sex					
Male	205 (42.9)	232 (48.3)	437 (45.6)	2.864	0.091
Female	273 (57.1)	248 (51.7)	521 (54.4)		
Age Group (years)					
60-69	277 (57.9)	278 (57.9)	555 (57.9)	1.000	0.001
70-79	151 (31.6)	152 (31.7)	303 (31.6)		
≥80	50 (10.5)	50 (10.4)	100 (10.4)		
Religion					
Christianity	302 (63.2)	155 (32.3)	457 (47.7)	93.323	<0.001*
Islam	171 (35.8)	307 (64.0)	478 (49.9)		
Traditional	5 (1.0)	18 (3.7)	23 (2.4)		

Educational Level					
No formal education	280 (58.6)	145 (30.2)	425 (44.4)	78.092	<0.001*
Primary and above	198 (41.4)	335 (69.8)	533 (55.6)		
Marital Status					
Curently married	319 (66.7)	271 (56.5)	590 (61.6)	10.694	0.001*
Not currently married	159 (33.3)	209 (43.5)	368 (38.4)		
Type of Marriage					
Monogamous	290 (60.7)	284 (59.2)	574 (59.9)	0.225	0.635
Polygamous	188 (39.3)	196 (40.8)	384 (40.1)		
Number of living children					
0-4	215 (45.0)	296 (61.7)	511 (53.4)	26.925	<0.001*
5-9	230 (48.1)	163 (34.0)	393 (41.0)		
≥10	33 (6.9)	21 (4.3)	54 (5.6)		
Duration of stay in the community (Years)					
1-15	121 (25.3)	190 (39.6)	311 (32.5)	74.008	<0.001*
16-30	171 (35.8)	220 (45.8)	391 (40.8)		
≥31	186 (38.9)	70 (14.6)	256 (26.7)		

The details of the respondents' social, family and living status by location are presented in the supplementary file (S2&S3). In terms of living arrangement, a significantly higher proportion 247 (53.3%) of the respondents in the rural area were living with their spouse compared to 183 (39.9%) in the urban area ($p<0.001$). Among farmers, traders and artisans that were the major occupations, artisans constituted the highest proportion of the respondents (27.0%) followed by the farmers (24.3%).

Among both rural and urban respondents, a significantly higher proportion 72.8% and 57.9% were earning wages below the minimum monthly wage of ₦18,000 ($59) respectively. Majority (73.8%) of the respondents perceived their monthly earning capacity as inadequate regardless of the income source. A significantly higher proportion (83.3%) of urban residents perceived their income to be inadequate compared to rural respondents (64.2%) ($p<0.001$).

The distribution of respondents' availability of social security is also presented as a supplementary file (S4). Concerning access to health insurance, less than six percent had any form of access to health insurance. Majority of the participants were without insurance in both groups, 97.9% and 90.2% in rural and urban settings respectively. It was observed that the National Health Insurance Scheme (NHIS) was more common than the Community Based Health Insurance Scheme (CBHIS) among both rural and urban respondents ($p=0.022$). Among those without health insurance, children were mostly responsible for catering for the needs of their elderly ones in the rural areas (53.2%), unlike their urban counterparts where older adults were more responsible for catering for themselves (49.3%). This difference was found to be statistically significant ($p=0.020$). A lower proportion (12.3%) of the rural respondents were pensioners compared to 23.3% in the urban ($p<0.001$). Only about a quarter of sampled respondents (24.2%) belonged to a cooperative organization while about three quarters did not belong to any cooperative organization ($p<0.001$).

Figure 1 shows self rating of the health status of the respondents. Overall, 59.6% of the respondents rated their health status to be average with a higher proportion (61.9%) in the urban compared to 57.3% in the rural. However, the trend was reversed among the group of elderly that rated their health as good. The proportion of respondents that reported good health were higher (40.8%) in the rural area compared to 32.3% in the urban area; this difference was statistically significant ($p<0.001$).

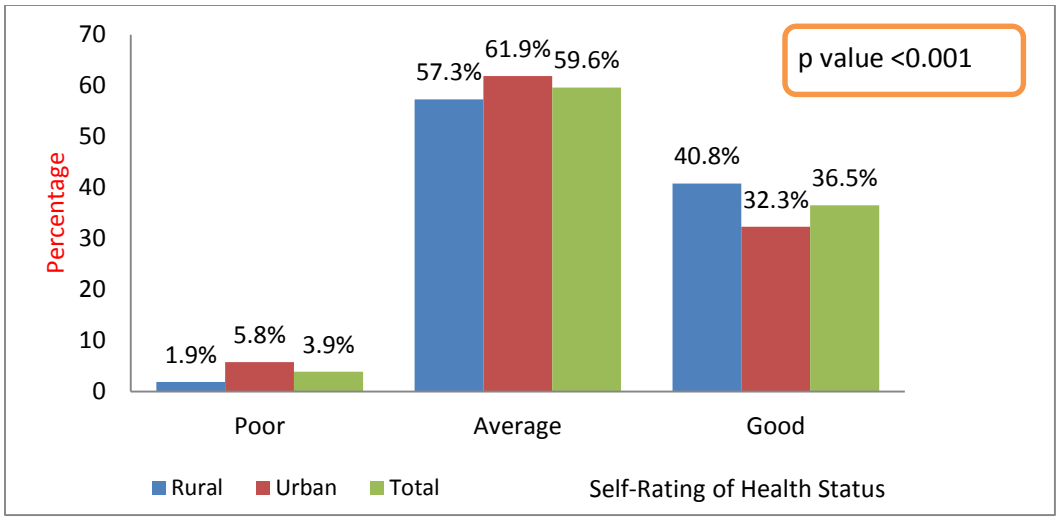

Fig 1: Distribution of respondents' self rating of health status by location

Table 2 presents the proportion of respondents assessed by overall QoL and four transformed domains by location. The only metric with a significant association was found in physical health and activities of daily living. With respect to physical health and activities of daily living, a higher proportion 290 (60.7%) of rural respondents had good QoL compared to 257 (53.5%) among urban respondents (p = 0.026). Although this was not a significant finding, a higher proportion of rural respondents had good QoL in the social relationship domain (66.5%) compared to (62.9%) in urban (p = 0.242). Also, with respect to environmental wellbeing, rural respondents had higher proportions (49.6%) compared to urban respondents (43.8%), even though the differences were found to be insignificant (p=0.070) (Table 2).

Table 2: Distribution of respondents by QoL rating by location.

Variables	Location		χ^2	p-value
Transformed Domains	**Rural**	**Urban**		
	N=478	**N=480**		
	n (%)	**n (%)**		
Overall QoL and Health Status				
Good	412 (86.2)	418 (87.1)	0.164	0.685
Poor	66 (13.8)	62 (12.9)		
Physical health and activities of daily living				
Good	290 (60.7)	257 (53.5)	4.967	0.026*
Poor	188 (45.7)	223 (46.5)		
Psychological Wellbeing				
Good	256 (53.6)	286 (59.6)	3.541	0.060
Poor	95 (47.7)	89 (43.6)		
Social Relationship Wellbeing				
Good	318 (66.5)	302 (62.9)	1.367	0.242
Poor	160 (33.5)	105 (51.5)		
Environmental Wellbeing				
Good	237 (49.6)	210 (43.8)	3.273	0.070
Poor	241 (48.7)	271 (38.7)		

* Significant

Table 3 presents the association between respondents' characteristics and quality of life considering the total population as an aggregate. All variables were significant at this level except for the variable that tested whether the older persons belonged to any cooperative society (p=0.527).

Table 3: Association between respondents' characteristics and QoL in total population

Characteristics **N=958**	**Good QoL** n (%)	**Poor QoL** n (%)	χ^2	**p-value**
Sex				
Male	350 (80.1)	87 (19.9)	11.755	<0.001*
Female	367 (70.4)	154 (29.6)		
Age group (years)				
60-69	227 (81.7)	51 **(**18.3)	9.910	0.007*
70-79	121 (79.6)	31 (20.4)		
≥80	31 (31.0)	19 (38.0)		
Religion				
Christianity	359 (78.6)	98 (21.4)	32.752	<0.001*
Islam	352 (73.6)	126 (26.4)		
Traditional	6 (26.1)	17 (73.9)		
Educational level				
No formal education	292 (68.7)	133 (31.3)	15.283	<0.001*
Formal education	425 (79.7)	108 (20.3)		
Marital Status				
Currently married	529 (81.7)	61 (10.3)	12.119	<0.001*
Not currently married	301 (81.8)	67 (18.2)		
Family type				
Monogamy	452 (78.7)	122 (21.3)	11.581	<0.001*
Polygamy	265 (69.0)	119 (31.0)		
Current health problems				
Yes	484 (70.9)	199 (15.0)	14.891	<0.001*
No	233 (84.7)	42 (15.3)		

Health self rating				
Poor	17 (45.9)	20 (54.1)	45.339	<0.001*
Average/Fair	400 (70.1)	171 (29.9)		
Good	300 (85.7)	50 (14.3)		
Asset				
No asset	186 (62.8)	110 (37.2)	32.795	<0.001*
Has asset	531 (80.2)	131 (19.8)		
Membership of cooperative society				
Yes	170 (73.3)	62 (26.7)	0.400	0.527
No	547 (75.3)	179 (24.7)		

*Significant

Table 4 presents the disaggregated bivariate analysis of respondents' characteristics and QoL by location. A significantly higher proportion of elderly practicing monogamy experienced better QoL compared to elderly practicing polygamy in the same area (p=0.001). Differences in their urban counterparts were however not significant (p=0.124).

In the urban area, 86.7% of married respondents had good QoL compared to 68.9% of unmarried elderly (p<0.001). Health self rating was also found to be significantly associated with QoL among both groups. Unlike the significance associated with marital status and health self rating among both rural and urban residents, there were no significant differences found associated with number of living children (p=0.126 and 0.301 respectively) (Table 4).

Table 4: Respondents' characteristics associated with QoL disaggregated by location

Characteristics	**Rural N=478**		**Urban N=480**	
	n (%)		**n (%)**	
	Good QoL	**Poor QoL**	**Good QoL**	**Poor QoL**
Sex				
Male	152 (74.1)	53 (25.9)	198 (85.3)	34 (14.7)
Female	186 (68.1)	87 (31.9)	181 (73.0)	67 (27.0)

	χ^2=2.045, p=0.153		**χ^2=11.024, p=0.001***	
Age group				
60 - 69	206 (74.4)	71 (25.6)	227 (81.7)	51 (18.3)
70 – 79	103 (68.2)	39 (22.8)	121 (79.6)	31 (20.4)
≥80	29 (58.0)	21 (42.0)	31 (62.0)	19 (38.0)
	χ^2=6.145, p=0.046*		**χ^2=9.910, p=0.007***	
Religion				
Christianity	231(76.5)	71 (23.5)	128(82.6)	27 (17.4)
Islam	105(61.4)	66 (38.6)	247(80.5)	60 (19.5)
Traditional	2 (40.0)	3 (60.0)	4 (22.2)	14 (77.8)
	χ^2=14.300$^+$, p=0.001*		**χ^2=36.514$^+$, p<0.001***	
Marital Status				
Currently married	236 (74.0)	83 (26.0)	235 (86.7)	36 (13.3)
Not currently married	102 (64.2)	57 (35.8)	144 (68.9)	65 (31.1)
	χ^2=4.951, p=0.026*		**χ^2=22.544, p<0.001***	
Educational level				
No formal education	190 (67.9)	90 (32.1)	102 (70.3)	43 (29.7)
Primary and above	148 (74.7)	50 (25.3)	277 (82.7)	58 (17.3)
	χ^2=2.659, p=0.103		**χ^2=9.278, p=0.002***	
Family type				
Monogamy	221(76.2)	69 (23.8)	231(81.3)	53 (18.7)
Polygamy	117(62.2)	71 (37.8)	148(75.5)	48 (24.5)

	χ^2=10.752, p=0.001*		**χ^2=2.731, p=0.124**	
No of living children				
0 – 4	156(72.6)	59 (27.4)	225(76.0)	71 (24.0)
5 – 9	163(70.9)	67 (29.1)	137(84.0)	26 (16.0)
≥10	19 (57.6)	14 (42.4)	17 (81.0)	4 (19.0)1`
	χ^2=4.138, p=0.126		**χ^2=2.404$^+$, p=0.301**	
Current Health Problems				
Yes	263 (68.8)	119 (31.2)	221 (73.4)	80 (26.6)
No	75 (78.1)	21 (21.9)	158 (88.3)	21 (11.7)
	χ^2=3.188, p=0.074		**χ^2=14.891, p<0.001**	
Health self-rating				
Poor	3 (33.3)	6 (66.7)	14 (50.0)	14 (50.0)
Average/Fair	178 (65.0)	96 (35.0)	222 (74.7)	75 (25.3)
Good	157 (80.5)	38 (19.5)	143 (92.3)	12 (7.7)
	χ^2=19.488$^+$, p<0.001		**χ^2=33.805, p<0.001**	
Asset				
No asset	54 (50.5)	53 (49.5)	132 (69.8)	57 (30.2)
Has asset	284 (76.5)	87 (23.5)	247 (84.9)	44 (15.1)
	χ^2=27.280, p<0.001		**χ^2=15.597, p<0.001**	
Cooperative membership				
Yes	101 (67.3)	49 (32.7)	69 (84.1)	13 (15.9)
No	237 (72.3)	91 (27.7)	310 (77.9)	88 (22.1)
	χ^2=1.204, p=0.272		**χ^2=1.602, p=0.206**	

$^+$Fisher's Exact test

The predictors of QoL in each location were determined and presented in Table 5. In the rural area, the following factors were found to be predictors of good QoL: family setting (whether monogamy or polygamy) (p=0.010), health rating (p=0.033; p=0.013) and possession of assets (p<0.001) were the only predictors among the rural respondents. Older persons living in rural settings that were in momogamous relationships were almost twice likely to have good QoL (OR=1.866, p=0.010; 95% CI=1.162 – 2.998). Rural respondents whose health ratings were average and poor were about twice (OR = 0.588, p = 0.033; 95% CI=0.354 – 0.956) and about seven times (OR = 0.148, p = 0.013; 95% CI=0.033 – 0.754) less likely to have good QoL compared to those with good health rating respectively (Table 5). Rural respondents with no assets were four times less likely to have good QoL (OR = 0.290, p < 0.001; 95% CI=0.175 – 0.481).

Religion (p=0.005; p=0.001), marital status (p=0.021), current health problems (p=0.044), and self rating (p=0.007; p<0.001) were predictors associated with good QoL among the urban residents. Those who are practicing Christianity and Islam religion were more than seven (OR = 7.627, p < 0.005; 95% CI=1.865 – 31.198) and eight times (OR = 8.439, p<0.001; 95% CI=2.204 – 31.044) more likely to have good QoL compared to traditionalists. Respondents in a marital engagement were found to be almost twice likely to have good QoL (OR=1.918, p=0.021; 95%CI=1.102–3.338) compared to unmarried elderly persons. Respondents with current health problems were found to be almost twice less likely to have good QoL (OR=0.531, p = 0.044; 95% CI=0.285 – 0.983) compared to those without health problems (Table 5). Those who have average and poor health ratings were about thrice and eight times less likely to have good QoL respectively (OR = 0.373, p = 0.007; 95% CI= 0.181 – 0.767), (OR = 0.125, p <0.001; 95% CI=0.042 – 0.369).

Table 5: Predictors of QoL among older persons in both rural and urban areas

		Rural Respondents		Urban Respondents	
	Variables	**OR (95% CI)**	**p-value**	**OR (95% CI)**	**p-value**
1.	**Sex**				
	Male	1.094 (0.664-1.801)	0.725	1.457 (0.792-2.667)	0.226
	Female (Ref)	1		1	
2.	Age Group				
	60 – 69	1.996 (0.876-4.550)	0.100	1.235 (0.535-2.852)	0.621
	70 – 79	1.359 (0.647-2.854)	0.419	1.839 (0.833-4.062)	0.132
	≥80 (Ref)	1		1	
3.	**Religion**				
	Christianity	3.785 (0.471-30.428)	0.211	7.627 (1.865-31.198)	0.005*
	Islam	2.301 (0.293-18.078)	0.428	8.439 (2.204-31.044)	0.001*
	Traditional (Ref)	1		1	
4.	**Educational level**				
	No formal education	-	-	0.993 (0.561-1.757)	0.982
	Formal education (Ref)	-	-	1	
5.	**Marital status**				
	Currently married	1.043 (0.631-1.722)	0.870	1.918 (1.102-3.338)	0.021*
	Not currently married (Ref)	1		1	
6.	**Family**				
	Monogamous	1.866 (1.162-2.998)	0.010*	0.818 (0.471-1.420)	0.475
	Polygamous (Ref)	1		1	

7	**Currently employed**				
	Yes	-	-	1.769 (0.962-3.255)	0.067
	No (Ref)	-	-	1	
8.	**Current health problem**				
	Yes	0.362 (0.404 – 1.392)	0.750	0.531(0.285-0.983)	0.044*
	No (Ref)	1		1	
9.	**Health rating**				
	Good (Ref)	1		1	
	Average	0.588 (0.354-0.956)	0.033*	0.373 (0.181-0.767)	0.007*
	Poor	0.148 (0.033-0.754)	0.013*	0.125 (0.042-0.369)	<0.001*
10.	**Assets**				
	Has assets (Ref)	1		1	
	No assets	0.290 (0.175-0.481)	<0.001*	0.616 (0.361-1.053)	0.077

* Significant

Discussion

This study was conducted to assess and compare the social correlates as well as the quality of life (QoL) of older adults in selected rual and urban areas of a southwestern state in Nigeria. The age pattern distribution (highest proportion of respondents falling within the age group of 60-69 years in both locations while the least proportion falling within the age group ≥80years) is expected since mortality increases with age; a finding found to be established in other studies [47–49].

In both locations, females constituted a higher proportion of the study population. This finding is similar to what has been reported by other studies [50,51] and this has been attributed to the longer life expectancy of females [52]. Most men also tend to marry women younger than themselves and as such wives would eventually outlive their husbands [53,54]. Furthermore, our findings with regards to gender (QoL across all domains was better for male respondents than the female

respondents), marital status (currently married had better QoL than those not married) is also similar to other studies [55–57]. Concerning, the factors that influenced the respondents' QoL, being male had an influence which cuts across all the domains of QoL and this may be due to the fact that men have less co- morbidities in old age compared to women.

Higher proportions of currently married elderly respondents and high illiteracy rates in the rural areas is similar to that of Mudey in which 74.7% and 49.0% were found to be illiterates in the rural and in the urban locations respectively [58]. An overwhelming majority of respondents being of Yoruba descent, practicing Christianity and monogamy is an expected finding since the study sites lie within the South Western geopolitical zone of Nigeria where dominant cultutural norms favor monogamy and Christianity over polygamy and Islam. Furthermore, being currently married had a positive influence because respondents that were currently married had better quality of life in both locations and this is similar to what was found in an urban elderly population in India and as well as a rural state in India [59–61]. Education also had an influence on QoL of respondents. Those who had formal education had better QoL overall than those without formal education and this is similar to other studies [62,63]. This study also found out that presence of health problems also affects the quality of life of respondents in both locations on bivariate analysis and this is similar to what was found in other studies [64–65].

Overall and in all the domains, the mean QoL scores of the study respondents were comparably above average. Our findings with regards to QoL domains and scores are consistent with what was found by Raj et al in which the environmental domain in his study recorded the highest score [61]. The observed higher QoL score in the social relationship domain for urban residents may be due to the presence of better social amenities in the area. Findings in which a greater majority of respondents exhibited good QoL is consistent with findings from Qadri and colleagues, where an overwhelming majority of its participants were also found to possess good QoL [66, 67, 68].

Lack of financial support could also affect their QoL negatively; a finding similar to a study conducted by Fajemilehin that established a negative association between inadequate personal money and quality of life in older adults [70, 71]. This is further buttressed by Alexandre et al (2009) that found out that elderly people with financial independence live in better conditions [72]. Possession of assets in old age was found to be associated with better QoL which was significant among urban respondents. This is plausible because part of old age security is having asset which

may be a source of cushioning effect of old age. The poor earning capacity of about two-thirds of older adults in this study (earning below the minimum wage stipulated by the government) establishes the weak financial independence of the respondents.

Respondents in the rural location with assets, good health ratings and in monogamous relationship had better quality of life whereas on the flipside, respondents in the urban regions that were currently married had good QoL. Also, respondents currently with health problems were less likely to have good QoL compared to those without health problems. It therefore implied that increasing chronic comorbidities at old age was synonumous with poorer quality of life. Currently engagement in a job was also associated with a better quality of life; a finding that is similar to Joshi and colleagues, where individuals with current employment were also found to be exhibit better QoL than those without jobs [73].

With respect to social security, about a quarter (17.8%) of the respondents had access to pension though not regular. This is in consonance with similar studies in sub-Saharan Africa where one in five older persons (16.9%) received an old age pension that will provide him with old age income security [74,75]. This is a bit higher than the civil pension coverage rate which was 7% in Nepal, 13% in Bangladesh and 14% in India [76]. This shows that majority of older adults were still not captured in the coverage of the formal retirement pension scheme thus increasing their vulnerability after retirement or old age.

Access to health insurance scheme that would have otherwise secured the health of older adults was also found to be grossly poor. Only 5.9% of the respondents had access to a form of health insurance yet increasing their susceptibilities in the advent of a health crisis. Almost half (47.2%) of the respondents having to cater for their health care themselves is even more worrisome with the poor access and availability to health insurance [77]. Another consideration of the availability of social security is the membership of a cooperative organization which was also found to be grossly deficient. Less than a quarter of the respondents belonging to any cooperative organization, lack of external financial assistance, which is also a form of social protection further attest to the vulnerabilities of elderly populations. The access to social support through FBOs is contradictory to the mandate in ILO report that admonishes government to provide social security measures for older adults [78].

There was a significant association between age and QoL on bivariate analysis in all domains (overall, rural and urban) even though, age was not found to be a significant predictor of QoL on multivariate analysis. The QoL decreased with increasing age across all domains. This inverse relationship can be explained by the fact that aging is associated with loss of normal physiological characteristics and frailty. As age advances, health-related problems abound leading to increased morbidities in the elderly. Frailty, a geriatric syndrome defined as a state of age-related physiologic vulnerability that is characterized by reduced functional reserve and high susceptibility to adverse health outcomes, has been investigated in literature [79,80]. The common features of frailty include body weakness, slowness, exhaustion, weight loss and low activity [79,81]. Some of the adverse outcomes of frailty are falls, injuries, disability, acute illness, hospitalization and mortality [79, 82]. Studies have shown a link between the adverse outcomes of frailty and health related QoL. Frailty was strongly associated with dimished quality of life in elderly populations [82,83], as was also corroborated in this study.

Despite our study findings, our study must be interpreted bearing the following limitiations in mind. A subjective interviewer bias might have been introduced during the interview period. This was minimized using a standard instrument deployed for use after reliability of the instrument was established. Respondents also might have underreported their ailments since this is usually associated with a negative social image. To minimize this, advantages of early intervention and full details of the study and their rights were explained to them. Difficulty with recounting ages by some of the respondents were assisted with recall of historical events to assist in accurately estimating their ages.

Conclusion

The quality of life of the respondents was generally above average with a great majority of the respondents in both locations having good QoL. Factors and predictors differed greatly between rural and their urban counterparts. Concerted efforts are needed and paramount and needed to improve the psychological, social and environmental domains of the elderly and the QoL of older persons in the country. Care of the older adults is an integral part of the newly added components of primary health care model, and as such, must be handled with much more urgency and conscientiousness. Formidable and promising steps include but are not limited to, provision of

affordable and functional health services for older adults with ease of access as obtainable in both rural and urban settings of developed countries, enhancement of economic security through regular payment of pensions for formal retirees and provision of monthly stipends to capture the informal sector retirees by the government.

Supporting information

S1 File. Social Correlates of Aging and QoL in Older Adults Dataset [84]
https://doi.org/10.6084/m9.figshare.19817542
S2 File:
Table S2: Respondents' social, family and living status of older adults by Location
Table S3: Respondents' socio-economic and employment status by location
Table S4: Respondents' access to social security & health insurance by location
Table S5: Table S5: Respondents' QoL scores by location

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Authors' Contributions

JOO and AMA conceptualized the study. JOO wrote the protocol, literature review and carried out the research. AMA supervised the study. JOO wrote the initial draft of the manuscript. TAO provided technical and critical reviews on the writing of the mansuscript. All authors proof-read and approved the final manuscript.

Authors' Information:

Author 1: JOO: (MBBS, MSc, FWACP)
Email: okediranj@yahoo.com
Tel: +234-803-539-9943
Orcid: http://orcid.org/0000-0002-4113-7236

Author 2: TAO (MBBS, MPH, PHD)
Email: tobems17@yahoo.com
Tel: +234-805-840-9495

Orcid: http://orcid.org 0000-0001-9610-1137

Author 3: AMA: (MBBS, MPH, FWACP)
Email: davidsonone@yahoo.com
Tel: +234-803-382-8948
Orcid: http://orcid.org/0000-0002-9912-100X

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Social correlates of aging and Quality of Life ~~among~~of older adults in rural and urban areas of Southwestern Nigeria: a comparative cross-sectional study

James O. Okediran[1¶], Taiwo A. Obembe[2,3*¶], Ayodeji M. Adebayo[1¶]

Running Title: Aging process in older Nigerian adults

1. Department of Community Medicine, Faculty of Clinical Sciences, College of Medicine, University of Ibadan

2. Department of Health Policy and Management, Faculty of Public Health, College of Medicine, University of Ibadan

3. Claremont Graduate University, School of Community and Global Health, California, USA

*Corresponding Author: TAO
Email: tobems17@yahoo.com ~~(TAO)~~

¶~~These~~All authors contributed equally to this work.

Abstract

~~Background~~Introduction**:** Quality of Life (QoL) among older adults is an important area of concern that directly affects their health status and wellbeing. This study was conducted to assess and compare the social correlates as well as the QoL of older adults in selected locations of Oyo State~~, Southwest~~ in southwestern Nigeria.

Methods: A comparative study of 958 older adults was conducted using a two-stage cluster sampling technique. A semi-structured, interviewer-administered questionnaire was used to elicit information on QoL and social security. QoL was assessed using a WHO QoL-BREF questionnaire. Twenty-six questions on a Likert scale of 1-5 gave a minimum and maximum obtainable score of 26 (20%) and 130 (100%), respectively. ~~QoL~~QoL was dichotomized into good or poor using an average of 3 and above (≥78/130; ≥60%) as good ~~QoL~~QoL and scores below 3 (<78/130; <60%) as poor ~~QoL~~QoL. Predictors of QoL were determined using logistic regression with level of statistical significance set at 95%.

Results: Overall, rural respondents exhibited a higher QoL (63.89 ± 15.9) compared to the urban counterparts (60.76 ± 13.9). Rural respondents had significantly higher QoL scores in physical health (61.58 ± 17.8) than their counterparts (58.62 ± 15.4) (p=0.006). Urban older adults had higher scores in psychological and social relationship wellbeing though insignificant (p=0.599 and 0.806 respectively). Some significant predictors of good QoL included family setting (p=0.010), possession of assets (p<0.001) and health ratings (p<0.001).

Conclusion: The QoL of older adults was above average while the social correlates found in the study included ~~pension~~pensions and external financial assistance from faith-based organizations (FBOs). In order for older adults to enjoy enhanced QoL, ~~it is recommended that~~ adequate social security should be put in place for them to enjoy financial support and societal integration.

Key words: Aging, Elderly, Quality of life, Rural and Urban, Social correlates, social security

Introduction

Industrialization, urbanization and improvement in medical care has resulted in global increase in life expectancy, leading to a sharp rise in the number of older persons [1,2]. The World Health Organization (WHO) defines older persons as those individuals above the age of 60 years [3,4]. The world's elderly population is increasing by about one million persons per month, and the percentage of elderly people in the world is expected to increase rapidly from the 9.5% in 1995 to 20.7% in 2050 and 30.5% by 2150 [5]. It is estimated that more than 60% of the world's elderly are found in developing countries, including Nigeria [6].

~~An ageing population poses a number of problems that range from health to financial and social security issues. Health wise, they~~Health wise, older persons are prone to a number of non-communicable diseases (NCDs), which are currently responsible for roughly 60% of all deaths ~~and nearly half of the loss of actual and effective life years [7].~~[7]. The most common chronic NCDs being cardiovascular disease, cancer, chronic respiratory ~~disease,~~diseases and diabetes ~~and mental health conditions (including Alzheimer's)~~ [8]. A vast number of elderly population and the associated health problems have implications for health care and also quality of life. The effect is more in low- and middle-income countries where many public services ~~(especially for health care and the health care systems)~~ are still focused on childhood and infectious diseases as well as reproductive health services [9,10].

Quality of Life (QoL) is an important health index for older adults in every country~~, playing a key role in assessing interventions, and establishing essential medical and social care needs for the ageing population. According~~ and according to the World Health Organization (WHO), quality of life is defined as as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns [11,12]. Felce and Perry define the quality of life as an overall general wellbeing that comprises objective descriptors and subjective evaluations of physical, material, social, and emotional wellbeing together [13].

At the global level, QoL among older adults is an important area of concern that reflects the health status and well-being of this vulnerable population [14]. Majority of older adults evaluate their

quality of life positively on the basis of social contacts, dependency, health, material circumstances and social comparisons [15].

QoL of older adults is affected by problems related to fulfillment of basic requirements such as social relations, personal care, nutrition and accommodation. These are examples of social correlates affecting older adults [16]. ~~Social correlate is a construct which includes social security, economic security and social protection.~~

Social security may be defined as constituting measures that enhance social capabilities and enables the vulnerable sections of the population to survive [17]. According to the International committee of the Red Cross, economic security is defined as the ability of individuals, households, or communities to cover their essential needs sustainably and with dignity [18]. More relevant to this study, economic security is defined as a financial status where elders have sufficient income (pension, retirement savings and other sources) to cover basic and necessary living expenses [19]. ~~Economic security refers to the condition of having a stable source of financial income that allows for the on-going maintenance of one's standard of living currently and in the near future. It requires an assured basic income for individuals, usually from productive and remunerative work or, as a last resort, from a publicly financed safety net.~~

Social protection can be defined as a set of policies and programmes seeking to reduce social and economic risk, to alleviate extreme poverty and deprivation, and to promote decent standards of living stemming in part from fair and equitable working standards [20]. Social security benefits are used as a main policy instrument to eradicate poverty, reduce income inequalities and enhance human capital and productivity [21]. ~~These measures are important mechanisms for financing older adults in many western countries. The agents that provide such security are spread over the government, firms, households and the community.~~ The provision of minimum levels of income constitutes not only a necessity for survival but also an essential pre-requisite for the acquisition of education, health and nutrition [22].

Furthermore, an ageing population also brings with it increased expenditure on health care services, on home care and shelter of the elderly, and a greater demand for relevant skilled health care workers and health professionals to cater for senior citizens who are more prone to illness and problems of mobility [23]. ~~In economies such as Japan,~~The situation that the older adults face in

Nigeria (whereby a dwindling base of working age people have to support a growing number of the elderly~~. The situation that the older adults face in Nigeria~~) is not quite different from what is obtainable in other sub-Saharan African countries where very few social security systems exist. ~~Only~~Currently, only South Africa and Namibia currently have a social security system where persons aged ~~60years~~60 years and above are entitled to a monthly stipend [24].

~~As with households with higher disposable incomes, older persons with reasonable economic security are less likely to experience anxiety associated with financial strains.~~ The cushioned effects of economic and social security invariably ~~facilitates~~facilitate greater lifestyle choices and ~~access to~~ resources to manage a crisis, should one occur [25].

~~The Nigerian elderly are disadvantaged regarding systemic support and several factors are responsible for this. Firstly, demographic change is increasing the number and proportion of older persons, and thus the demand for social support. Secondly, dynamics of family units (and social institutions) are constantly changing with severe implications for the support for older adults. For instance, as more young people leave agricultural employment, obtain education, enter the wage market and migrate to urban areas, these circumstances have all cumulatively resulted in declining family support for older adults [24]. The implications of this change in the family structure on the wellbeing of older adults include over reliance on formal support systems, falling income, deteriorating health conditions, poor nutrition, isolation, and boredom [24].~~

Despite the aforementioned, QoL varies widely in literature. In a bid to assess the QoL and its determinants among older persons aged 60-90 years attending a general practice clinic in Southwest Nigeria, Fakoya et al (2018) found that 75.0% of its study population experienced poor QoL that was worsened with co-morbidites [26].

In another study, economic status was found to be the most consistent predictor of the four domains of QoL [27] . A study showed that Primary Health Care (PHC) has overlooked the needs of aging population [28] as most of its components largely concentrate more on maternal ~~health,~~and child health ~~and contagious diseases~~ [29]. The Sustainable Development Goals (SDGs) ~~have~~has also failed to emphasize the need for health development in older adults [30,31]. In order to enable ~~the future~~ health care systems cope with increasing demands of the elderly, and to avoid reductions in the QoL, it is crucial to develop strategies that effectively address the burden of

disability ~~(that is associated with a concomittant increase in the need for health and social services)~~in older persons [32,33].

The health problems ~~that manifest among children and youths in Nigeria have generally received more attention from the government than those~~ of older adults ~~and as a result,~~have attracted very little consideration ~~is given to older adults~~ by researchers and policymakers [34]. The speed of population ageing has important implications for government policies, such as health care, pension schemes and economic growth [35]. The demographic transition with ageing of the population is a global phenomenon which demands international, national, regional and local action [36,37]. The lack of social pensions has serious consequences on the wellbeing of the older persons~~. The majority of older people who cannot earn an income and are not covered by the contributory pension scheme are left at the mercy of the vagaries of life~~ [38]. ~~As older adults constitute an increasing proportion of Nigeria's population, it is pertinent to examine health and socio-economic issues among this age group and to effectively and efficiently respond to the growing health and socio-economic needs of the elderly.~~ It is thus critical to have an in-depth understanding about ~~their~~the health conditions of older adults, QoL and related socio-economic factors, considering that they constitute an increasing proportion of Nigeria's population [39].

Hitherto, the question of how to care for the growing numbers of the elderly, their concerns and needs are yet to feature prominently in major policy debates [40]. This study will therefore focus on the assessment of the social correlates, socio-economic security and QoL among older adults in a southwestern ~~state~~region of Nigeria ~~(Oyo State).~~ The information obtained from this research will be used to guide policy development to improve the health status, socio-economic security and quality of life of older adults not in Nigeria alone but in the greater sub-Saharan African region and low- & middle-income countries (LMIC).

Methods

Study design & Study Setting

A community-based comparative cross-sectional study was carried out in selected rural and urban Local Government Areas (LGAs) of Oyo State, Southwest Nigeria. Out of thirty-three LGAs within the state, twelve are urban; nine are semi-urban while twelve are located in the rural areas. Older adults constitute about 6% of the total population of the state ~~[41]~~[38]. Social welfare

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services for older adults are few both in the country generally as well as in Oyo state. There are mini clinics for widows and the aged in each of the 33 LGAs, two non-governmental elderly homes both located in Ibadan, and also a geriatric centre located in the University College Hospital, Ibadan, which is a tertiary health institution ~~[42]~~[41].

Study population

The study population comprised of older men and women aged 60 years and above ~~[43]~~[42] from households in the selected LGAs. The inclusion criteria were those who had been resident in the selected communities for at least 12 months and who were severely or mentally ill to grant interview were excluded.

Sample size and Sampling technique

A minimum sample size of 832 (416/group) older persons were estimated using the formula for calculating sample size for comparing two proportions [36].

$$n/group = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 [P_1(1-P_1) + P_2(1-P_2)]}{(P_1-P_2)^2}$$

P_1 was the proportion of elderly with good quality of life in a rural area of North central Nigeria (50.9%) [34] and P_2 of 65.9%, assuming a 15% difference between the rural and urban areas; $Z_{1-\alpha/2}$ was the standard normal deviate corresponding to the probability of type 1 error (α) at 5% at 1.96 and $Z_{1-\beta}$, the standard normal deviate at 90% statistical power, corresponding to the probability of making a type 2 error at 1.28). Adjustment was made for non-response rate of 10% and clustering effect by a design effect of 1.5. A two-stage cluster sampling technique was used. **Stage I:** An urban (Ibadan South-East local Govt Area) and a rural LGA (Surulere Local Government Area) were sampled by balloting from a list of urban and rural LGAs respectively. **Stage II:** A list of all the wards in the two LGAs was obtained and a ward was selected in each local government area (LGA) by balloting. From Ibadan Southeast local government area, ten settlements were identified in ward VI (Elekuro/Asanike) while a total of eleven settlements were

listed out in ward V of Surulere local government area. Since cluster sampling method was utilised to select eligible respondents, all the eligible and consenting older adults present in the 10 settlements from the urban wards (480) and from the 11 settlements from the rural wards (478) were interviewed. Cluster sampling also meant recruitment of all older persons found in some households with more than two eligible older adults.

Study Instrument

A semi-structured, interviewer-administered questionnaire was used to obtain information on QoL of the older persons and availability of social security/protection. Questions that assessed respondents' QoL were adapted from the WHO Quality of life - BREF (WHOQoL BREF) on a 26 item-scale ~~[44]~~[43]. It was designed as a self-rating instrument that could also be interviewer-administered. The WHOQoL-BREF questionnaire has been shown to be a valid measure of QoL in older adults ~~[45]~~[44]~~.~~. Validation ~~[46]~~[45] was conducted locally by ensuring that constructs adequately captured the variables appropriately during the pre-test for both urban and rural areas separately. An achievement of an internal reliability with a Cronbach alpha of 0.86 following a rule of thumb for acceptable reliability confirmed the reliability of the instrument. The WHOQoL-BREF consists of the following overall quality of life and health status, physical health and activities of daily living, psychological wellbeing, social and personal relationship and environmental wellbeing.

Data Collection

~~***Social security/Social protection***~~

~~This was measured using the senior financial stability index [47] which comprises of retirement assets, house budget, health expenses, home equity and housing. Questions were asked on assets they had, ownership of house, availability of health insurance, who caters for health care expenditure (HCE) for those without health insurance, membership of a cooperative organization, availability of pension, presence of external financial assistance.~~

Five research assistants with a minimum qualification of Ordinary National Diploma (OND) were recruited and trained in sessions over a period of two days. They were trained on the content and method of administration of questionnaire and maintenance of ethical standards. A role play session took place on the second day of training to ensure mastery of the questions. The training ~~also~~ helped to reduce inter observer variation that could ~~occur~~have occurred with data collection. The research assistants were supervised regularly by the principal investigator on the field to ensure quality of data collection. The study instrument was pre-tested among elderly respondents in one rural (Orire LGA) and one urban LGA (Ibadan North LGA) among ~~those~~local government areas that were not ~~selected for~~part of the main study. The instrument was translated to Yoruba language and back translated to English language in order to maintain consistency in meaning by a native and an independent assistant with a Bachelor degree in arts and linguistics.

Study Variables

Social security/Social protection

This was measured using the senior financial stability index [46] which comprises of retirement assets, house budget, health expenses, home equity and housing. Questions were asked on assets they had, ownership of house, availability of health insurance, who caters for health care expenditure (HCE) for those without health insurance, membership of a cooperative organization, availability of pension, presence of external financial assistance.

Quality of life among older adults

The 4-domains of the WHOQoL-BREF namely: physical, psychological, social relationship, and environmental health consists of 7, 6, 3, and 8 questions respectively while other remaining items pertain to general health items. Scores ranging between 1 and 5 were given for each item on a 5-point Likert scale (Very dissatisfied/not at all = 1, Dissatisfied/A little = 2, neither satisfied nor dissatisfied/moderately = 3, Satisfied/Mostly = 4, and Very satisfied/Completely = 5). The domain scores were scaled in a positive direction (i.e~~.~~.., higher scores denoted higher quality of life). The scoring of 3 questions (3, 4 and 26) which were negatively phrased were reversed (1=5, 2=4, 3=3, 4=2, 5=1) thus transforming them to positively phrased questions. The four domain scores denote an individual's perception of quality of life in each particular domain. For each individual, the mean score obtained from the items within each domain was used to calculate the individuals'

domain score. These mean scores were then multiplied by 4 in order to make the domain scores obtained comparable with the scores used in the WHOQoL-100. This first transformation method converted scores to range from 4 - 20, comparable with the WHOQoL-100. The second transformation method converted domain scores to a 0-100 scale.

Twenty-six questions on a Likert scale of 1-5 gave a minimum and maximum obtainable score of 26 and 130, respectively. This corresponds to a scale of 20% and 100% (4-20). An average response of 3 gives 78/130 (60%). The dichotomy into good or poor ~~Qol~~QoL was achieved using an average response of 3 and above (≥78/130; ≥60%) on the Likert scale as good ~~Qol~~QoL and scores below 3 (<78/130; <60%) as poor ~~Qol~~QoL. The primary outcome variable was QoL while the independent variables were *s*ocio-demographics including age, sex, marital status, religion, location, educational status, health status and social correlates (Social security/Economic security/Social protection).

Data Analysis

The data collected was checked for errors, cleaned, entered into the computer and analyzed using IBM SPSS version 20. Data checking and cleaning was done daily to ensure that missing items were accounted for and improperly entered variables were corrected. Frequencies were generated and presented using charts and tables. Categorical variables were summarized as proportions and compared between LGA. Continuous variables were summarized as presented as means and standard deviations. The association of the categorical variables with each of the quality-of-life measures was assessed with chi-square. T-test was used to test for the comparison of means between 2 groups.

Binary logistic regression was used to identify the variables and factors that best predicted quality of life. Logistic regression models were fitted for urban and rural population. Results were reported using odds ratio, confidence intervals at 95% and level of statistical significance was set at 5%.

Ethical consideration

Ethical approval was obtained from the Ethics Review Committee of Oyo State Ministry of Health~~.~~ (AD:13/479). A letter of introduction, obtained from the Department of Community Medicine at University of Ibadan, was presented to all selected households. Written informed consents were

provided to all recruited elderly persons. Elderly persons that were illiterate were requested to thumbprint the consent forms to signify approval. Ethical issues like confidentiality, right to decline interview at any stage and non-exposure to risk were fully discussed with each respondent before every interview session.

Results

In all, nine hundred and seventy (970) older persons were approached to participate in the study (Four hundred and eighty-five each in the rural and urban locations). An extra 69 respondents were appoached over the minimum sample size of 416 to make allowance for incomplete or improperly filled quesionnaires. Out of 970 respondents that were approached, 958 of those that consented (response rate of 98.7%) had properly filled questionnaires. Four hundred and seventy-eight (49.9%) of these respondents were recruited from the rural location, while four hundred and eighty (50.1%) were from the urban area.

Table ~~1a~~1 shows respondents' socio-demographic characteristics by location. Older adults in the rural area had a mean age of 69.1±7.5 years compared to respondents in the urban area witha similar mean age of 69.1±7.1 years. The highest proportion 555 (57.9%) of all respondents was in the age group of 60-69 years. The proportion of females was slightly higher in the rural area 273 (57.1%) compared to the urban area 248 (51.7%). Of the overall 958 respondents, 521 (54.4%) were females. With regards to marital status, 319 (66.7%) of the respondents were currently married with those in rural area more compared to urban area 271 (56.5%) and this difference was statistically significant (p=0.001). More than half 280 (58.6%) of the respondents in the rural area had no formal education compared to their urban counterpart 145 (30.2%). A significantly higher proportion 335 (69.8%) of respondents in urban area had primary education and above compared to 198 (41.4%) in the rural area (p<0.001). With regards to the family type most of the respondents were monogamous with a slightly higher proportion in the rural area 290 (60.7%) as compared to 284 (59.2%) in the urban area. With regards to number of living children, 511 (53.3%) were those with 0-4 children with a higher proportion in those in urban location 296 (61.7%) compared to those in the rural location 215 (45.0%) (p<0.001).

Table ~~1a~~1: Socio-demographic characteristics of older adults by location

Variable (N=958)	Rural N=478 n (%)	Urban N=480 n (%)	Total N=958 n (%)	χ^2	p-Value
Sex					
Male	205 (42.9)	232 (48.3)	437 (45.6)	2.864	0.091
Female	273 (57.1)	248 (51.7)	521 (54.4)		
Age Group (years)					
60-69	277 (57.9)	278 (57.9)	555 (57.9)	1.000	0.001
70-79	151 (31.6)	152 (31.7)	303 (31.6)		
≥80	50 (10.5)	50 (10.4)	100 (10.4)		
Religion					
Christianity	302 (63.2)	155 (32.3)	457 (47.7)	93.323	<0.001*
Islam	171 (35.8)	307 (64.0)	478 (49.9)		
Traditional	5 (1.0)	18 (3.7)	23 (2.4)		
Educational Level					
No formal education	280 (58.6)	145 (30.2)	425 (44.4)	78.092	<0.001*
Primary and above	198 (41.4)	335 (69.8)	533 (55.6)		
Marital Status					
Curently married	319 (66.7)	271 (56.5)	590 (61.6)	10.694	0.001*
Not currently married	159 (33.3)	209 (43.5)	368 (38.4)		
Type of Marriage					
Monogamous	290 (60.7)	284 (59.2)	574 (59.9)	0.225	0.635
Polygamous	188 (39.3)	196 (40.8)	384 (40.1)		

Number of living children					
0-4	215 (45.0)	296 (61.7)	511 (53.4)	26.925	<0.001*
5-9	230 (48.1)	163 (34.0)	393 (41.0)		
≥10	33 (6.9)	21 (4.3)	54 (5.6)		
Duration of stay in the community (Years)					
1-15	121 (25.3)	190 (39.6)	311 (32.5)	74.008	<0.001*
16-30	171 (35.8)	220 (45.8)	391 (40.8)		
≥31	186 (38.9)	70 (14.6)	256 (26.7)		

~~Table 1b & 1c show~~The details of the respondents' social, family and living status by location~~. A higher proportion 282 (59.0%) of respondents~~ are presented in the ~~rural area reportedly owned a house, comparably with 266 (55.4%) in the urban area. A sizeable proportion of respondents were not living alone (96.2%).~~supplementary file (S2&S3). In terms of living arrangement, a significantly higher proportion 247 (53.3%) of the respondents in the rural area were living with their spouse compared to 183 (39.9%) in the urban area (p<0.001). Among farmers, traders and artisans that were the major occupations, artisans constituted the highest proportion of the respondents (27.0%) followed by the farmers (24.3%). ~~Among the rural respondents, farmers constituted a greater proportion (37.9%), unlike the urban respondents having a much lesser proportion of farmers (10.8%). These differences were statistically significant (p<0.001). Overall, 39.8% of the respondents maintained themselves through what they received from their children with a slightly higher proportion 40.2% in the urban area compared to the 39.3% in the rural area (p<0.001). Slightly above half 53.2% were currently employed at the time when the data collection was ongoing.~~

Among both rural and urban respondents, a significantly higher proportion 72.8% and 57.9% were earning wages below the minimum monthly wage of ₦18,000 ($59) respectively. Majority (73.8%) of the respondents perceived their monthly earning capacity as inadequate regardless of the income source. A significantly higher proportion (83.3%) of urban residents perceived their income to be inadequate compared to rural respondents (64.2%) (p<0.001).

~~**Table 1b: Respondents' social, family and living status of older adults by Location**~~

1b. Respondents' social, family and living status by location

Social, family & living status	Rural N=478 n (%)	Urban N=480 n (%)	Total N=958 n (%)	χ^2	p-Value
Ownership of house (N=958)					
Yes	282 (59.0)	266 (55.4)	548 (57.2)	1.253	0.263
No	196 (41.0)	214 (44.6)	410 (42.8)		
Living alone (N= 958)					
Yes	15 (3.1)	21 (4.4)	36 (3.8)	1.013	0.314
No	463 (96.9)	459 (95.6)	922 (96.2)		
Living Arrangement (N=922)					
Spouse	247 (53.3)	183 (39.9)	430 (46.6)	26.719	<0.001*
Children	102 (22.1)	131 (28.5)	233 (25.3)		
Extended Family	96 (20.7)	132 (28.8)	228 (24.7)		
Others+	18(3.9)	13(2.8)	31(3.4)		
Longest held job /Current job (N=958)					
Artisan	120 (25.0)	139 (29.0)	259 (27.0)	135.857	<0.001*
Farmer	181 (37.9)	52 (10.8)	233 (24.3)		
Trader	76 (15.9)	57 (11.9)	133 (13.9)		
Others±	101 (21.2)	232 (48.3)	333 (34.8)		

Table **1c. Respondents' socio-economic and employment status by location**

Social, family & living status	Rural N=478 n (%)	Urban N=480 n (%)	Total N=958 n (%)	χ^2	p-Value
Main Source of Income (N= 958)					
Primary job	216 (45.2)	163 (34.0)	379 (39.6)	30.703	<0.001*
Children	188 (39.4)	193 (40.2)	381 (39.8)		
Pension	59 (12.3)	113 (23.5)	172 (17.9)		
Others?	15 (3.1)	11 (2.3)	26 (2.7)		
Regularity of pension (N= 172)					
Regular	16 (27.1)	44 (38.9)	60 (34.9)	2.384	0.123
Not regular	43 (72.9)	69 (61.1)	112 (65.1)		
Average Monthly Income (N= 958)					
<$50 (N18,000)	348 (72.8)	278 (57.9)	626 (65.3)	23.438	<0.001*
>$50 (N18,000)	130 (27.2)	202 (42.1)	332 (34.7)		
Adequacy of income (N= 958)					
Yes	171 (35.8)	80 (16.7)	251 (26.2)	45.221	<0.001*
No	307 (64.2)	400 (83.3)	707 (73.8)		
Current Employment (N= 958)					
Yes	286 (59.8)	224 (46.7)	510 (53.2)	16.676	<0.001*
No	192 (40.2)	256 (53.3)	448 (46.8)		

Table 1d shows theThe distribution of respondents' availability of social security. is also presented as a supplementary file (S4). Concerning access to health insurance, less than six percent had any form of access to health insurance. Majority of the participants were without insurance in both groups, 97.9% and 90.2% in rural and urban settings respectively. It was observed that the National Health Insurance Scheme (NHIS) was more common than the Community Based Health Insurance

Scheme (CBHIS) among both rural and urban respondents (p=0.022). Among those without health insurance, children were mostly responsible for catering for the needs of their elderly ones in the rural areas (53.2%), unlike their urban counterparts where older adults were more responsible for catering for themselves (49.3%). This difference was found to be statistically significant (p=0.020). A lower proportion (12.3%) of the rural respondents were pensioners compared to 23.3% in the urban (p<0.001). Only about a quarter of sampled respondents (24.2%) belonged to a cooperative organization while about three quarters did not belong to any cooperative organization (p<0.001).

Table 1d. Respondents' access to social security and health insurance by location

1d. Respondents' distribution of Availability of Social security/protection by Location					
Access to Health Insurance (N= 958)	**Rural N=478** n (%)	**Urban N=480** n (%)	**Total N=958** n (%)	χ^2	**p-Value**
Yes	10 (2.1)	47 (9.8)	57 (5.9)	25.373	<0.001*
No	468 (97.9)	433 (90.2)	901 (94.1)		
Type of health insurance (n=57)					
CBHIS	2 (20.0)	1 (2.1)	3 (5.3)	5.282	0.022*
NHIS	8 (80.0)	46 (97.9)	54 (94.7)		
Who caters for HCE(N= 901)**	**N=468**	**N=433**			
Myself	201 (42.9)	224 (51.7)	425 (47.2)	9.784	0.020*
Children	249 (53.2)	196 (45.3)	445 (49.3)		
Relatives	12 (2.6)	12 (2.8)	24 (2.7)		
Spouse	6 (1.3)	1 (0.2)	7 (0.8)		
Access to Pension (N= 958)					
Pensioner	59 (12.3)	112 (23.3)	171 (17.8)	19.728	<0.001*

Non-pensioner	419 (87.7)	368 (76.7)	787 (82.2)		
Membership of Cooperative Organisation (N= 958)					
Yes	150 (31.4)	82 (17.1)	232 (24.2)	26.676	<0.001*
No	328 (68.6)	398 (82.9)	726 (75.8)		
External Financial Assistance (N= 958)					
Yes	26 (5.4)	47 (9.8)	73 (7.6)	6.445	0.011*
No	452 (94.6)	433 (90.2)	885 (92.4)		
Source of financial assistance (n=73)					
Political acquintance	1 (3.85)	3 (6.4)	4 (5.5)	2.431	0.297
NGOs	1 (3.85)	7 (14.9)	8 (11.0)		
FBOs	24 (92.3)	37 (78.7)	61 (83.5)		

Others+ (Tenants and friends); Others⊥ (Professional, Managerial, Technical, Service, Operators); Othersλ (Spouse & Relatives); *significant; +Tenants; ** HCE (Health Care Expenditure); NGO: Non-governmental organization; FBOs: Faith based Organizations; CBHIS (Community Based Health Insurance Scheme); NHIS (National Health Insurance Scheme)

Figure 1 shows self rating of the health status of the respondents. Overall, 59.6% of the respondents rated their health status to be average with a higher proportion (61.9%) in the urban compared to 57.3% in the rural. However, the trend was reversed among the group of elderly that rated their health as good. The proportion of respondents that reported good health were higher (40.8%) in the rural area compared to 32.3% in the urban area; this difference was statistically significant ($p<0.001$).

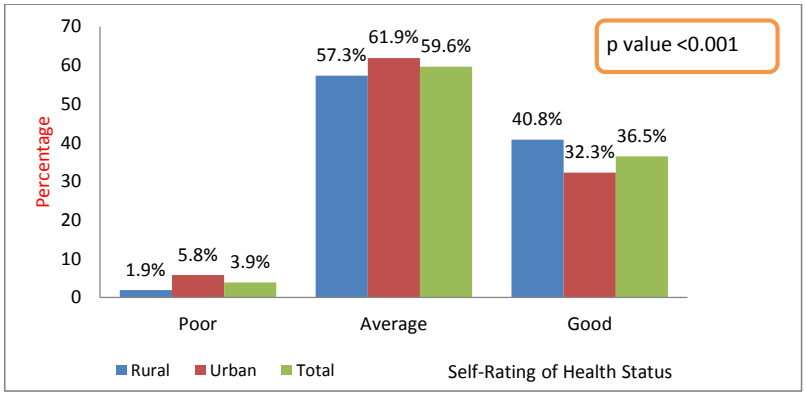

Fig 1: Distribution of respondents' self rating of health status by location

~~The evaluation of respondents' quality of life (QoL) scores are summarized as means and standard deviation~~Table 2 presents the proportion of respondents assessed by ~~location~~overall QoL and four transformed domains ~~in Table 2. Among all the respondents, the overall QoL score was 62.32 ± 15.0. For the domains, environmental health had the highest mean QoL scores (75.67 ± 14.2) followed by social relationship domain (68.19 ± 18.5). The least mean score was in the physical domain (60.10 ± 16.7).~~

~~However,~~by location. The only metric with ~~reference to location, rural respondents had significantly higher QoL scores~~ a significant association was found in physical health and activities of daily living ~~domain (61.58 ± 17.8) than their urban counterparts (58.6 ± 15.4) (p=0.006). Differences in the quality of life (QoL) score across the psychological, social relationship and environmental wellbeing domains were not found to be significant (Table 2).~~

~~**Table 2: Respondents' QoL scores by location**~~

~~**Variables**~~	~~**Location**~~		~~**Independent Ttest**~~	~~**p value**~~
~~**Transformed domain**~~	~~**Rural QoL Score Mean± SD**~~	~~**Urban QoL Score Mean± SD**~~		

Overall QoL & Health Status	63.89 ± 15.9	60.76 ± 13.9	3.246	<0.001*
Domain 1 Physical Health and Daily Activity	61.58 ± 17.8	58.62 ± 15.4	2.757	0.006*
Domain 2 Psychological Wellbeing	61.69 ± 14.5	62.17 ± 13.8	-0.526	-0.599
Domain 3 Social Relationship Wellbeing	68.03 ± 13.2	68.33 ± 22.6	-0.245	0.806
Domain 4 Environmental Wellbeing	76.26 ± 14.2	75.07 ± 14.3	1.289	0.198

*Significant

Table 3 presents the proportion of respondents having above average QoL score ratings by location. In general, higher proportions of the respondents exhibited QoL scores that was above average in three domains namely physical (57.1%), psychological (56.6%) and social relationship domains (64.7%).

. With respect to physical health and activities of daily living, a higher proportion 290 (60.7%) of rural respondents had above averagegood QoL score compared to 257 (53.5%) among urban respondents (p = 0.026). Similarly, higher proportions thoughAlthough this was not a significant finding, a higher proportion of rural respondents had above averagegood QoL scores in the social relationship domain (66.5%) compared to (62.9%) in urban (p = 0.242). Also, with respect to environmental wellbeing, rural respondents had higher proportions (49.6%) compared to urban respondents (43.8%), even though the differences were found to be insignificant (p=0.070) (Table 32).

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Table ~~3~~2: Distribution of respondents by QoL rating by location.

Variables	Location		χ^2	p-value
Transformed Domains	**Rural**	**Urban**		
	N=478	**N=480**		
	n (%)	**n (%)**		
Overall QoL and Health Status				
Good	412 (86.2)	418 (87.1)	0.164	0.685
Poor	66 (13.8)	62 (12.9)		
Physical health and activities of daily living				
Good	290 (60.7)	257 (53.5)	4.967	0.026*
Poor	188 (45.7)	223 (46.5)		
Psychological Wellbeing				
Good	256 (53.6)	286 (59.6)	3.541	0.060
Poor	95 (47.7)	89 (43.6)		
Social Relationship Wellbeing				
Good	318 (66.5)	302 (62.9)	1.367	0.242
Poor	160 (33.5)	105 (51.5)		
Environmental Wellbeing				
Good	237 (49.6)	210 (43.8)	3.273	0.070
Poor	241 (48.7)	271 (38.7)		

* Significant

Table ~~4~~3 presents the association between ~~respondent's~~respondents' characteristics and quality of life considering the total population as an aggregate. All variables were significant at this level except for the variable that ~~tests~~tested whether the older persons belonged to any ~~coopeative~~cooperative society (p=0.527).

Table ~~4~~3: Association between respondents' characteristics and QoL in total population

Characteristics N=958	~~**QoL**~~ **Good QoL** n (%)	**Poor QoL** n (%)	χ^2	**p-value**
Sex				
Male	350 (80.1)	87 (19.9)	11.755	<0.001*
Female	367 (70.4)	154 (29.6)		
Age group (years)				
60-69	227 (81.7)	51 (18.3)	9.910	0.007*
70-79	121 (79.6)	31 (20.4)		
≥80	31 (31.0)	19 (38.0)		
Religion				
Christianity	359 (78.6)	98 (21.4)	32.752	<0.001*
Islam	352 (73.6)	126 (26.4)		
Traditional	6 (26.1)	17 (73.9)		
Educational level				
No formal education	292 (68.7)	133 (31.3)	15.283	<0.001*
Formal education	425 (79.7)	108 (20.3)		
Marital Status				
Currently married	529 (81.7)	61 (10.3)	12.119	<0.001*
Not currently married	301 (81.8)	67 (18.2)		
Family type				
Monogamy	452 (78.7)	122 (21.3)	11.581	<0.001*
Polygamy	265 (69.0)	119 (31.0)		
Current health problems				
Yes	484 (70.9)	199 (15.0)	14.891	<0.001*

No	233 (84.7)	42 (15.3)		
Health self rating				
Poor	17 (45.9)	20 (54.1)	45.339	<0.001*
Average/Fair	400 (70.1)	171 (29.9)		
Good	300 (85.7)	50 (14.3)		
Asset				
No asset	186 (62.8)	110 (37.2)	32.795	<0.001*
Has asset	531 (80.2)	131 (19.8)		
Membership of cooperative society				
Yes	170 (73.3)	62 (26.7)	0.400	0.527
No	547 (75.3)	179 (24.7)		

~~*~~ *Significant

Table ~~5~~4 presents the disaggregated bivariate analysis of respondents' characteristics and QoL by location. A significantly higher proportion of elderly practicing monogamy experienced better QoL compared to elderly practicing polygamy in the same area (p=0.001). Differences in their urban counterparts were however not significant (p=0.124).

In the urban area, 86.7% of married respondents had good QoL compared to 68.9% of unmarried elderly (p<0.001). Health self rating was also found to be significantly associated with QoL among both groups. Unlike the significance associated with marital status and health self rating among both rural and urban residents, there were no significant differences found associated with number of living children (p=0.126 and 0.301 respectively) (Table ~~5~~4).

Table ~~5~~4: Respondents' characteristics associated with QoL disaggregated by location

Characteristics	**~~QoL~~ Rural N=478**		**~~QoL~~ Urban N=480**	
	n (%)		**n (%)**	
	Good QoL	**Poor QoL**	**Good QoL**	**Poor QoL**

Sex				
Male	152 (74.1)	53 (25.9)	198 (85.3)	34 (14.7)
Female	186 (68.1)	87 (31.9)	181 (73.0)	67 (27.0)
	χ^2=2.045, p=0.153		**χ^2=11.024, p=0.001***	
Age group				
60 - 69	206 (74.4)	71 (25.6)	227 (81.7)	51 (18.3)
70 – 79	103 (68.2)	39 (22.8)	121 (79.6)	31 (20.4)
≥80	29 (58.0)	21 (42.0)	31 (62.0)	19 (38.0)
	χ^2=6.145, p=0.046*		**χ^2=9.910, p=0.007***	
Religion				
Christianity	231(76.5)	71 (23.5)	128(82.6)	27 (17.4)
Islam	105(61.4)	66 (38.6)	247(80.5)	60 (19.5)
Traditional	2 (40.0)	3 (60.0)	4 (22.2)	14 (77.8)
	χ^2=14.300, p=0.001*		**χ^2=36.514, p<0.001***	
Marital Status				
Currently married	236 (74.0)	83 (26.0)	235 (86.7)	36 (13.3)
Not currently married	102 (64.2)	57 (35.8)	144 (68.9)	65 (31.1)
	χ^2=4.951, p=0.026*		**χ^2=22.544, p<0.001***	
Educational level				
No formal education	190 (67.9)	90 (32.1)	102 (70.3)	43 (29.7)
Primary and above	148 (74.7)	50 (25.3)	277 (82.7)	58 (17.3)
	χ^2=2.659, p=0.103		**χ^2=9.278, p=0.002***	

Family type				
Monogamy	221(76.2)	69 (23.8)	231(81.3)	53 (18.7)
Polygamy	117(62.2)	71 (37.8)	148(75.5)	48 (24.5)
	χ^2=10.752$^{\pm}$, p=0.001*		**χ^2=2.731$^{\pm}$, p=0.124**	
No of living children				
0 – 4	156(72.6)	59 (27.4)	225(76.0)	71 (24.0)
5 – 9	163(70.9)	67 (29.1)	137(84.0)	26 (16.0)
≥10	19 (57.6)	14 (42.4)	17 (81.0)	4 (19.0)1`
	χ^2=4.138^{+}, p=0.126		**χ^2=2.404^{+}, p=0.301**	
Current Health Problems				
Yes	263 (68.8)	119 (31.2)	221 (73.4)	80 (26.6)
No	75 (78.1)	21 (21.9)	158 (88.3)	21 (11.7)
	χ^2=3.188, p=0.074		**χ^2=14.891, p<0.001**	
Health self-rating				
Poor	3 (33.3)	6 (66.7)	14 (50.0)	14 (50.0)
Average/Fair	178 (65.0)	96 (35.0)	222 (74.7)	75 (25.3)
Good	157 (80.5)	38 (19.5)	143 (92.3)	12 (7.7)
	χ^2=19.488^{+}, p<0.001		**χ^2=33.805$^{\pm}$, p<0.001**	
Asset				
No asset	54 (50.5)	53 (49.5)	132 (69.8)	57 (30.2)
Has asset	284 (76.5)	87 (23.5)	247 (84.9)	44 (15.1)
	χ^2=27.280, p<0.001		**χ^2=15.597, p<0.001**	
Cooperative membership				
Yes	101 (67.3)	49 (32.7)	69 (84.1)	13 (15.9)
No	237 (72.3)	91 (27.7)	310 (77.9)	88 (22.1)

	χ^2=1.204, p=0.272	**χ^2=1.602, p=0.206**

[+]**Fisher's Exact test**

The predictors of QoL in each location were determined ~~using multivariate logistic regression model (~~and presented in Table ~~6).~~5. In the rural area, the following factors were found to be predictors of good QoL: family setting (whether monogamy or polygamy) (p=0.010), health rating (p=0.033; p=0.013) and possession of assets (p<0.001) were the only predictors among the rural respondents. ~~Elderly respondents~~ Older persons living in rural settings that were in momogamous ~~relationship~~relationships were almost twice likely to have good QoL~~. [~~ (OR=1.866, p=0.010~~,~~;~~ 95% CI ~~(~~=1.162 – 2.998~~)]. Respondents~~). Rural respondents whose health ratings were average and poor were about twice ~~[(~~OR = 0.588~~:~~ p = 0.033; 95% CI ~~(~~=0.354 – 0.956~~)])~~ and about seven times ~~[(~~OR = 0.148~~:~~ p = 0.013; 95% CI ~~(~~=0.033 – 0.754~~)])~~ less likely to have good QoL compared to those with good health rating respectively (Table ~~6). Respondents who had~~5). Rural respondents with no assets were four times less likely to have good QoL ~~[(~~OR = 0.290~~:~~ p < 0.001; 95% CI ~~(~~=0.175 – 0.481~~)].~~).

Religion (p=0.005; p=0.001), marital status (p=0.021), current health problems (p=0.044), and self rating (p=0.007; p<0.001) were predictors associated with good QoL ~~on~~among the urban ~~side~~residents. Those who are practicing Christianity and Islam religion were more than seven ~~[(~~OR = 7.627~~:~~ p < 0.005; 95% CI ~~(~~=1.865 – 31.198~~)])~~ and eight times ~~[(~~OR = 8.439~~:~~ p<0.001; 95% CI ~~(~~=2.204 – 31.044~~)])~~ more likely to have good QoL compared to traditionalists. Respondents in a marital engagement were found to be almost twice likely to have good QoL ~~[(~~OR=1.918~~;~~ p=0.021; 95%CI ~~(~~=1.102–3.338~~)])~~ compared to unmarried elderly persons. Respondents with current health problems were found to be almost twice less likely to have good QoL ~~[(~~OR=0.531, p = 0.044~~,~~; 95% CI~~:~~ =0.285 – 0.983~~)])~~ compared to those without health problems (Table ~~6~~5). Those who have ~~poor and~~ average and poor health ratings were ~~twice~~about thrice and eight times less likely to have good QoL respectively ~~[([~~(OR = 0.373, p = 0.007~~,~~; 95% CI~~:~~= 0.181 – 0.767~~);~~), (OR = 0.125, p <0.001~~,~~; 95% CI ~~(~~=0.042 – 0.369~~)].~~).

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Table 65: Predictors of QoL among ~~Elderly~~older persons in both rural and urban areas

		Rural Respondents				Urban Respondents				
	Variables	~~Odds Ratio~~OR (95% CI)	p-value	~~Lower~~	~~Upper~~	~~Odds Ratio~~ OR (95% CI)	p-value	~~Lower~~	~~Upper~~
1.	**Sex**								
	Male	1.094 (0.664-1.801)	0.725	~~0.664~~	~~1.801~~	1.457 (0.792-2.667)	0.226	~~0.792~~	~~2.667~~
	Female (Ref)	1				1			
2.	Age Group								
	60 – 69	1.996 (0.876-4.550)	0.100	~~0.876~~	~~4.550~~	1.235 (0.535-2.852)	0.621	~~0.535~~	~~2.852~~
	70 – 79	1.359 (0.647-2.854)	0.419	~~0.647~~	~~2.854~~	1.839 (0.833-4.062)	0.132	~~0.833~~	~~4.062~~
	≥80 (Ref)	1				1			
3.	**Religion**								
	Christianity	3.785 (0.471-30.428)	0.211	~~0.471~~	~~30.428~~	7.627 (1.865-31.198)	0.005*	~~1.865~~	~~31.198~~
	Islam	2.301 (0.293-18.078)	0.428	~~0.293~~	~~18.078~~	8.439 (2.204-31.044)	0.001*	~~2.204~~	~~31.044~~
	Traditional (Ref)	1				1			
4.	**Educational level**								

	No formal education	-	-	-		0.993 (0.561-1.757)	0.982	0.561	1.757
	Formal education (Ref)	-	-	-		1			
5.	**Marital status**								
	Currently married	1.043 (0.631-1.722)	0.870	0.631	1.722	1.918 (1.102-3.338)	0.021*	1.102	3.338
	Not currently married (Ref)	1				1		1	
6.	**Family**								
	Monogamous	1.866 (1.162-2.998)	0.010*	1.162	2.998	0.818 (0.471-1.420)	0.475	0.471	1.420
	Polygamous (Ref)	1				1		1	
7	**Currently employed**								
	Yes	-	-	-		1.769 (0.962-3.255)	0.067	0.962	3.255
	No (Ref)	-		-		1		1	
8.	**Current health problem**								
	Yes	0.362 (0.404 – 1.392)	0.750	0.404	1.392	0.531(0.285-0.983)	0.044*	0.285	0.983
	No (Ref)	1				1		1	
9.	**Health rating**								

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	Good (Ref)	1				1		~~1~~		
	Average	0.588 (0.354-0.956)	0.033*	~~0.354~~	~~0.956~~	0.373 (0.181-0.767)	0.007*	~~0.181~~	~~0.767~~	
	Poor	0.148 (0.033-0.754)	0.013*	~~0.033~~	~~0.754~~	0.125 (0.042-0.369)	<0.001*	~~0.042~~	~~0.369~~	
10.	**Assets**									
	Has assets (Ref)	1				1		~~1~~		
	No assets	0.290 (0.175-0.481)	<0.001*	~~0.175~~	~~0.481~~	0.616 (0.361-1.053)	0.077	~~0.361~~	~~1.053~~	

* Significant

Discussion

This study was conducted to assess and compare the social correlates as well as the quality of life (QoL) of older adults in selected rual and urban areas of a southwestern state in Nigeria. The age pattern distribution (highest proportion of respondents falling within the age group of 60-69 years in both locations while the least proportion falling within the age group ≥80years) is expected since mortality increases with age; a finding found to be established in other studies ~~[48–50]~~[47–49].

In both locations, females constituted a higher proportion of the study population. This finding is similar to what has been reported by other studies [50,~~[~~51~~,52]~~] and this has been attributed to the longer life expectancy of females ~~[53]~~[52]. Most men also tend to marry women younger than themselves and as such wives would eventually outlive their husbands [53,~~[~~54~~,55]~~]. Furthermore, our findings with regards to gender (QoL across all domains was better for male respondents than the female respondents), marital status (currently married had better ~~QOL~~QoL than those not married) is also similar to other studies ~~[56–58]~~[55–57]. Concerning, the factors that influenced the respondents' QoL, being male had an influence which cuts across all the domains of QoL and this may be due to the fact that men have less co- morbidities in old age compared to women.

Higher proportions of currently married elderly respondents and high illiteracy rates in the rural areas is similar to that of Mudey in which 74.7% and 49.0% were found to be illiterates in the rural

and in the urban locations respectively~~[59]~~ [58]. An overwhelming majority of respondents being of Yoruba descent, practicing Christianity and monogamy is an expected finding since the study sites lie within the South Western geopolitical zone of Nigeria where dominant cultutural norms favor monogamy and Christianity over polygamy and Islam. ~~-~~Furthermore, being currently married had a positive influence because respondents that were currently married had better quality of life in both locations and this is similar to what was found in an urban elderly population in India and as well as a rural state in India~~[60–62]~~ [59–61]. Education also had an influence on QoL of respondents. Those who had formal education had better QoL overall than those without formal education and this is similar to other studies [62,~~[~~63~~,64]~~]. This study also found out that presence of health problems also affects the quality of life of respondents in both locations on bivariate analysis and this is similar to what was found in other studies [64–~~[~~65~~–67]~~].

Overall and in all the domains, the mean ~~QOL~~QoL scores of the study respondents were comparably above average. Our findings with regards to QoL domains and scores are consistent with what was found by Raj et al in which the environmental domain in his study recorded the highest score ~~[62]~~[61]. The observed higher QoL score in the social relationship domain for urban residents may be due to the presence of better social amenities in the area. Findings in which a greater majority of respondents exhibited good QoL is consistent with findings from Qadri and colleagues, where an overwhelming majority of its participants were also found to possess good QoL ~~[68]~~[66, 67, 68]~~. The decrease in QoL with increasing age across all domains may be due to the fact that as the age advances, the health-related problems abound. For instance, he/she loses the power to work and becomes more confined to his/her own house. The possibility of losing a spouse (or loved one) is higher, thus increasing the individual's vulnerability to loneliness, depression and a variety of mental disorders to a much greater extent. As a result, a deterioration of physical and psychological domains of QoL is imminent and thus worsening the existing social relationships[69,70].~~ .

Lack of financial support could also affect their QoL negatively; a finding similar to a study conducted by Fajemilehin that established a negative association between inadequate personal money and quality of life in older adults [70, ~~[~~71]. This is further buttressed by ~~Da Silva~~Alexandre et al (2009) that found out that elderly people with financial independence live in better conditions [72]. Possession of assets in old age was found to be associated with better QoL which was

significant among urban respondents. This is plausible because part of old age security is having asset which may be a source of cushioning effect of old age. The poor earning capacity of about two-thirds of older adults in this study (earning below the minimum wage stipulated by the government) establishes the weak financial independence of the respondents.

~~On multivariate analysis, respondents~~Respondents in the rural location with assets, good health ratings and in monogamous relationship had better quality of life whereas on the flipside, respondents in the urban regions that were currently married had good QoL. Also, respondents currently with health problems were less likely to have good QoL compared to those without health problems. It therefore implied that increasing chronic comorbidities at old age was synonumous with poorer quality of life. Currently engagement in a job was also associated with a better quality of life; a finding that is similar to Joshi and ~~colleague~~colleagues, where individuals with current employment were also found to be exhibit better QoL than those without jobs ~~among older adults~~ [73].

With respect to social security, about a quarter (17.8%) of the respondents had access to pension though not regular. This is in consonance with similar studies in sub-Saharan Africa where one in five older persons (16.9%) received an old age pension that will provide him with old age income security [74,75]. This is a bit higher than the civil pension coverage rate which was 7% in Nepal, 13% in Bangladesh and 14% in India [76]. This shows that majority of older adults were still not captured in the coverage of the formal retirement pension scheme thus increasing their vulnerability after retirement or old age.

Access to health insurance scheme that would have otherwise secured the health of older adults was also found to be grossly poor. Only 5.9% of the respondents had access to a form of health insurance yet increasing their susceptibilities in the advent of a health crisis. Almost half (47.2%) of the respondents having to cater for their health care themselves is even more worrisome with the poor access and availability to health insurance [77].

Another consideration of the availability of social security is the membership of a cooperative organization which was also found to be grossly deficient. Less than a quarter of the respondents belonging to any cooperative organization, lack of external financial assistance, which is also a form of social protection further attest to the vulnerabilities of elderly populations. The access to

social support through FBOs is contradictory to the mandate in ILO report that admonishes government to provide social security measures for older adults [78].

There was a significant association between age and QoL on bivariate analysis in all domains (overall, rural and urban) even though, age was not found to be a significant predictor of QoL on multivariate analysis. The QoL decreased with increasing age across all domains. This inverse relationship can be explained by the fact that aging is associated with loss of normal physiological characteristics and frailty. As age advances, health-related problems abound leading to increased morbidities in the elderly. Frailty, a geriatric syndrome defined as a state of age-related physiologic vulnerability that is characterized by reduced functional reserve and high susceptibility to adverse health outcomes, has been investigated in literature [79,80]. The common features of frailty include body weakness, slowness, exhaustion, weight loss and low activity [79,81]. Some of the adverse outcomes of frailty are falls, injuries, disability, acute illness, hospitalization and mortality [79, 82]. Studies have shown a link between the adverse outcomes of frailty and health related QoL. Frailty was strongly associated with dimished quality of life in elderly populations [82,83], as was also corroborated in this study.

Despite our study findings, our study must be interpreted bearing the following limitiations in mind. A subjective interviewer bias might have been introduced during the interview period. This was minimized using a standard instrument deployed for use after reliability of the instrument was established. Respondents also might have underreported their ailments since this is usually associated with a negative social image. To minimize this, advantages of early intervention and full details of the study and their rights were explained to them. Difficulty with recounting ages by some of the respondents were assisted with recall of historical events to assist in ~~fairly accurate estimation of~~accurately estimating their ages.

Conclusion

The quality of life of the respondents was generally above average with a great majority of the respondents in both locations having good QoL. Factors and predictors differed greatly between rural and their urban counterparts. ~~A concerted effort to~~ Concerted efforts are needed and paramount and needed to improve the psychological, social and environmental domains of the elderly ~~is paramount and needed to further improve~~and the QoL of older persons in the country.

Care of the older adults ~~forms~~is an integral part of the newly added components of primary health care model, and as such, must be handled with much more urgency and conscientiousness. Formidable and promising steps ~~to take~~ include but are not limited to, provision of affordable and functional health ~~service~~services for older adults with ease of access as ~~obtained~~obtainable in ~~other countries in~~both rural and urban settings of developed countries, enhancement of economic security through regular payment of pensions for formal retirees and provision of monthly stipends to capture the informal sector ~~retiree~~retirees by the government.

Supporting information

S1 File. Social Correlates of Aging and QoL in Older Adults Dataset ~~[79]~~[84]
~~https://doi.org/10.6084/m9.figshare.19817542~~

https://doi.org/10.6084/m9.figshare.19817542
S2 File:
Table S2: Respondents' social, family and living status of older adults by Location
Table S3: Respondents' socio-economic and employment status by location
Table S4: Respondents' access to social security & health insurance by location
Table S5: Table S5: Respondents' QoL scores by location

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Authors' Contributions

JOO and AMA conceptualized the study. JOO wrote the protocol, literature review and carried out the research. AMA supervised the study. JOO wrote the initial draft of the manuscript. TAO provided technical and critical reviews on the writing of the mansuscript. All authors proof-read and approved the final manuscript.

Authors' Information:

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Author 1: JOO: (MBBS, MSc, FWACP)
Email: okediranj@yahoo.com
Tel: +234-803-539-9943
Orcid: http://orcid.org/0000-0002-4113-7236

Author 2: TAO (MBBS, MPH, PHD)
~~Email: tobems@yahoo.com~~
Email: tobems17@yahoo.com
Tel: +234-805-840-9495
Orcid: http://orcid.org 0000-0001-9610-1137

Author 3: AMA: (MBBS, MPH, FWACP)
Email: davidsonone@yahoo.com
Tel: +234-803-382-8948
Orcid: http://orcid.org/0000-0002-9912-100X

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May 03, 2023

Response to the editor

Dear Sir,

The authors are happy to receive the extra reviews of editor and appreciate the time taken out by the editor to provide extra comments to improve the quality of our manuscript.

Manuscript Titled:

Social Correlates and Quality of Life Among the Elderly in Rural and Urban Areas of Southwest Nigeria (PONE-D-22-09285)

The requested corrections are highlighted below:

New Title:

Social correlates of aging and Quality of Life of older adults in rural and urban areas of Southwestern Nigeria: a comparative cross-sectional study

S/ No	**Reviewer 1 comments**	**Action Taken**
1	Social correlates of aging and Quality of Life of older adults residing in rural and urban areas of Southwestern Nigeria: a comparative cross-sectional study	This has been corrected as recommended by the authors to: **Social correlates of aging and Quality of Life of older adults in rural and urban areas of Southwestern Nigeria: a comparative cross-sectional study**
2	The abstract should be revised to achieve the consistency among Introduction, Methods, Results and Conclusion	This has been corrected
3	The Introduction seems too lengthy. The authors are highly recommended to revise and concise the Introduction of the main text manuscript.	The length of the introduction has been cut down as much as possible. Most of what is left in the introduction now are what previous reviewers suggested us to add under the previous editor that was assigned to the manuscript. Some of the suggestions included: Defining QoL and providing some background on QoL in local and global contexts Ensuring that operational definitions were provided for all our proposed variables. We believe that the recommendation to move some tables into the supplementary file as recommended in this revision will help to further contribute to trimming down the length of the entire manuscript.
4	The Methods section of the manuscript should be better to write in structured form including- Ethical Consent (mentioning IRB number) and permission for data collection, Study design, Study population, place and time duration, Sample size and sampling technique (s), Selection criteria, Variables included in the study (including preparation of dependent variable (s) and coding/categorizing with valid reference), Data collection and Data analysis	The methods have been rearranged in a structured form The IRB ethical approval number also has been provided.
5	There are so many tables in Results section. Authors are requested to present less important tables as supplementary file. It is also recommended to present the cross-tab and Chi-square test summary in a uniform way in the table. The author may reduce the size of tables by revising. For example: In	The tables have been reduced. (Tables 1b, 1c 1d and Table 2 have been moved to supplementary files and they are now Supplementary table 2,3,4 and 5 respectively) The table 5 (former table 6) has been revised to match the OR (LCL-UCL) heading with OR (95% CI.)

	table 6, the author may present the OR and CI together as OR (LCL-UCL) heading with OR (95% CI.).	
6	In discussion, the authors should focus on their main objectives concisely addressing relevant references. In addition, elderly peoples' QoL are highly linked with their frailty status. The author should address this issue in discussion. For more information, you may visit the following articles: PMCID: PMC7927074, PMCID: PMC3360631 and PMCID: PMC7786917.	The discussion has been revised and information from the recommended articles (PMCID: PMC7927074, PMCID: PMC3360631 and PMCID: PMC7786917) have been cited along with other references for a more robust discussion around frailty and its relevance to older persons and Quality of Life
7	The conclusion should made on the basis of main findings.	This has been revised accordingly also – See track changes
8	The authors are recommended to revise the whole manuscript according to the guidelines of PLOS ONE and resubmit the revised version as soon as possible.	This has been done – See track changes

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