Adetola *et. al.* BUMJ 2021 4(2):71-77
https://doi.org/10.38029/bumj.v4i2.73

RESEARCH ARTICLE OPEN ACCESS

Prevalence of Obesity and its primary comorbidities among patients attending the dietetics out-patient clinic in a tertiary health institution in southwestern Nigeria

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Submitted: 30th April 2021
Accepted: 9th July 2021
Published: 30th December 2021

Abstract

Objective: The study assessed the prevalence of obesity and its co-morbidities among patients attending the dietetics outpatient clinic of the hospital.

Methods: The prevalence of obesity and its co-morbidities were assessed in this retrospective study from the available in the outpatient clinic of the Dietetics Department in University College Hospital Ibadan, Oyo State. Age, gender, occupation, religion, height, weight, diagnosed diseases were extracted from the record of individuals who presented at the clinic over 72 months. Data obtained was analyzed using the Statistical Package for Social Sciences (SPSS) version 20.

Result: A total of 3248 patients' records were assessed. Of these, 1174 (36.15%) patients met the criteria for obesity according to their recorded BMI; 614(52.3%) had obesity class I (BMI 30–34.9), 343(29.2%) had obesity class II (BMI 35–39.9) and 217(18.5%) had obesity class III (BMI ≥40). Obesity was significantly higher amongst females than males ($p<0.05$). The most prevalent single co-morbidity was diabetes 22.3%, while the most prevalent double co-morbidity was hypertension/diabetes 22.9%.

Conclusion: The prevalence of obesity amongst patients was significant. Diabetes and hypertension were the most dominant co-morbidity. Interventions should be developed to combat the increasing prevalence of the diseases and these should involve educating the public and clinical management of the diseases upon identification.

Keywords: Body mass index, comorbidities, Diabetes, Obesity

Plain English summary

This present study conducted in University College Hospital Ibadan assessed obesity and its co-morbidities among patients attending the dietetics outpatient clinic of the hospital using a retrospective design. The present study revealed that the prevalence of obesity among patients was significant and the dominant co-morbidity associated with obesity was diabetes and hypertension. Screening for obesity and its co-morbidities should be integrated as a baseline assessment in clinics.

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Background

Obesity is a non-communicable medical disorder defined as body mass index (BMI) ≥ 30 kg/m2 (1). It is a major public health and economic problem of global significance with prevalence rates increasing in all parts of the world; both in developed countries and in poorer nations. It is a common nutritional disorder in industrialized countries and is becoming increasingly prevalent in developing countries due to changes in lifestyle (2). Obesity and health problems associated with them are now so common that they are replacing the more traditional public health concerns such as under-nutrition and infectious disease as the most significant contributors to global ill health (2). Obesity is associated with diseases such as hypertension, heart diseases, atherosclerosis, certain types of cancer, dyslipidemia, type 2 diabetes mellitus, post-surgical complications with poor tissue healing, and infections (3, 4, 5).

Obesity is a public health problem in Nigeria from the dual aspects of prevalence and consequence. The prevalence of obesity in Nigeria increased from 8.1% in 2010 to 22.2% in 2013, an increase of more than two times between 2010 and 2013. A survey data in 2010 also revealed that the prevalence of obesity among individuals aged 30 years and above increased by 47% and 39% in men and women respectively between 2002 and 2010 in Nigeria (6, 7, 8, 9).

In Nigeria, obesity is not generally regarded as a disease until complication sets in; In fact, a mild degree of obesity is socially acceptable and desirable (10). It has been reported to be commonly seen among the affluent business executives and middle-aged females with a sedentary lifestyle, it is also seen among those in the catering profession who are exposed to food preparation and consumption (11).

There is a rising burden of obesity and other related co-morbidities in developing countries including Nigeria; and to combat this, there is a need to have adequate knowledge of the prevalence of the diseases across the regions of the country to develop strategies to address them appropriately, this need formed the basis for this study.

Methods

The study which was retrospective in design was carried out at the dietetics clinic of the medical out-patient clinic, University College Hospital Ibadan, Oyo state Nigeria. The records of patients that attended the dietician's clinic were used. The information retrieved includes demographic characteristics such as age, gender, religion, occupation, individual's weight, height, body mass index, and diagnosis. Required information about individual subjects was entered in a table. This table served as the primary source of data for statistical analysis. Data collected covered a period of 72 months, from 2010 to 2015.

Using the WHO classification (1), Obesity (≥30 kg/m2) was categorized as: class one (BMI=30.0 −34.9), class two (BMI=35.0–39.9), and class three (BMI≥40).

Data collected were analyzed using Statistical Package for Social Sciences (SPSS version 20) using descriptive statistics such as frequency, percentage, cumulative percentage, means, and standard deviation. Chi-square was used to assess the association among the variables. All statistical analyses were set at a 5% level of significance.

Results

A total of 3248 patients' records were assessed in the study. The ages of the respondents ranged from 18-92 years with a mean age of 51.75±12.5 years. Sex distribution showed males making up 20.2% and females 79.8%. More than half 699(59.5%) of the patients were Christians while 474(40.4%) were Muslims. Those who were employed with white-collar jobs were 342(29.1%), semi-skilled and skilled 546(46.5%) and those unemployed were 286(24.4%). (See table 1)

Table 1: Gender distribution of demographic characteristics

Variables	Male n(%)	Female n(%)	Total n(%)
Gender	237(20.2)	937(79.8)	1174(100)
Age (years)			
18-30	9(0.8)	52(4.4)	61(5.2)
31-40	24(2)	142(12.1)	166(14.1)
41-50	98(5.8)	225(21.7)	323(27.5)
51-60	75(6.4)	268(22.8)	343(29.2)
≥61	61(5.2)	220(18.7)	281(24.5)

Religion			
Christianity	139(11.8)	560(47.7)	699(59.5)
Islam	98(8.3)	376(32)	474(40.4)
Occupation			
Employed (white-collar)	73(6.2)	269(22.9)	342(29.1)
Employed (semi-skilled and skilled)	104(8.9)	442(32)	546(46.5)
Unemployed	60(5.1)	226(19.3)	286(24.4)

The results for anthropometry showed that males had significantly higher weight (53.3±11.8 kg) and height (1.67±0.7m) than females ($p < 0.05$), while females had significantly higher BMI (36.4±5.5 kg/m2) than males ($p < 0.05$). A total of 1174 (36.15%) patients met the criteria for obesity according to their recorded BMI; 614(52.3%) had class I obesity (BMI 30–34.9), 343(29.2%) had class II obesity (BMI 35–39.9) and 217(18.5%) had class III obesity (BMI ≥40). The overall prevalence of obesity among the patients was 36.15%. (See Tables 2 and 3).

Table 2: Gender distribution of anthropometry

Variables	All	Male	Female	p-value
Mean weight (Kg)	91.6±15.4	95.9±13.9	90.6±15.6	0.000
Mean height (m)	1.6±0.07	1.67±0.73	1.58±0.69	0.000
Mean BMI (kg/m^2)	35.91±5.34	34.1±4.3	36.4±5.5	0.000
Mean age (years)	51.75±12.5	53.3±11.8	51.3±12.6	0.000

$p<0.05$ statistically significant

Table 3: Gender distribution of obesity

Obesity class	Male n(%)	Female n(%)	Total n(%)
Obesity (class 1)	161(13.7)	453(38.)	614(52.3)
Obesity (class 2)	57(4.9)	286(24.4)	343(29.2)
Obesity (class 3)	19(1.6)	198(16.9)	217(18.5)

The association between obesity and gender was significant ($p<0.05$) with obesity higher among females than males. Obesity was observed to be more among the older age group and it increased with age ($p<0.05$). There was no significant relationship between obesity and employment status ($p>0.05$), and obesity and religion ($p>0.05$). (See table 4)

Table 4: Relationship between obesity and demographic characteristics

Variable	Obesity class 1	Obesity class 2	Obesity class 3	X²	p-value
Gender				34.1	0.000
Male	161(13.7)	57(4.9)	19(1.6)		
Female	453(38.6)	286(24.4)	198(16.9)		
Age (years)				30.6	0.001
18-30	36(3.1)	11(0.9)	14(1.2)		
31-40	75(6.4)	45(3.8)	46(3.9)		
41-50	153(13)	109(9.5)	61(5.2)		
51-60	175(14.9)	111(9.5)	57(4.9)		
≥61	175(14.9)	67(5.7)	39(3.4)		
Occupation				9.1	0.057
Employed (White collar)	179(15.2)	107(9.1)	56(4.8)		

Employed (semi-skilled and skilled	267(22.7)	166(14.1)	113(9.6)		
Unemployed	168(14.3)	70(6)	48(4.1)		
Religion				3.22	0.521
Christianity	372(3.1)	203(17.3)	124(10.6)		
Islam	242(20.6)	139(11.8)	93(7.9)		
Others	0	1(0.1)	0		

p<0.05 statistically significant

Co-morbidities of obesity were grouped into one, two, and three morbidities respectively. More than half 59.2% of the patients had one comorbidity, 33.9% and 3.1% had two and three co-morbidities respectively. The single co-morbidities found among the patients were diabetes, hypertension, dyslipidemia, arthritis, and renal diseases respectively. The most prevalent single co-morbidities were diabetes 22.3% and hypertension 14.1%, while the most prevalent double co-morbidity was hypertension/diabetes 22.9%. However, 12.9% had no co-morbidity. (See table 5)

Table 5: Co-morbidity pattern and obesity category

Co morbidities	Obesity class 1 n(%)	Obesity class 2 n(%)	Obesity class 3 n(%)	Total n(%)
None	59(5)	52(4.4)	41(3.5)	152(12.9)
One morbidity				
Diabetes	154(13.1)	83(7.1)	25(2.1)	**262(22.3)**
Hypertension	56(4.8)	50(4.3)	59(5)	165(14.1)
Dyslipidemia	56(4.8)	23(2)	13(1.1)	92(7.8)
Arthritis	2(0.2)	10(0.9)	6(0.5)	18(1.5)
Renal	6(0.5)	0	1(0.1)	7(0.6)
Total				696(59.2)
Two morbidity				
Hypertension/diabetes	157(13.4)	75(6.4)	37(3.2)	**269(22.9)**
Hypertension/dyslipidemia	63(5.4)	23(2)	14(1.2)	100(8.5)
Hypertension/arthritis	0	2(0.2)	2(0.2)	4(0.3)
Hypertension/renal	5(0.4)	0	1(0.1)	6(0.5)
Diabetes/dyslipidemia	11(0.9)	3(0.3)	2(0.2)	16(1.4)
Diabetes/renal	1(0.1)	1(0.1)	1(0.1)	3(0.3)
Total				379(33.9)
Three morbidity				
Hypertension/dyslipidemia/diabetes	18(1.5)	9(0.8)	5(0.4)	32(2.7)
Hypertension/dyslipidemia/arthritis	1(0.1)	0	0	1(0.1)
Hypertension/diabetes/renal	2(0.2)	1(0.1)	0	3(0.3)
Total				36(3.1)
Other	22(1.9)	11(0.9)	1(0.9)	43(3.7)

Discussion

This study recorded an obesity prevalence of 36.16%. This is higher than the prevalence reported in some studies carried out in a general out-patient clinic (12, 13, 14) and lower than the prevalence reported by Olebu et al. in a study among type 2 diabetes in a diabetic clinic at a Tertiary Healthcare Center in Eastern Nigeria, where the prevalence rate was 56.4% (15) and 74% reported from a study among diabetic

patients attending Teaching Hospitals in Lagos Nigeria (16). Patients who were employed with either semi-skilled or skilled jobs had higher obesity across the three classes of obesity with class 1 obesity being the most common among the patients. This distribution may be because individuals in this category have little or no education and they may see obesity as a desirable trait. Although this perception is common to Nigerians irrespective of the level of education, it is more acceptable among individuals with little or no education (17).

Obesity was significantly associated with gender ($p<0.05$). It was higher among females than males. Gender disparity among males and females has been consistently reported by other studies stating obesity to be prominent among females than males (18, 19, 20). Studies by Adebayo et al. (21) and Sagna et al. (22) reported obesity to be higher among older women and increased along age gradient peaking in the 51-60 years group, which is consistent with the finding in this study as obesity was significantly associated with age ($p<0.05$), with the highest prevalence among the age group 51-60 years. This high prevalence may be attributed to short intervals between pregnancies, hormonal imbalance related to menopause, use of oral contraceptive pills, dietary habits, and sedentary lifestyle (15).

Co-morbidities were grouped into one, two, and three morbidities respectively. The most prevalent single comorbidity was diabetes 22.3% while the most prevalent double comorbidity was hypertension/diabetes 22.9%. However, studies by Idung et al. (20) and Ikwudinma (13) reported dyslipidemia as the dominant co-morbidity while Lloh et al. (14) reported hypertension as the most common co-morbidity. These studies were carried out in the south-eastern part of Nigeria; therefore, more studies across the different geopolitical zones in Nigeria are needed to ascertain the dominant co-morbidity in the various zones and the reason for the differences in dominant co-morbidities among people with obesity in the country.

The prevalence of some co-morbidity increased with increasing BMI; the proportion of patients with hypertension rose with increasing obesity category. The prevalence of hypertension within obesity categories increased from 4.3% of the obesity class 2 category to 5% in obesity class 3 category and arthritis increased from 0.2% in obesity class 1 category to 0.9% in obesity class 2 category. Co-morbidities were higher among patients in the obesity class 1 category which is consistent with studies by Lloh et al. (14) and Adeloye et al. (19). Patients in the obesity class 1 category also had a higher prevalence of double and triple comorbidities.

Limitations of the study

All respondents were identified from a single affiliation, and they were all seeking health care services thus possibly were not representative of the broader southwestern population. Pre-existing data were used in this study, which is subject to numerous biases, and biochemical parameters (e.g., lipid profile) were not added to determine the presence of co-morbidities.

Conclusion

The prevalence of obesity amongst the patients was high, with obesity class 1 been the commonest among the patients. Diabetes and hypertension were the dominant co-morbidities among the patients. This finding calls for a critical look into strategies to combat these diseases in terms of prevention and management as the prevalence of obesity, diabetes, hypertension and other associated diseases keep increasing comparing the past and present reports of the prevalence of these diseases in the country.

Intervention should focus on educating the public on healthy eating and screening for obesity. There is an urgent need for hospitals to integrate screening for obesity and its co-morbidities as a baseline assessment in clinics to facilitate early detection and appropriate management. Also, there is the need for properly trained professionals who can lead and educate the public on obesity.

List of abbreviations

WHO: World health organization
BMI: Body mass index

Declarations

Ethics consideration

Approval to carry out the research was obtained from the department. Patients' information such as names and file numbers were excluded from the record.

Consent for publication

The authors hereby give consent for the publication of this work under the creative Commons CC Attribution. Non-commercial 4.0 license.

Availability of data and materials

All data generated or analyzed in this study are available upon reasonable request to the corresponding author.

Competing interest
The authors declare no conflict of interest

Funding
The authors did not receive any research funding.

Authors' contributions
Work conceptualization: AA
Data collection: AT and AO
Data entry and analysis: AA and OO
Manuscript development first draft: AA and OT
Manuscript final submission: AA and OT

Acknowledgment
Not applicable

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Fasiku *et. al.* BUMJ 2021 4(2):78-85
https://doi.org/10.38029/bumj.v4i2.84

RESEARCH ARTICLE OPEN ACCESS

Unmet needs for assistance with activities of daily living among elderly in rural and urban areas in Kwara State Central Senatorial District, Nigeria

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Submitted: 30th June 2021
Accepted: 29th July 2021
Published: 30th December 2021

Abstract
Objective: The elderly usually require assistance and sometimes have unmet needs for assistance with activities of daily living. This study assessed the unmet needs for assistance with activities of daily living among the elderly in rural and urban areas in Kwara Central Senatorial District, Nigeria.
Methods: Cross-sectional data were collected using pre-tested semi-structured interviewer-administered questionnaires from 300 elderly using the multistage sampling technique. The Statistical Package for Social Sciences 20 was used to analyze data, and the level of significance was predetermined at a p-value less than 0.05.
Results: Overall, 60% of the elderly in the urban than rural group (46%) had unmet needs for assistance with activities of daily living. The prevalence of unmet needs for assistance with basic activities of daily living in the rural areas ranged from 0.0% (eating) to 70.8 % (bathing) and 0.0% (eating) to 68.8 % (transferring) in the urban areas. The prevalence of unmet needs for instrumental activities of daily living ranged from 16.7% (handling finances) to 59.3 % (cooking) for those in the rural areas. However, the range was from 33.3% (transportation) to 75.0% (taking medications) in the urban areas. The urban respondents had higher unmet needs for assistance with telephone use than rural respondents. (p=0.004*).
Conclusion: The elderly in the urban areas had a higher prevalence of unmet needs for assistance with activities of daily living. The government must address the needs of the elderly through a policy to prevent unmet needs for assistance with activities of daily living.

Keywords – Elderly, Unmet needs for assistance, Activities of daily living, rural and urban communities

Plain English Summary

This study assessed the elderly in rural and urban areas in Kwara State Central Senatorial District, Nigeria, who had unmet needs for assistance (inadequate or absences of needed assistance) to perform their activities of daily living (ADL). The findings revealed that a higher proportion of the elderly in the urban compared to the rural areas had unmet needs for assistance with ADL. In the rural and urban areas, there were also differences in the unmet needs for assistance as regards the self-maintenance skills, which include eating, bathing, dressing, toileting, transferring, and also complex activities, which permit one to manage one's affairs independently, such as shopping, taking medicines, using the phone, using public transportation and managing finances.

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Background

The essential self-care tasks that a person is usually expected to engage in on a daily or regular basis is known as "Activities of daily living" (ADL). It can be divided into “Basic activities of daily living” (BADL) and “Instrumental activities of daily living” (IADL). BADL includes self-maintenance skills or a set of common, everyday tasks, performance of which is required for personal self-care and independent living. Examples of these tasks include eating, bathing, dressing, toileting, and transferring (i.e., getting in and out of a bed or chair). “Instrumental activities of daily living” (IADLs) refer to more complex activities that permit one to manage one’s affairs independently, such as shopping, taking medicines, using the phone, using public transportation, and managing finances (1, 2). ADLs are important because the accumulation of these activities can significantly reduce the time the elderly person spends being sedentary (3).

The United Nations defined the elderly as persons who are at least 60years of age (4). This is the age being adopted too, for the elderly in Nigeria since most working-class people retire at this age. The elderly have varying degrees of disabilities depending on several factors which may necessitate the need for personal assistance to perform ADL. It is increasingly becoming difficult for the elderly to have personal assistance for ADLs due to the breakdown in the extended family support in Nigeria and many other African countries (5, 6). There have been unmet needs with regards to assisting the elderly in performing ADLs (7, 8). In Nigeria, it was found that the prevalence of physical disability for people aged 60 years and above was 15.7% (9). However, whether or not the needs were met was not indicated in the study. Another study in Nigeria among the elderly found that 19.8% of disabled elderly persons had an unmet need for assistance BADL or IADL (10). Preventing elderly people from becoming limited in performing activities of daily living (ADL) is also an important health objective for maintaining their quality of life. The prevalence of physical disability in elderly persons with functional limitations is, therefore, important for policy development on the care of the elderly. In contrast to the developed nations most developing nations, especially those in sub-Sahara Africa, there is a lack of reliable data to formulate policy on aging despite the increasing populations of their elderly persons (11, 12). Elderly people’s ability to function independently is therefore important, as physical disability and functional limitation have profound public health implications especially increased utilization of health care and a need for supportive services and long-term care (13). This study, therefore, assessed the unmet needs for assistance with activities of daily living among the elderly in rural and urban areas in Kwara State Central Senatorial District, Nigeria.

Methods

Description of the Study Area

Kwara State is one of the 36 states of Nigeria. It has three senatorial districts, namely, Kwara Central Senatorial District, Kwara South Senatorial District, and Kwara North Senatorial District. Kwara Central Senatorial District was the study area, and it is made up of four Local government areas (LGA), namely, Asa, Ilorin East, Ilorin West, and Ilorin South LGAs.

The elderly constitute about 6% of the population in Nigeria (14). The projected total population of the elderly 60 years and older based on the 2006 census in the study area is 9,490.

Study Population

The study population consisted of the elderly who were 60 years and older (both males and females) in rural and urban areas of Kwara Central Senatorial District.

Inclusion and exclusion criteria

The elderly (both males and females), in rural and urban communities in Kwara Central Senatorial District who are permanent residents for 6 months and above in the communities

The study excluded the elderly who could not communicate through any means, those without sufficient cognitive ability to answer the study questions, and the acutely ill or those who did not cooperate due to ill-health.

Study Design

The study is a community-based cross-sectional analytical study on the unmet needs for assistance with activities of daily living among the elderly in rural and urban settings in Kwara Central Senatorial District in Nigeria.

Sample size determination

The minimum sample size was determined using the formula for comparison of two proportions (15). After adjusting for 10% non-response, a minimum sample size of 294 was obtained. However, a total of 300 respondents were interviewed (150 each for rural and urban areas).

Sampling technique

A multistage sampling technique was used for the selection of respondents for this study.

Kwara Central Senatorial District has 4 LGAs. Two LGAs were selected; Asa a rural LGA and Ilorin East LGA an urban LGA through simple random sampling by balloting. Two wards were randomly selected by simple random sampling by balloting from each of the urban and rural LGAs selected. The list of the communities in the 4 wards selected was generated. Two communities were selected by the use of the table of random numbers from each of the selected wards, giving 4 urban and 4 rural communities (A total of 8 communities). Then proportionate allocation was again used to allocate questionnaires to each of the selected communities based on their populations. A systematic sampling technique was used to select the households to be sampled using the sampling frame and where there was more than one eligible elderly person, a simple random sampling technique by balloting was used to select one eligible elderly. When there was no elderly person in the household, the next household was visited until an eligible respondent was found, but still maintained the sampling interval.

Data Collection

The data was obtained using a pre-tested, semi-structured interviewer-administered questionnaire to elicit information from eligible respondents. The questionnaire was developed and adapted from BADL and IADL tools and a review of relevant research work on the topic (1, 16). Validity of the content was achieved through consultation of relevant literature on unmet needs for assistance with Activities of Daily Living among the elderly.

Data Management

The data obtained were entered into a personal computer after being manually checked for possible errors. Analysis was done using Statistical Package for Social Sciences (SPSS) version 20.0. Descriptive statistics were used to examine the prevalence of those indicating difficulty in performing ADLs and IADLs. Then, for those indicating difficulty with at least one of the six ADLs (bathing, dressing, toileting, transferring, walking, and eating) or eight IADLs (Using the telephone, shopping, cooking, housework, laundry, transportation, taking medication, and finance management), the prevalence of those indicating no need, met need, and unmet need by each activity was determined. Thereafter, the unmet need for assistance with the activity of daily living among those with a need for assistance was determined. The analytic sample to examine assistance need status (no need, met need, and unmet need) was restricted to those who reported one or more ADL or IADL difficulties.
The Chi-square test was used to determine the statistical significance of observed differences in cross-tabulated categorical variables. The frequencies and proportions were presented in tables. A p-value of less than 0.05 was considered significant.

Results

The mean age of respondents in the rural area was approximately 76.00 ± 12.00 years compared to the urban area that was approximately 74 ± 10 years. The proportion of the female respondents was higher than males in both rural and urban areas, (96; 64%) and (84; 56%) respectively. The differences in the religion (<0.001), type of family (<0.001), educational status (<0.001), and employment status (0.001) of the respondents in the rural and urban areas were statistically significant (Table 1).

Table 1: Socio-demographic characteristics of rural and urban respondents (n=150)

Variable	Rural n (%)	Urban n (%)	χ^2	*p*-value
Age group (years)				
60 – 69	51 (34.0)	62 (41.3)	7.383	0.061
70 – 79	39 (26.0)	50 (33.3)		
80 – 89	34 (22.7)	22 (14.7)		
≥90	26 (17.3)	16 (10.7)		
Mean ± SD	76.04 ± 11.587	73.83± 10.44	1.738[a]	0.083
Sex				
Male	54 (36.0)	66 (44.0)	2.000	0.157
Female	96 (64.0)	84 (56.0)		
Religion				
Christianity	5 (3.3)	71 (47.3)	76.762	<0.001*
Islam	145 (96.7)	79 (52.7)		

Marital Status				
Married	75 (50.0)	89 (59.3)	2.636	0.104
Widowed	75 (50.0)	61 (40.7)		
Type of Family				
Monogamy	55 (36.7)	93 (62.0)	19.257	< 0.001*
Polygamy	95 (63.3)	57 (38.0)		
Educational Level				
No formal education	133 (88.7)	71 (47.3)	61.310	<0.001*
Primary education	11 (7.3)	31 (20.7)		
Secondary education	2 (1.3)	9 (6.0)		
Tertiary education	4 (2.7)	39 (26.0)		
Employment status				
Employed	108 (72.0)	81 (54.0)	10.425	0.001*
Unemployed	42 (28.0)	69 (46.0)		

χ^2: Chi square test, *: *p* value< 0.05 (statistically significant), a: student's t test

The proportion of those that had difficulty performing one or more BADL/IADL, in the rural area was higher 87 (58.0%) than those respondents from the urban area 70 (46.7%). However, the number of respondents with unmet needs for assistance with one or more BADL/IADL in the rural area 40 (46.0%) was slightly lower than in the urban area 42 (60.0%) (Table2).

Table 2: Respondents with difficulty performing and unmet needs for assistance with at least one activity of daily living

Variable	Rural n (%)	Urban n (%)	χ^2	*p*-value
Difficulty in performing at least one activity	**n=150**	**n=150**		
Yes	87 (58.0)	70 (46.7)	3.862	0.049*
None	63 (42.0)	80 (53.3)		
Unmet needs for assistance	**n=87**	**n=70**		
No	47 (54.0)	28 (40.0)	3.057	0.080
Yes	40 (46.0)	42 (60.0)		

Estimates of unmet need for BADL ranged from 0.0% for eating to 70.8 % for bathing for those in the rural area (Table 3) and the estimates of unmet need for BADL ranged from 0.0% for eating to 68.8 % for transferring for those in the urban area (Table 4). The estimates of unmet need for IADL ranged from 16.0% for handling finances to 59.3 % for cooking for those in the rural area (Table 3) and the estimates of unmet need for IADL ranged from 33.3% for transportation to 75.0% for taking medications for those in the urban area (Table 4).

Table 3: Need and Unmet Assistance Need with BADL/IADLs in the rural group (n=87)

Variable	Difficulty performing [a] n (%)	Assistance need status [b] No need n (%)	Unmet need n (%)	Met need n (%)
BADLs				
Bathing	24 (16.0)	2 (8.3)	17 (70.8)	5 (20.8)
Dressing	13 (8.7)	4 (30.8)	7 (53.8)	2 (15.4)
Toileting	8 (5.3)	3 (37.5)	4 (50.0)	1 (12.5)
Transferring	15 (10.0)	3 (20.0)	10 (66.7)	2 (13.3)
Walking	12 (8.0)	8 (66.7)	2 (16.7)	2 (16.7)
Eating	1 (0.7)	1 (100.0)	(0.0)	(0.0)
IADLs				
Using telephone	52 (34.7)	8 (15.4)	14 (26.9)	30 (57.7)
Shopping	24 (16.0)	3 (12.5)	14 (58.3)	7 (29.2)

Cooking	27 (18.0)	2 (7.4)	16 (59.3)	9 (33.3)
Housework	35 (23.3)	1 (2.9)	16 (45.7)	18 (51.4)
Laundry	33 (22.0)	1 (3.0)	16 (48.5)	16 (48.5)
Transportation	30 (20.0)	9 (30.0)	10 (33.3)	11 (36.7)
Taking medication	15 (10.0)	6 (40.0)	6 (40.0)	3 (20.0)
Finance management	12 (8.0)	6 (50.0)	2 (16.7)	4 (33.3)

[a] Reported difficulty.
[b] The denominator represents persons with a stated difficulty in each ADL or IADLs.

Table 4: Need and Unmet Assistance Need with BADL/IADLs in the urban group (n=70)

	Difficulty performing [a]	**Assistance need status [b]**		
		No need	**Unmet need**	**Met need**
ADL/IADLs	**n (%)**	**n (%)**	**n (%)**	**n (%)**
ADL				
Bathing	6 (4.0)	1 (16.7)	4 (66.7)	1 (16.7)
Dressing	3 (2.0)	1 (33.3)	2 (66.7)	0 (0)
Toileting	2 (1.3)	1 (50.0)	1 (50.0)	0 (0)
Transferring	16 (10.7)	2 (12.5)	11 (68.8)	3 (18.8)
Walking	11 (7.3)	3 (27.3)	5 (45.5)	3 (27.3)
Eating	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
IADLs				
Using telephone	29 (19.3)	2 (6.9)	18 (62.1)	9 (31.0)
Shopping	33 (22.0)	3 (9.1)	15 (45.5)	15 (45.5)
Cooking	38 (25.3)	3 (7.9)	20 (52.9)	15 (39.5)
Housework	43 (28.7)	3 (7.0)	23 (53.5)	17 (39.5)
Laundry	43 (28.7)	3 (7.0)	23 (53.5)	17 (39.5)
Transportation	24 (16.0)	7 (29.2)	8 (33.3)	9 (37.5)
Taking medication	8 (5.3)	1 (12.5)	6 (75.0)	1 (12.5)
Finances	10 (6.7)	3 (30.0)	5 (50.0)	2 (20.0)

[a] Reported difficulty.
[b] The denominator represents persons with a stated difficulty in each ADL or IADLs.

Differences in those with unmet needs among those in the rural (Table 5) and urban areas (Table 6) were not statistically significant for all the activities for the BADL. However, for the IADL, the differences in those with unmet needs were not statistically significant for all the activities except telephone use, where the proportion of unmet need among the urban area respondents was higher than that of rural areas, and this difference was statistically significant (p=0.004*) (Table 6).

Table 5: Unmet needs for assistance with basic activities of daily living among rural and urban respondents with difficulty performing activities

ADL	**Rural n (%)**	**Urban n (%)**	**χ^2**	***p*-value**
Bath				
Unmet need	17 (77.3)	4 (80.0)	0.215[Y]	0.642
Met need	5 (22.5)	1 (20.0)		
Dressing				
Unmet need	7 (77.8)	2 (100.0)	0.076[Y]	0.782
Met need	2 (22.2)	0 (0.0)		
Toileting				
Unmet need	4 (80.0)	1 (100.0)	0.960[Y]	0.327
Met need	1 (20.0)	0 (0.0)		
Transferring from chair/bed				
Unmet need	10 (83.3)	11 (78.6)	0.037[Y]	0.847

Met need	2 (16.7)	3 (21.4)		
Walking				
Unmet need	2 (50.0)	5 (62.5)	0.043[Y]	0.835
Met need	2 (50.0)	3 (37.5)		

χ^2: Chi square test, [Y]: Yates correction, *p* value, *: *p* value< 0.05 (statistically significant)
The denominator is persons with need (either met need or unmet need) for ADL assistance.

Table 6: Unmet needs for assistance with instrumental activities of daily living among rural and urban respondents with needs for assistance

IADLs	Rural n (%)	Urban n (%)	χ^2	*p*-value
Telephone				
Unmet need	14 (31.8)	18 (66.7)	8.208	0.004*
Met need	30 (68.2)	9 (33.3)		
Shopping				
Unmet need	14 (66.7)	15 (50.0)	1.399	0.237
Met need	7 (33.3)	15 (50.0)		
Cooking help				
Unmet need	16 (64.0)	20 (57.1)	0.286	0.593
Met need	9 (36.0)	15 (42.9)		
Doing housework				
Unmet need	16 (47.1)	23 (57.5)	0.804	0.370
Met need	18 (52.9)	17 (42.5)		
Laundry help				
Unmet need	16 (50.0)	23 (57.5)	0.403	0.526
Met need	16 (50.0)	17 (42.5)		
Transportation help				
Unmet need	10 (47.6)	8 (47.1)	0.001	0.973
Met need	11 (52.4)	9 (52.9)		
Taking medication help				
Unmet need	6 (66.7)	6 (85.7)	0.762 [Y]	0.770
Met need	3 (33.3)	1 (14.3)		
Handling finances help				
Unmet need	2 (33.3)	5 (71.4)	0.665 [Y]	0.414
Met need	4 (66.7)	2 (28.6)		

χ^2: Chi square test, [Y]: Yates correction, *p* value, *: *p* value< 0.05 (statistically significant)
The denominator is persons with need (either met need or unmet need) for ADL assistance.

Discussion

This study found differences between the rural and urban elderly in terms of unmet needs for assistance with ADL. The prevalence of unmet needs for assistance with ADL was higher in the urban than the rural area. Studies in America and India also showed similar findings (17, 18). Those in the rural area had a lower proportion of unmet needs for assistance with bathing and dressing than those in the urban group who had greater unmet needs for assistance with bathing and dressing. It could be attributed to the communal way of life in the rural areas where anyone could be beckoned upon for assistance which may not be available to those in the urban areas where people usually live a cosmopolitan way of life. These findings were different from those in other studies conducted in America, which had a lower proportion of those unmet needs for bathing and dressing (7, 18). This could be attributed to the availability of different options of care for the elderly in such places.

Of all the elderly studied, only one had unmet needs for assistance with toileting, and this elderly was an urban dweller. This proportion of unmet need for assistance with toileting was similar to other studies (17, 18). About one-third of the rural respondents had unmet needs for telephone use, while two-thirds of those respondents in the urban area had an unmet need for assistance with telephone use. The higher prevalence in the urban than the rural area could be as a result of the elderly in the rural area getting help from neighbors. However, due to the way the urban area is structured it is oftentimes difficult to have a communal way of living. These unmet needs for assistance with telephone use among the rural and urban areas were higher than that reported in a study conducted in America which reported slightly above one-tenth of those studied (18).

The unmet need for assistance with walking was different from other studies conducted (7, 19). The rural than the urban group, had a greater proportion of those with unmet needs for assistance with shopping. These findings contrast with findings from a study among American Indians where a smaller proportion had an unmet need for assistance with shopping (18). This could be a result of the availability of different options for the care of the elderly in America.

The greater proportion of unmet needs for assistance with cooking in the rural than in urban group may be as a result of the presence of appliances that could help with cooking such as the use of gas or electronic stoves, microwave machines, while such may not be available in the rural area. This also applies to performing laundry activity which could be better handled with appliances like washing machines, thereby allowing those in the urban area to better manage their laundry than the rural area where such is not available. This is different from studies conducted in America and Vietnam that had lower unmet needs (18, 20).

Both the rural and the urban areas had a similar proportion of unmet needs as regards transportation. The study conducted among American Indians revealed a lower proportion of unmet needs for assistance with transportation (18). Considering responsibility for taking own medications and handling finances, a greater proportion of the elderly in the urban than the rural area, had unmet needs for assistance with these. This could be because more respondents in urban than rural areas lived alone as found out by this study. The proportion of respondents with unmet needs for taking medication in the rural and urban areas was higher than those reported by studies in both America and Malaysia (18, 21).

Limitations of the study

There is a need to exercise caution in making direct comparisons with other studies because there were differences in measurement and study inclusion criteria. There is a dearth of studies on unmet needs for assistance with ADL, especially in the study area.

Conclusion

In this study, unmet needs for assistance with performing both BADL and IADL among the elderly were generally high but higher in the urban areas, and there were differences in both the rural and urban areas. It will be worthwhile to conduct National surveys to determine the unmet needs for assistance with activities of daily living in the whole country since this was conducted in a senatorial district in one of the states of the country. The results of such findings can assist policy-makers to address the unmet needs for assistance with BADL/IAD through the development of programs such as optimal social security systems, elderly people's homes, etc, that will address the unmet needs for assistance with activities of daily living for the elderly.

List of abbreviations

ADL: Activities of Daily Living
BADL: Basic Activities of Daily Living
IADL: Instrumental Activities of Daily Living
LGA: Local Government Area

Declarations

Ethics approval and consent to participate

Ethical clearance to conduct the study was obtained from the Ethical Review Committee of the University of Ilorin Teaching Hospital with approval number ERC PAN/2016/10/1606. Written informed consent was obtained from respondents. Participation was voluntary. All information obtained was treated with the utmost confidentiality.

Consent for publication

The authors hereby give consent for the publication of our work under the creative commons CC Attribution-Non-commercial 4.0 license.

Competing interests

None to declare

Funding

No funding was received for the conduct of this research.

Authors' contributions

Conceptualization- FMM, ATM; Designed the study- FMM, ATM, MOI, OGK; Data collection and analysis- FMM, DKA, BMO, AA, OMO; Drafting the manuscript-FMM, MOI, DKA; Proof-read manuscript-MOI, ATM, BMO, DKA, AA; Approval of the final draft- All the authors.

Acknowledgments

We appreciate the assistance of Dr. Afolayan AM and Prof Abdulraheem IS.

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Adeniran *et. al.* BUMJ 2021 4(2):86-96
https://doi.org/10.38029/bumj.v4i2.82

RESEARCH ARTICLE OPEN ACCESS

Infection Control Practices among Laboratory Healthcare Workers in an Urban Local Government Area of Lagos State, Nigeria

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Submitted: 17th June 2021
Accepted: 31st July 2021
Published: 30th December 2021

Abstract
Objective: Laboratory healthcare workers do handle a wide range of potentially dangerous materials which exposes them to numerous hazards. This study aimed to assess the practices of laboratory health care workers towards safety, infection control, and the associated factors to its practices.
Methods: A cross-sectional study was conducted among 181 laboratory healthcare workers in all registered 33 laboratory facilities in Ikeja Local Government Area in 2017. Data were collected with pre-tested, structured self-administered questionnaires. Data were analyzed with SPSS version 20 and a p-value of < 0.05.
Results: The mean age of respondents was 35.0 ± 2.45 years, most of whom were females (57.7%) and married (61.1%). The majority (98.9%) demonstrated good knowledge of infection control. A total of 62.3% identified hand washing as the most important infection control practice while HIV and Tuberculosis were diseases respondents majorly considered as high risk of contracting. A total of 84.6% of the respondents showed good practices. Limited availability of personal protective equipment in the laboratories was a major barrier identified by 98.1% of respondents. Respondents displayed good knowledge, attitude, and practice of infection control.
Conclusion: The barrier to infection control was the limited availability of personal protective equipment. Therefore, concerted efforts should be mustered to ensure continuous training and retraining with the provision of personal protective equipment.

Keywords: infection control practices, laboratory, healthcare workers, knowledge, attitude

Plain English summary

Adequate efforts should be geared towards the infection control and prevention practices amongst all health care workers in order to improve the health of the people.

Background

The World Health Organisation has stated that infection prevention and control is practical evidence that prevents patients and health care workers from being harmed by avoidable infection (1). It includes the policies and procedures of a hospital or other health facility to minimize the risk of spreading healthcare-associated infections or community-acquired infections to patients or members of the staff (1, 2). Infection in the laboratories has been reported to be caused by pathogens being inhaled in aerosols or through contact, airborne droplets or on snapping-closing specimen containers, dispensing or pipetting infectious fluids, or centrifuging infectious materials in open buckets (3, 4).

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Laboratory health workers are exposed to a large pool of specimens from patients with infections such as hepatitis B (HBV), hepatitis C (HCV), HIV, Tuberculosis (TB), typhoid fever, other enteric pathogens, and parasitic infections (5, 6).

Worldwide, the healthcare workforce represents 12% of the working population (7), and they encounter diverse hazards due to their work-related activities (8). Substantial morbidity and mortality among these workers inevitably lead to loss of skilled personnel and adversely impact healthcare services which are already strained in many low-and middle-income countries (9). According to the World Health Organization WHO, about 2.5% of HIV cases among Health Care Workers (HCWs) and 40% of HBV and HCV cases among HCWs worldwide are as a result of occupational exposures (10). In a 2002–2004 survey of clinical laboratory directors who participated in ClinMicroNet, an online forum sponsored by the American Society of Microbiology, 33% of laboratories reported the occurrence of at least one laboratory-associated infection (11).

The knowledge of infection control among laboratory staff based on work done so far is generally below average (12, 13). Also, prevalent recapping of used needles, non-compliance with the standard precautions, lack of HBV vaccination, ignorance, lack of regular training of the staff in universal precautions and correct laboratory procedures, and proper waste management among others are still problems (12, 13). Due to the high risk of exposure of medical laboratory staff, there is a need for infection control practices which include all the activities carried out and actions taken daily to restrain, regulate or influence the entry (6), development, and multiplication of infectious agent in the laboratory health care workers.

In Nigeria, there are many infection controls challenges such as the absence of a nosocomial infection surveillance system at a national level and a high prevalence of communicable diseases with over three million people living with HIV and most of which were co-infected with tuberculosis or hepatitis (13). Lack of infection control awareness among health personnel and behavioral problems, both in the community and among the healthcare workers is a major concern (7). In a study done to explore the knowledge and practices of infection control among HCW in a tertiary referral center in North-Western Nigeria, most of the respondents knew of and correctly identified hand washing, avoiding injury with sharps, use of barrier precaution, and hand hygiene as effective strategies for preventing Healthcare-associated infections (HCAI) (12).

A high prevalence of laboratory-acquired infections has been more frequently reported due to lack and non-compliance with universal precautions and standard practices (14). Poor perception of the risk of infections (3), and lack of infection control awareness among health care workers (12) are common in sub-Saharan Africa and developing countries including Nigeria (13).

A qualitative study conducted to assess the facilitators and barriers to infection control practices at a tertiary care hospital in Haryana, northern India identified person, task, and organizational level factors including a high rate of nursing staff turnover, time spent training new staff, limitations in language competency, and heavy clinical workloads as primary barriers to infection control at the hospital (15).

Another cross-sectional study which compared the practice and adherence to WHO infection control guidelines among the health workers in two hospitals in Port Harcourt, Nigeria reported reasons for non-adherence to infection control policy which included poor supervision, lack of in-service training, inadequate supply of consumables, and absence of a hospital's policy on infection control (16).

Identifying existing infection control knowledge and practices among health care workers is paramount in developing a successful infection control program (17). Therefore, research work as this is imperative, as efforts need to be directed towards enhancing awareness of and also ensuring maximal efficient and effective utilization of Infection Control Procedures to achieve various benefits for improvement of public health.

This study sought to assess the knowledge, compliance to safety practices and identified barriers to infection control practices among laboratory healthcare workers in Ikeja LGA of Lagos Nigeria, to identify shortcomings in standard infection control practices, reinforcing control efforts, as well as bridging the probable gap in knowledge.

Methods

Study area

The study was conducted at Ikeja, the capital of Lagos State. It is one of the seven hundred and seventy-four (774) local government areas (LGA) in Nigeria and one of the fifty-seven Local Government/Local council development areas in Lagos. Ikeja has ten wards (18) and an estimated human population of six hundred and forty-eight thousand, seven hundred and twenty (19). Ikeja has both private and public health facilities, the government health facilities

include; four Primary Health Care (PHC) centers, two health posts, and a tertiary hospital: Lagos State University Teaching Hospital (LASUTH). There are hospital-based and private medical laboratories in Ikeja. The number of currently registered medical laboratories (both Government and Private) in Ikeja LGA is thirty-three (19).

Study design and study population
A descriptive, cross-sectional study design was used to assess compliance and barriers to infection control practices among laboratory healthcare workers in Ikeja LGA. All cadres of laboratory healthcare workers in all the registered and functioning medical laboratories in Ikeja LGA who gave informed consent participated.

Sample size determination, Sampling technique
The sample size was calculated using a Fishers' formula with p = 0.879, the prevalence of knowledge of hand washing as the most effective infection control measure (20). q= 1- p (1 – 0.879 = 0.121), d = error of precision at ± 5% (0.05). The calculated minimum sample size was 163, which was adjusted to 181 to make up for 10% non and incomplete responses. All the laboratory healthcare workers (181) working in the 33 facilities were taken as the sample size.

Study instruments and data collection
A self-administered questionnaire was adapted to measure socio-demographic variables such as age, gender, marital status, religion, ethnicity, cadre and years of work experience, the knowledge of laboratory health care workers on infection control with questions on infection control definition, guidelines, and preventive measures, attitude towards infection control with questions such as; opinion about the necessity to always observe infection control practices (ICPs). Also, the most important ICPs, participants' infection control practices were measured with questions on availability and use of infection control guidelines, routinely practiced infection control measures, and training on infection control. It also took cognizance of hand hygiene practice, PPE usage, laboratory cleaning schedule, as well as waste segregation, and barriers to infection control practice.

A pre-tested was conducted among 18 laboratory healthcare workers at another local government in the state. This was carried out to validate the appropriateness of the questionnaire developed. Necessary corrections were made before the questionnaire was used in this study.

Data analysis
Data analysis was conducted using the statistical package for the social sciences (SPSS version 20) software. Descriptive statistics were computed to generate frequencies, mean, and percentages. Knowledge level was assessed by awarding 1 mark for every correct answer, a zero mark for each wrong answer. The total number of marks for each respondent was calculated by summing up the marks obtained. Respondents that scored below the median value were categorized as having poor knowledge while those that scored above it were categorized as having good knowledge (21).
In determining the attitude: 1 mark was awarded for positive or good attitude, a zero mark for a negative or poor attitude. Scores below the median were adjudged to signify a negative attitude while respondents that scored above the median value were adjudged to have a positive attitude (21). In the same manner, 1 mark was awarded for every correct practice response; a zero mark was awarded for every wrong practice. All the scores were added and the median score was calculated. Respondents that scored below the median value were categorized as having poor practice while those that scored above the median value were categorized as having good practice (21). Significance level set at p-value < 0.05. Chi-square and Fisher's exact tests were used to measure the association between categorical variables.

Results
In table 1, the population characteristics of the respondents are presented. The majority were females (57.7%), married (61.1%), and mostly from the Yoruba ethnic group (69.2%). The most prevalent age group was those less than 29 years (37.1%) and the mean age of respondents was 35.0 ± 2.45. A total of 150 respondents (85.7%) practiced Christianity.

Table 1: Sociodemographic characteristics of respondents

Variables	Frequency (n=175)	Percentage
Age group		
< 29	65	37.1
30-39	48	27.4
40 and above	62	35.5
Mean ±SD 35.0 ± 2.45 years		
Gender		
Male	74	42.3
Female	101	57.7
Marital status		
Singled	68	38.9
Married	107	61.1
Religion		
Christianity	150	85.7
Islam	22	12.6
Traditional	3	1.7
Ethnicity		
Yoruba	121	69.2
Igbo	25	14.3
Hausa	13	7.4
Others	14	8.0
No response	2	1.1

'Table 2' shows almost all the respondents have heard of the term 'infection control' (95.4%). The source of this information was mostly through seminars/workshops (63.5%), classroom/lectures (67.7%), and colleagues (51.5%). However, a total of 80.8% showed an understanding of what "infection control" meant. The infection control measures they were aware of were; hand washing (100.0%), Personal protective equipment (93.4%), disinfection (92.8%), sterilization (92.8%), and safe medical waste disposal (88.9%) among others. The infection control practice considered most important was hand washing (62.3%) followed by the use of PPE (48.0%). However, twenty-three respondents (13.1%) reported that some infection control measures were difficult to observe, including isolation (48.5%), sterilization (39.4%), use of personal protective measures (36.4%), disinfection (33.3%), and handwashing (27.3%).

Table 2: Knowledge of respondents on infection control

Variables	Frequency	Percentage
Ever heard of infection control(n=175)		
Yes	167	95.4
No response	8	4.6
Source of information (n=167) *		
Seminar/ Workshop	106	63.5
Co-workers/ colleagues	86	51.5
Textbook /Journals	84	50.3
Media	62	37.1
Classroom/ Lectures	113	67.7
Understanding of the term "infection control" (n=167)		
Good	135	80.8
No response	32	19.2
Heard of infection control guidelines (n=167)		

Yes	147	88.0
No	16	9.6
No response	4	2.4
known or heard control measures (n=167) *		
Hand washing	167	100.0
Personal protective wear	156	93.4
Safe injection and sharps use	146	87.4
Safe medical waste disposal	148	88.6
Isolation	117	70.1
Disinfection	155	92.8
Sterilization	155	92.8
Housekeeping	93	55.7
Others	7	4.2

Multiple responses *

In 'Table 3' More than 80% of the respondents affirmed that their units or sections possess a copy of infection control guidelines while those without it gave reasons such as poor organization (27.3%), non-provision (40.9%), and lack of proper documentation in their laboratory unit (31.8%). The majority of the respondents (78.3%) had read the infection control guideline but 44.4% did not follow the guidelines due to forgetfulness, its unavailability of materials was 22.2%, and high workload (16.7%).

Table 3: Infection control practices by the respondents.

Variables	Frequency	Percentage
Had a copy of the infection control guidelines		
Yes	144	82.3
No	22	12.5
No response	9	5.2
Reason for not having a copy of the guideline in the unit (n=22)		
Lack of proper documentation	7	31.8
Poor organization	6	27.3
Not provided	9	40.9
Ever read the infection guideline		
Yes	137	78.3
No	18	10.3
No response	20	11.4
Frequency of use of infection control guideline		
Occasionally	33	18.9
Often	20	11.4
Always	87	49.7
Never	6	3.4
No response	29	16.6
Reasons why the guideline was not followed (n=18)		
Forgot	8	44.4
Differences in each unit as regards infection control practices.	1	5.6
High workload	3	16.7
Material unavailability concerning waste disposal	4	22.2
Believing that I know all the basics in the guideline	2	11.1

As shown in 'Table 4', the major barrier to adequate infection control was the limited availability of personal protection equipment (98.1%), limited time to attend seminars

/workshops on infection control was 47.3%, lack of provision for post-exposure prophylaxis (40.3%), non-availability of color-coded waste bags for waste segregation (39.6%), non-availability of sharps/ puncture-proof bins (36.9%) and excessive workload due to staff shortage, making it practically impossible to carry out proper hand hygiene procedures (25.7%).

Table 4: Barriers to infection control in the laboratory

Barriers to infection control	Agree Freq (%)	Disagree Freq (%)	Indifferent Freq (%)	Total Freq (%)
Limited availability of Personal protection equipment (PPE)	99 (98.1)	2 (1.9)	0 (0.0)	101 (100)
Limited time to attend seminars/ workshops on infection control	69 (47.6)	72 (49.7)	4 (2.7)	145 (100)
Colour coded waste bags for waste segregation are not always available	59 (39.6)	84 (56.4)	6 (4.0)	149 (100)
Lack of political will on the part of the management towards workers' safety	58 (42.0)	71 (51.5)	9 (6.5)	138 (100)
No provision for post-exposure prophylaxis	56(40.3)	70(50.3)	13(9.4)	139(100)
Sharps/ Puncture-proof bins are not always available	55 (36.9)	89 (59.7)	5 (3.4)	149 (100)
Soap, alcohol hand rub/ sanitizers are not always available	53 (35.3)	91 (60.7)	6 (4.0)	150 (100)
There is an inadequate water supply for proper handwashing	51 (33.6)	99 (65.1)	2 (1.3)	152 (100)
Unavailability of policy on infection control guidelines	49(33.1)	88(59.5)	11(7.4)	148(100)
Excessive workload due to staff shortage, making it practically impossible to carry out proper hand hygiene between laboratory procedures	39(25.7)	108(71.0)	5(3.3)	152(100)

In ‘Table 5, almost all the respondents who participated in this research showed good knowledge of infection control practices. The majority also expressed good attitude and practices except for 17.1% and 15.4% respectively.

Table 5: Evaluation of respondents’ knowledge, attitude, and practice of infection control.

Parameter	Poor Freq (%)	Good Freq (%)	Total Freq (%)
Knowledge	2 (1.1%)	173 (98.9%)	175 (100.0%)
Attitude	30 (17.1%)	145 (82.9%)	175 (100.0%)
Practice	27 (15.4%)	148 (84.6%)	175 (100.0%)

Table 6’ shows that there was no statistically significant association between respondents’ age, gender, staff cadre, post-qualification experience, and their practice of infection control ($p>0.05$). However, there is a statistically significant association between the year of training of good practices of infection control. A higher proportion of respondents who attended training on infection control between the years 2016 and 2017 (the year of this study and the year before) had good infection control practices compared to those who had training later($p<0.05$).

Table 6: Association between respondents’ infection control practices and their sociodemographic characteristics

Variables	Practice			Test of significance	
	Good Freq (%)	Poor Freq (%)	Total Freq (%)	χ^2	p value
Age					
<40	96(85.0)	17(15.0)	113(100.0)		
40 and above	52(83.9)	10(16.1)	62(100.0)	0.03	0.849
Total	148(84.6)	27(15.4)	175(100.0)		
Gender					
Male	62(83.8)	12(16.2)	74(100.0)		

Female	86(85.1)	15(14.9)	101(100.0)	0.1	0.835
Total	148(84.6)	27(15.4)	175(100.0)		
Staff cadre					
Lab. Scientist	97(84.3)	18(15.7)	115(100.0)		
Junior Staff	43(82.7)	9(17.3)	52(100.0)	0.1	0.788
Total	140(83.8)	27(16.2)	167(100.0)		
Post Qualification Experience					
≤ 5	35(74.5)	12(25.5)	47(100.0)		
6 – 10	45(86.5)	7(13.5)	52(100.0)	2.7	0.257
>10	43(84.3)	8(15.7)	51(100.0)		
Total	123(82.0)	27(18.0)	150(100.0)		
Most recent training					
2017	64(85.3)	11(14.7)	75(100)		
2016	36(92.3)	3(7.7)	39(100)	6.3	0.042*!
2015 and later	45(73.8)	16(26.2)	61(100)		
Total	145(82.9)	30(17.1)	175(100)		

*Statistically significant.! fisher's p-value

Discussion

Healthcare-associated infections have been closely associated with increased morbidity and mortality among hospitalized patients and predispose healthcare workers to an increased risk of infections (20). To this end, the knowledge of infection control is essential among the laboratory health care workers to ensure safety while discharging duties. Nearly all (95.4%) of the respondents have heard of infection control and its guidelines but only 80.8% displayed a good understanding of its definition. There was a good knowledge of infection control in this study which was in contrast to what was obtained from other studies which stated that opinion of infection prevention and control guidelines are based on evidence collected in acute care settings and therefore are not always practical or appropriate in the facility where resources are more constrained (22, 23). Also, the good knowledge of infection control practices displayed by the respondents was in line with recommendations in the infection control guideline (24). Furthermore, the participants demonstrated good knowledge of the use of Personal Protective Equipment (PPE) such as safety glasses, laboratory coats, footwear, hand gloves, and face shields while rendering laboratory services, this is in synergy with a report which further enumerated the protective roles of PPE against contracting infection when used properly (25).

From this study, antiseptic soaps, water, and alcohol-based hand rubs were the most frequently suggested method of ensuring adequate hand hygiene in the laboratory, and this is in line with WHO guidelines on hand hygiene in health care (26). In addition, respondents' perception that healthcare workers must wear gloves during work activities that involve wound dressing, blood transfusion, surgical operation, giving an injection, obtaining specimen or sample processing is rightly in line with the recommendations that gloves should be worn for both direct and indirect contact with blood, body fluids or mucous membranes given from a study done in Malaysia (27).

Only 62.3% of the respondents considered hand washing as the most important infection control practice and this did not demonstrate their good practices to infection control in the laboratory. This was in contrast to the study results of some earlier researchers that proper hand hygiene was the single most important, simplest, and least expensive means of reducing the prevalence of laboratory-acquired infections and the spread of antimicrobial resistance (28, 29). Moreover, respondents were more concerned with being at a high risk of contracting tuberculosis and HIV from specimen handling. Their attitude toward these health conditions was justified with healthcare workers being enlisted among the high-risk populations for tuberculosis (30), while the risk of contracting HIV might be associated with the nature of the disease being a blood-borne transmission that occurs predominantly by percutaneous or mucosal exposure of workers to the blood or body fluids of infected patients as reported by Beltrami EM and et al (31).

The good practice recorded concerning the usage of infection control guidelines was similar to what was obtained from another study (23)

since standard precautions were designed to protect health workers from getting contaminated. However, only 44.4% of them followed the recommendations in the guideline and the low adherence to standard precaution reported can have negative consequences on workers, patients, and institutions and these were also being supported by another study (32). The major factors that prevented usage of the guidelines were forgetfulness, non-availability of infection control materials, and high workload. This is consistent with the reasons identified for low adherence earlier reported in another study (32). The infection control measure routinely practiced by respondents ranged from hand washing, using gloves, wearing laboratory coat, disinfection, sterilization, waste segregation, and disposal of sharps in a puncture-proof bin agree with other studies (33, 34). Whereas among all the measures, isolation was observed as the poorly practiced control measure, a possible reason could be because simple protective isolation offered no advantage over routine care for most immune-compromised patients (34, 35).

Training of laboratory workers as was experienced by almost 80.0% of the respondents in this study had been recognized as a strategy to protect workers from exposure to pathogens and impact their adherence to a standard guideline. This was in close similarity with a study done in another African country (35). This study also highlighted the significant roles played by the colleagues at work in disseminating information on infection control which was near was obtained in other studies (23, 34).

The high level of hygiene maintained in the laboratory by the respondents demonstrated their detailed understanding of infection control practices, except for more than 40% of the studied population that recap needles after use. Contrary to this practice, recapping needles are considered extremely dangerous as health care workers have been primarily infected with HIV after needlestick and sharps injuries (36, 37). The high overall knowledge (98.9%), and practice (84.6%) of infection control among the respondents studied indicated that there was a successful implementation of infection prevention and control in their facilities which was also what was obtained in a study done in two tertiary institutions in Nigeria (38).

The major barriers to infection control practices in this study were limited availability of personal protection equipment, lack of political will of the management towards worker's safety, lack of provision for post-exposure prophylaxis and sharps/puncture-proof bins not always available (15). These reports were in the same line with earlier studies in China where further reports included occurrences of occupational accidents, particularly exposure to potentially contaminated biological materials and sickening of health workers (39).

Only the most recent training received by the respondents exhibited a significant relationship with the knowledge of infection control practices. The capacity building undergone by the laboratory scientists could account for the significant impact of the good knowledge displayed. A similar result of laboratory scientists demonstrating good knowledge of infection control has been reported in Edo (40). This is consistent with the deductions that in terms of infection control, knowledge, and practice (KAP) surveys can identify knowledge gaps, cultural beliefs, or behavioral patterns that may impede infection control efforts (41).

Conclusions and Recommendations.

The study showed that despite the good knowledge and good practices demonstrated by the respondents to infection control and safety, there was limited availability of personal protective equipment for them. The training and retraining of these laboratory health workers will be an added advantage.

Declarations

Ethics consideration

Ethical approval was obtained from the Health Research Ethics Committee of Lagos State University Teaching Hospital (LASUTH) with reference number LREC/06/10/901. Informed consent was obtained from the respondents before the administration of the questionnaire after the purpose of the study has been explained to respondents.

Consent for publication

The authors hereby give consent for the publication of this work under the Creative Commons CC Attribution. Non-commercial 4.0 license.

Availability of data and materials

All data generated or analyzed in this study are included in this article and are available at any request.

Competing interests

The authors declare that they have no competing interests

Funding

None

Contributions of authors

AA: Involved in data curation, analysis/ production of results, validation, interpretation, critical review of the manuscript.

OOY**:** Involved in the methodology, did a critical review of the paper, validation, visualization, original draft preparation, and editing of the manuscript for publication.

OIO**:** Involved in methodology, data collection, analysis, and manuscript writing.

GOO: Review, edited the work, and engaged in the draft presentation of the manuscript.

ABI: Supervision, review the work, and did project administration.

OEO: Involved in the validation, review, and editing of the work for publication.

KY: Conceptualisation, original draft, and design of the work, supervision, data collection tool, interpretation, review, and editing of the work.

Acknowledgments

We express our heartfelt thanks to all individuals who participated in the study: respondents, data collectors, and administrative officials.

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Imhonopi *et. al.* BUMJ 2021 4(2):97-106
https://doi.org/10.38029/bumj.v4i2.85

RESEARCH ARTICLE OPEN ACCESS

Client Satisfaction: Understanding its Predictors to improve HIV treatment and care in a tertiary facility southwestern state, Nigeria

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Submitted: 1st July 2021
Accepted: 19th August 2021
Published: 30th December 2021

Abstract
Objective: Human Immunodeficiency Virus (HIV) infection is a major public health concern. Frequent hospital visits are needed on the part of the patient to achieve decreased prevalence, the efficacy of antiretroviral therapy (ART), and viral suppression. Patient satisfaction is needed to achieve the aforementioned outcomes of care. This study, therefore, was conducted to assess clients' satisfaction and perception of the quality of HIV/AIDs services and to elicit factors associated with dissatisfaction.
Method: A cross-sectional survey was done using a systematic sampling method to select the study population. Data were analyzed by descriptive statistics, chi-square test, and logistic regression at a p-value set at < 0.05.
Results: Most of the respondents (34.4%) were within the age range of 36- 44years. The mean age was 42.1± 11.5years. The overall satisfaction was 85.6%. The majority of respondents (95.2%) affirmed that the quality of care received was good. Unavailability of HIV educational materials was shown to predict clients' satisfaction more than other factors with 3.545; 95% CI: 1.519 - 8.275; p = 0.003. Likewise, clients who perceived health workers to be non-accepting and judgmental are 3.6 times more likely to be unsatisfied with HIV services provided compared to those who do not (3. 580; 95% CI: 1.264- 10.141; p = 0.016).
Conclusion: The study demonstrated impressive overall clients' satisfaction with services provided at the health facility and the quality of care. Attention must be paid to the availability of HIV materials and training and retraining of staff to reduce stigmatization and discrimination against patients.

Keywords: Client satisfaction, Quality of care, HIV, Determinants, Patients

Plain English summary

The study was carried out to assess clients' satisfaction and understand the predictors of factors affecting satisfaction among patients attending the ART clinic at the Federal Medical Centre, Abeokuta, Ogun State. The study found that the majority (85.6%) of the clients were satisfied with the care given. However, waiting time was found to be a major factor among clients who were dissatisfied with the services provided. We recommended that there should be continuous training and retraining of staff to ensure quality service delivery.

Background

Human Immunodeficiency Virus (HIV) infection is a major public health concern. Reports from the Joint United Nations Program on HIV/Acquired Immune Deficiency Syndrome (UNAIDS) described the global burden of HIV/AIDS as one

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of the most destructive epidemics the world has ever witnessed. Sub-Saharan Africa is the worst hit by the infection with nearly 23 million of the 33.2 million people with infection living there. Global AIDS death in adults and children were estimated at 2.1million of whom1.6 million was again from sub-Saharan Africa (1).
HIV and AIDS care requires frequent visits to the hospital. As a result, patient satisfaction with care services during hospital visits is important in considering the quality and outcome of care (2). To maintain a decline in the prevalence of HIV and efficacy of antiretroviral therapy (ART), it is better to keep the patients on treatment satisfied with ART services. Poor patients satisfaction is associated with poor virological and immunological response (3). It is also responsible for the development of resistant strains (3). Patients' satisfaction rating is both a measure of care and the person providing the care (4).
Patients' satisfaction ratings can measure the different aspects of the medical services received or different specific dimensions of the satisfaction or the overall level of satisfaction of total package often referred to as global satisfaction (4). Studies on patients' satisfaction with a healthcare need to be carried out intermittently so that factors responsible for their dissatisfaction can be promptly addressed before clinic default sets in.
Provision of services for the management of HIV infection has become a concern to the team at Federal Medical Centre, Abeokuta, Nigeria. In the same vein, the satisfaction and perception of the quality of care by clients are of utmost importance. This study was conducted to assess clients' satisfaction, and perception of the quality of HIV/AIDs services to enhance the efficiency and quality of services.

Methods

Study Area
The study was conducted at the Anti-Retroviral Treatment Clinic (AIDS Prevention Initiative in Nigeria Clinic) of the Federal Medical Centre Abeokuta (FMCA). FMCA is a 500-bedded regional specialist hospital that came into existence on 21st April 1993 with a philosophy of excellence in the provision of medical services to the Gateway State of Ogun and other neighboring states. Ogun State has an HIV prevalence of 1.6% and has 327 centers for the management of HIV (5). There are 19,189 HIV-positive patients on treatment in Ogun State. Antiretroviral (ARV) services in Ogun State are currently being supported by APIN Public Health Initiatives and Prime health response initiatives (6).

Study Design
This was a descriptive cross-sectional study of clients' satisfaction with services at the antiretroviral treatment center and its determinants in Federal Medical Centre, Abeokuta.

Study population
The respondents in this study were adult HIV clients aged 18 years and above on treatment receiving ART services at the Federal Medical Centre, Abeokuta.

Inclusion and exclusion criteria
Patients who were aware of their diagnosis admitted into care for at least six months and with sufficient cognitive ability to answer questions were recruited for the study.
HIV patients who were on admission in the facility and clients who objected to being part of the study.

Sample Size Determination
The number of clients sampled was determined using Fischer's formula. A prevalence (p) of 90.0%, which was the proportion of clients satisfied with HIV services in a previous study conducted in Anambra (7). After a 10% adjustment for non-response, a minimum sample size of 142 was determined. A total of 270 clients were surveyed from the clinic.

Sampling Technique
A systematic sampling technique was used for the selection of respondents. The sampling frame was obtained from the clinic record. The first respondent was chosen by simple random sampling technique by balloting and subsequent respondents were selected using a predetermined calculated sampling interval until the required sample size was reached.

Study instruments/Data collection/Data analysis
The study instrument was a semi-structured interviewer-administered questionnaire. It was pretested among clients in a Primary Health Care facility offering comprehensive HIV services. The questionnaire had three sections. Section A assessed the socio-demographic characteristics. Section B measured patients' satisfaction under the following themes; Accessibility, User Friendliness/Information, Level of stigmatization/discrimination, confidentiality, and privacy, Comprehensiveness of HIV/AIDs services, and overall client satisfaction (8).

Section C assessed the perception of the quality of services.
Four resident doctors were trained for three days on the use of the study instrument, obtaining informed consent, and maintaining confidentiality. Data collected were entered into a computer and analyzed using SPSS version 21. Summary statistics were generated and presented using frequency tables. Appropriate tests of significance (chi-square test and regression analysis) were used to test statistics. Logistic regression analysis of independent variables was performed to determine predictors of clients' satisfaction. Statistical significance was set at a p-value.

Results

The population characteristics of the respondents are presented in table-1 where about 93 (34.4%) of the respondents were within the age range 36-44years. The mean age was 42.1± 11.5years. More than two-thirds 194 (71.9%) were females. A higher percentage 220 (81.5%) were of the Yoruba ethnic group. Christian respondents constituted the majority of 164 (60.7%) while 111 (41.1%) had secondary education. About 164 (60.7%) were married. Most of the respondents fall within the income range ≤ N10, 000 which is approximately $29 as seen in table-1 below.

Table 1: Socio- demographic characteristics of respondents

Demographic	Characteristics	Frequency (n=270)	Percentage (%)
Age Group	16-25 Years	17	6.3
	26-35 Years	69	25.6
	36-45 Years	93	34.4
	>46 Years	91	33.7
Mean age	42.1± 11.5 Years		
Gender	Male	76	28.1
	Female	194	71.9
Ethnicity	Yoruba	220	81.5
	Igbo	24	8.9
	Hausa	7	2.6
	Others	19	7.0
Religion	Christian	164	60.7
	Islam	100	37.0
	Traditional	6	2.2
Educational Level	Primary	61	22.6
	Secondary	111	41.1
	Tertiary	86	31.9
	None	12	4.4
Marital Status	Single	34	12.6
	Married	164	60.7
	Divorced/Separated	27	10.0
	Widowed	45	16.7

Considering access to the HIV service point, most of the respondents 184 (68.1%) get to the facility within one hour. When asked if there were problems in getting transport to the hospital, the majority 238 (88.1%) reported an absence of transportation problems. A larger percentage 215 (79.6%) reported cost of transportation to the health facility was affordable. Also, a larger percentage of the respondents 230 (85.2%) reported cost of consultation was affordable. Almost all clients 266 (98.5%) waited more than one hour before been attended to. Likewise, the majority 243 (90.0%) reported the drugs were adequate. (Table 2a)

Table 2a: Assessment of factors affecting clients' satisfaction

Variables	Frequency(n=270)	Percentage (%)
Time to the Facility		
</= 1 hour	184	68.1
>1hour	86	31.9

Transportation problems		
Yes	32	11.9
No	238	88.1
Cost of Transportation		
Yes	55	20.4
No	215	79.6
Waiting time		
< 30 Minute	4	1.5
>1 Hour	266	98.5
Cost of Consultation		
Yes	40	14.8
No	230	85.2
Drugs		
Adequate	243	90.0
Inadequate	27	10.0

This study found an overall clients' satisfaction of 231 (85.6%). Interestingly, 231 (85.6%) of respondents never had reasons to complain about the attitude of caregivers at the HIV clinic. The majority 229 (84.8%) said they never had an interruption of consultation, while 210 (77.8%) always had an adequate explanation about test results though, 155 (57.4%) of the respondents said they never had more time as they could have during a consultation. A majority, 218 (80.7%) reported never been uncomfortable discussing personal or intimate issues while with the caregiver. In the same vein, 175 (64.8%) of respondents never had any problem being involved in decision-making about their HIV treatment and care. Also, 230 (85.2%) said they never had problems with asking the providers questions about HIV care. Almost all respondents 252 (93.3%) never had their complaints ignored. It's good to know that, almost all the respondents 263 (97.4%) had their consultation in a language they could understand and 88.5% never have a hard time understanding questions. Similarly, 208 (77.0%) of the respondents never had a delay of appointment. Conversely, 64 (23.7%) never had a delay in getting an appointment for urgent care and 63 (23.3%) reported never had a delay in getting an appointment for non-urgent care. However, only 62 (23.0%) of respondents reported always having access to available HIV-specific educational materials. (See Table-2b).

Table 2b: Clients Satisfaction and Perception of services provided at the HIV clinic.

Variable	Never (%)	Sometimes (%)	Usually (%)	Always (%)
Availability of HIV Specific educational materials	142 (52.6)	54 (20.0)	12 (4.4)	62 (23.0)
Delay of appointment	208 (77.0)	40 (14.8)	9 (3.3)	13 (4.8)
Delay in getting appointment for urgent care	64 (23.7)	30 (11.1)	27 (10.0)	149 (55.2)
Delay in getting appointment for non-urgent care	63 (23.3)	32 (11.9)	17 (6.3)	158 (58.5)
Delay in getting answers to questions when facility is contacted	40 (14.8)	10 (3.7)	16 (5.9)	204 (75.6)
Perception on interruption of consultation	229 (84.8)	24 (8.9)	4 (1.5)	13 (4.8)
Perception on providing adequate explanation on test results	28 (10.4)	14 (5.2)	18 (6.7)	210 (77.8)
Perception on providing more time during consultation	155 (57.4)	44 (15.6)	25 (9.3)	48 (17.8)
Perception on being uncomfortable discussing personal or intimate issues	218 (80.7)	15 (5.6)	14 (5.2)	23 (8.5)
Involvement in Decision making	175 (64.8)	50 (18.5)	17 (6.3)	28 (10.4)
Perception on unable to ask provider questions about HIV.	230 (85.2)	21 (7.8)	7 (2.6)	12 (4.4)
Perception on complaints ignored	252 (85.2)	5 (1.9)	6 (2.2)	7 (2.6)

Perception on inability to understand their answer.	239 (88.5)	12 (4.4)	4 (1.5)	15 (5.6)

Furthermore, table-3 is about the factors associated with clients' satisfaction and perception of quality of care. The majority of respondents, 257 (95.2%), affirmed that the quality of care received was good though 239 (88.5%) complaint of lack of adequate equipment. About half, 139 (51.5%), of respondents, reported that health personnel accepted them and there were no judgmental feelings about their condition. Similarly, 264 (97.8%) believed their HIV status was kept confidential. Waiting time was a major determinant of satisfaction, in this study 229 (86.1%) of clients waited for >30minutes before being consulted. About 58.9% reported the staff to be up-to-date with recent developments in HIV. Most of the respondents, 70.7%, acknowledged the staff to be respectful and 63.3% reported that the staff was understanding. Some of the associated factors to clients' satisfaction in this study were availability of HIV educational material (χ2-15.928, P-value=<0.001), not ignoring complaint of respondents (χ2-5.568, P-value= 0.018), accepting and non-judgmental of clients (x2-11.162, P-value=0.001), availability of equipment (χ2-6.031, P-value=0.014) were all found to be statistically significant.

Table 3: Clients satisfaction, quality of care, and factors influencing satisfaction

Variables	Frequency(n=270)	Percentage (%)	Chi-value	P-value
Perception on quality of care				
Good	257	95.2		
Poor	13	4.8		
Equipment				
Adequate	31	11.5		
Inadequate	239	88.5		
Level of Stigma and Discrimination				
Accepting and Non-judgmental				
Never	99	36.7		
Sometimes	22	8.1		
Usually	10	3.7		
Always	139	51.5		
Confidentiality and Privacy				
HIV Status kept confidential				
Yes	264	97.8		
No	6	2.2		
Waiting time	Satisfied	Not Satisfied	χ^2	p-value
30 minutes and less	2(50.0)	2(50.0)	4.153	0.042*
>30minutes	229(86.1)	37(13.9)		
User-friendliness/Information				
Availability of HIV educational materials				
Yes	98(76.6)	30(23.4)	15.928	<0.0001*
No	133(93.7)	9(6.3)		
Ignoring complaints of respondents				
Yes	12(66.7)	6(33.3)	5.568	0.018*
No	219(86.9)	33(13.1)		
Perception of respondents on interruption of consultation				
Yes	21(75.6)	10(24.4)	3.869	0.049*
No	200(87.3)	29(12.7)		
Level of Stigma and Discrimination				
Accepting and non-judgmental health provider				
Yes	137(80.1)	34(19.9)	11.162	0.001*
No	94(94.9)	5(5.1)		
Confidentiality and Privacy				
Yes	5(83.3)	1(16.7)	0.025	0.875

No	226(85.6)	38(14.4)		
Equipment				
Adequate	209(87.4)	30(12.6)	6.031	0.014*
Inadequate	22(71.0)	9(29.0)		
Respectful Staff				
Yes	74(93.7)	5(6.3)	5.951	0.015*
No	157(82.2)	34(17.8)		
Understanding Staff				
Yes	90(90.9)	9(9.1)	3.625	0.057
No	141(82.5)	30(17.5)		

Table 4 shows the logistic regression of predictive factors for clients' satisfaction. Respondents who reported unavailability of HIV educational materials were 3.5 times more likely to be unsatisfied with HIV services compared to those who do not (3.545; 95% CI: 1.519 - 8.275; p = 0.003). Likewise, clients who perceived health workers to be non-accepting and judgmental are 3.6 times more likely to be unsatisfied with HIV services provided compared to those who do not (3. 580; 95% CI: 1.264- 10.141; p = 0.016).

Table 4: Logistic Regression on predictors of satisfaction of HIV services

Variable	Odds Ratio	95% CI		P-value
		Lower	Upper	
Waiting time				
</1hour (ref)				
>1 hour	3.613	0.346	37.751	0.283
Availability of HIV educational materials				
Yes (ref)				
No	3.545	1.519	8.275	0.003
Ignoring complaints of respondents				
Yes (ref)				
No	2.230	0.651	7.636	0.202
Accepting and non-judgmental health provider				
Yes (ref)				
No	3.580	1.264	10.141	0.016
Interruption of consultation				
Yes (ref)				
No	2.022	0.761	5.377	0.158
Equipment				
Adequate	2.604	0.953	7.117	0.084
Inadequate (ref)				
Respectful staff				
Yes (ref)				
No	0.291	0.072	1.181	0.084
Understanding Staff				
Yes (ref)				
No	1.546	0.511	4.680	0.441

Discussion

The socio-demographic pattern of respondents in this study was similar to that found in another study by Opara et al (9) in Uyo, where the majority of People Living with HIV and AIDS attending HIV clinic at the University of Uyo Teaching Hospital, Uyo were aged 31-43 years (51.4%), this study found a mean age of 42.1±11.5 years. There was a significant relationship in the mean age of participants in this study with another similar research by Helena Getenet et al (10) in Ethiopia which was 30.5 years for females and 35.2 years for the males. The findings in the two studies corroborate well with what we found in our study which showed that in most situations, HIV

infections were acquired at a younger age with the manifestation of infection very early in life.

In the same vein, the study found the majority of our respondents were females and married. Similar findings were reported in Nnewi (11), Uyo (9), and Ethiopia (10) this might indicate that females were either exposed to HIV infection early in life. Our study also found that most of the respondents had secondary education, followed closely by the tertiary level of education, this was similar to what Anthony Iwu et al (12) found in Orlu, south-east, Nigeria. In the same study, Anthony et al (12) found more widowed/separated, Opara et al (9) found a majority of their respondents were divorced/separated, while the majority of our respondents were married, these findings capture the significance of heterosexual intercourse in the transmission of HIV in Nigeria and Africa in general.

Patient satisfaction can be used as an indicator of health care quality because the more satisfied patient is the more likely patient cooperate with the healthcare provider and have a higher level of continuity with the provider which in turn improves the clinical outcome (2, 11). Access to care was an important domain by which satisfaction was measured (13). This study found most clients stayed more than one hour before the consultation. Findings from our study were similar to a study conducted in Kano, North-west Nigeria which showed a median time spent waiting to see a doctor as 40minutes (13). Studies carried out in Uganda (14), Iran (15) and South Africa (16) also reported the significance of access to a health facility. They emphasized that clients' satisfaction is also determined through access to healthcare services which encompasses the availability of health workers and drugs especially in public health facilities, distance to health facilities, and a longer waiting time to access healthcare services.

In the area of general satisfaction with service provision, it was observed that there was a good level of overall satisfaction similar to the level of perception among the majority of the respondents, and as such, there could be a relationship between perception and satisfaction of the respondents which is not unusual as both satisfaction and perception depend on preconceived ideas, expectations, past experiences and achieved service performance (12, 17, 18). This general school of thought regarding perception and expectation was displayed in this study where there was a high overall clients' satisfaction among the respondents. Although a small fraction of the respondents lamented the lack of availability of HIV-specific educational materials, most were satisfied with the lack of delay in appointment even for urgent and non-urgent care and getting answers to question when the facility is contacted.

This study found perception on quality of care to be good, the majority of our respondents believed the quality of services was adequate though they perceived that equipment was lacking and the waiting time was equally perceived to be lengthy. An average respondent spent more than 30minutes before consultation in this study. Although, this study was not a comparison between public and private facilities studies in Nigeria had shown that the quality was better in public compared with private facilities. Olowookere et al (19) and Osungbade et al (20) in Nigeria both reported that generally, a high level of satisfaction with services was observed among the participants from public hospitals. In sharp contrast to the findings in this study, Nwabueze et al (11) reported more satisfaction among private facility attendants in their study. Umeokonkwo Chukwuma et al (2) in Anambra, South-east, Nigeria argued that the differences observed among the public and private facilities were largely due to reasons of subsidies where services are largely subsidized by the government, users generally report a high level of satisfaction due to their little expectation.

Furthermore, Awatta Walter Ochan and colleagues observed that patients in public health facilities usually have higher perceptions and they should have had a bigger average gap but due to their higher expectations as well, which is difficult to meet. This is in line with the disconfirmation theory, which states that 'the higher the expectations, the lower the perception' leading to less satisfaction or negative disconfirmation (14). This observation was similar to what we discovered in this study where perception was high in most of the thematic areas considered except in the area of waiting time which most patients believed was too long and could greatly affect clients' satisfaction. A high proportion of clients" in this study reported that the attitude of health staff was never poor to them; never had any interruption of consultation, always had an adequate explanation about test results; although majority complaint of never had more time during the consultation. Chukwuma et al (2) report contrast sharply our observation, in their study the proportions that were satisfied were less than 50% in both public and private hospitals in technical quality and time spent with the doctor

domains. This could mean the patients' perception of the technical competency of their clinicians was suboptimal. The findings in our study were most likely due to the doctor-client ratio with most of the time spent on ensuring that more clients are seen at every clinic. The findings on not getting more time to consultation in this study were contrary to a South African study where clients interviewed agreed that their healthcare provider listened to their problems long enough. In this same study majority of the patients had an opportunity to ask their healthcare provider questions and were satisfied with the explanations provided (21). Similarly, this study showed that the majority of our respondents were never uncomfortable discussing personal or intimate issues; were involved in decision making on their care and treatment, and were never ignored when the complaint was made. A related study in the United States of America supported this assertion that patient involvement in decisions on treatment modalities had a strong correlation with the interpersonal quality of care satisfaction and with overall quality-of-care satisfaction (22).

These findings are quite similar to a study that was done by the National Agency for the Control of AIDS (NACA), Nigeria to assess the quality of care where the majority of clients were completely satisfied with confidentiality and respect of patients' privacy, the competence of HCWs, consultation, explanation and guidance of HCWs, the responsiveness of the HCWs to patients" questions and requests (21). The medical staff needs to pay more attention to privacy and the adequacy of the doctors' explanations of medical terms is more than important in clients' satisfaction which was also demonstrated by this present study. This observation further emphasizes the importance of health care provider's behavior such as the conduct and attention to the patient in improving patients' satisfaction. This has been noted by Dansereau et al (23), which showed that patients' ratings of health care provider behavior were an especially strong predictor of satisfaction. A similar study among clients in Bangladesh showed that health workers' attitudes and behavior were much more important than the technical competence of the provider (24).

Other factors that could influence patients' experiences are responsiveness and empathy. It was indicated that health workers' interpersonal skills and patients' trust influence the satisfaction with the provider stronger than the actual quality of medical care (24). The Bangladeshi study (24) corroborated the finding in this study which demonstrated clients' confidentiality and privacy; accepting and non-judgmental attitude by a healthcare provider; not ignoring complaints of respondents and availability of HIV educational materials were found to be statistically significant predictors of client satisfaction. This goes to support Beller's (25) views that, "No matter how sophisticated and reputable a medical facility may be and no matter how brilliant and knowledgeable the physicians practicing there, patients will not perceive their care as being excellent unless they are satisfied concerning many of the behaviors cited above and that results in high patients' satisfaction is having physicians and other caregivers who are truly concerned about their patients" (25).

The predictors of clients' satisfaction of care received at the facility include unavailability of HIV educational materials and non-accepting and judgmental attitude of the staff. However, Jitta et al (26) in Uganda found total time spent in the facility and Joshua Amo-Adjei et al (27) in Ghana reported that regular drug supply is a factor influencing clients' satisfaction in their studies (2). The observation in this study is a clear and unique opportunity to increase information sharing between caregivers and clients to increase clients' satisfaction with the services provided.

Limitations of the study

We did not explore the waiting time at different service points such as pharmacy, laboratory, adherence counseling, and HIV testing units to have an idea where the patient usually waits more but the study makes it clear there is an issue with waiting time.

Conclusion and recommendations

This study showed that clients attending HIV/AIDS clinic were satisfied with the services provided at Federal Medical Centre, Abeokuta. However, certain areas of concern have been elucidated which include reducing the waiting time before patients are seen, inadequate availability of educational materials, and the need to be non-judgmental and accepting on the part of the health workers. Improvement in these areas will further enhance the overall patients' experience and satisfaction thereby increasing the certainty of better treatment adherence and retention in medical care.

From the foregoing and observation arising from this present study, the following recommendation would improve clients' satisfaction and increase

treatment adherence and retention in care at the HIV clinic.

1. Reducing waiting time before medical consultation through training and retraining of healthcare workers.
2. Making adequate availability of Information Education and Communication (IEC) materials to all clients both new and old.
3. Unacceptable and judgmental attitudes by some staff were also found to strongly determine satisfaction. There should be training and retraining on behavioral change for all cadres involved in care and treatment to minimize stigmatization.
4. Despite the pressure of ensuring all clients who present at the clinic are seen, adequate time must be given to each client to hear their view of care they receive and make input in the decision on their care and treatment.

Declarations

Ethics consideration

Ethical approval for this study (FMCA/470/HREC/01/2019/10) was obtained from the Federal Medical Centre Ethical Review Committee. Clients were provided with informed consent forms explaining the study objectives and aims and the voluntary nature of the study. The interviews were conducted in privacy and anonymously. Respondents were informed about the objectives of the study and that the data collected would be treated with confidentiality. Written informed consent was obtained from all respondents signed or thumb printed before the start of the interview.

Consent for publication

The authors hereby give consent for the publication of this work under the Creative Commons CC Attribution. Non-commercial 4.0 license.

Availability of data and materials

All data generated or analyzed in this study are included in this article and are available at any request.

Competing interests

The authors declare that they have no competing interests

Funding

None

Contributions of authors

Conception and design: IG, ST, OOY, and FMM
Acquisition of data: OOY and OIA
Analysis and interpretation of data: FMM
Drafting of the manuscript: AKA and AAR
Critical revision of the manuscript for important intellectual content: ST and AKA
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Administrative, technical, or material support: TAO
Supervision: ST AND OOY

Acknowledgments

We would like to appreciate the residents' doctors that were involved with data collection

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Ezeoke *et. al.* BUMJ 2021 4(2):107-111
https://doi.org/10.38029/bumj.v4i2.90

CASE REPORT OPEN ACCESS

Leiomyoma of the anterior vaginal wall: a rare case

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Submitted: 4th August 2021
Accepted: 11th September 2021
Published: 30th December 2021

Abstract
Background: Leiomyoma is a benign smooth muscle mesenchymal tumor, usually of uterine origin but may rarely develop in the vaginal walls.
Case presentation: A case of 40-year-old para 5+0 woman with anterior vaginal wall leiomyoma is reported. The presentation mimics that of uterovaginal prolapse and hence presents a diagnostic challenge. The unusual appearance of the protrusion, failure to reduce at any time even while lying down, and complete absence of urinary symptoms raised the suspicion of a rare case. The diagnosis was made through examination under anesthesia, cystoscopy, and biopsy. Histological examination of the biopsy specimen confirmed vaginal wall leiomyoma. The patient had complete excision of the mass without any complications.
Discussion and Conclusion: Vaginal wall leiomyoma is a rare benign vaginal lesion that can easily be misdiagnosed. Diagnosis involves critical clinical evaluation, especially during pelvic examinations. Any vaginal protrusion should be approached with a high index of suspicion, especially in patients of reproductive age.

Keywords: Leiomyoma, Cystoscopy, Biopsy, Vaginal Wall, Utero-Vaginal Prolapse

Background

Leiomyoma is a benign neoplasm of the smooth muscle, usually of the uterus but can occur in other sites like the cervix, broad ligament, and rarely vaginal walls. The tumor consists of smooth muscle cells in combination with varying amounts of fibrous tissue. The occurrence of this tumor in the anterior vaginal wall is uncommon.

Case presentation

Mrs. AD, a 40-year-old, para5^{+0} petty trader presented in our clinic with a history of protrusion of a mass per vagina of 3 months' duration. The protrusion was painless and said to be fleshy, not reducible at any time, and not increasing in size. There was associated watery vaginal discharge but no bleeding per vagina. There was no history of any urinary symptoms, no straining while defecating and she has not been carrying heavy objects. There was no history of abdominal swelling and abdominal pain, however, she complained of low back pain. Mrs. AD had stopped sexual activities since the onset of the symptoms. Her cycle had been regular; she bleeds for 5days in a 28-30 days' cycle. Her last Childbirth was 8 years before presenting and all her 5 parous experiences were hospital-supervised deliveries with no history of prolonged labor or perineal injury during the deliveries.
Examination at the presentation revealed an anxious-looking woman who was not pale and afebrile. Her Body Mass Index was 26.2kgm^{-2}, her pulse rate was 82 beats per minute and her blood pressure was 100/70 mmHg. There was no mass palpable on abdominal examination.

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Pelvic examination revealed a hyperaemic mass covered with slough protruding outside the introitus. The mass measured 10cm by 10cm, firm in consistency and originating from the anterior wall of the vagina. The anterior vaginal wall was edematous. The mass was not tender and there was no active bleeding on contact. There was no further protrusion of the mass on the Valsalva maneuver and no demonstrable urinary incontinence. It was also not reducible. The urethral meatus was visible and had a tiny fleshy tag at 1'0' clock position. The cervix was in its anatomical position, firm and os were patulous. The posterior vaginal wall was normal, the uterus was not bulky, the adnexa was free and the pouch of Douglas was empty. There were no abnormal findings on rectal examinations.

An initial diagnosis of vaginal wall mass probably infected vaginal wall cyst with differentials of vaginal cancer and bladder cancer was made.
Mrs. AD was commenced on broad-spectrum antibiotics and the mass was dressed daily with gauze soaked in normal saline. The urologist was invited to review the patient and made an assessment of the suspected bladder tumor. A second opinion by another gynecologist a few days after admission, when the edema has markedly subsided, raised the possibility of vaginal wall leiomyoma.
The full blood count showed a mild elevation in white blood cell count but the packed cell volume, serum electrolyte, urea, and creatinine as well as the urine analysis were all normal. Ultrasound Scanning showed no abnormality as the uterus was normal in size and in its anatomical position.

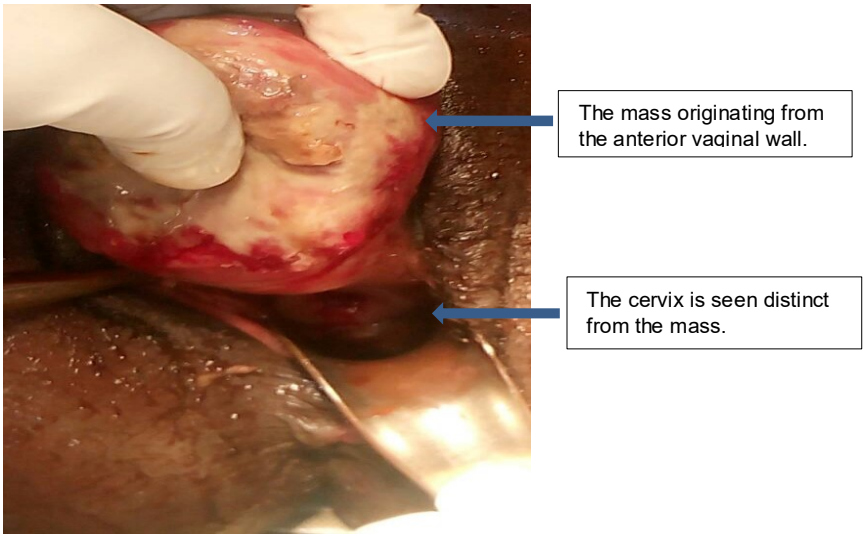


Figure 1: The vaginal mass during an examination

The patient had an examination under anesthesia, cystoscopy, and incisional biopsy. The cystoscopy findings showed prolapsed small fleshy tissue from the urethral meatus, hyperaemic urethral mucosa, and a patchy granular mucosa of the bladder from the trigone to the inferolateral wall on the left. There was no indentation of the bladder wall. A cystoscopic biopsy of the bladder mucosa was taken. The vaginal examination findings revealed an anterior vaginal wall mass measuring 10cm by 10cm and firm to touch, protruding from the introitus. The edema and slough noted at admission had markedly reduced. Bimanual examination of the pelvic structure and rectal examination did not reveal any abnormality. An incisional biopsy of the mass was taken and the urethral tag was excised.
Histology report of the urethral biopsy revealed chronic suppurative inflammation while the bladder mucosa biopsy showed cystitis glandularis. However, the vaginal wall mass biopsy showed extensive mucosa ulceration with proliferating fascicle of spindle-shaped smooth muscle cells but no mitotic figures or necrosis was seen. The conclusion of the report showed the mass to be a vaginal leiomyoma.

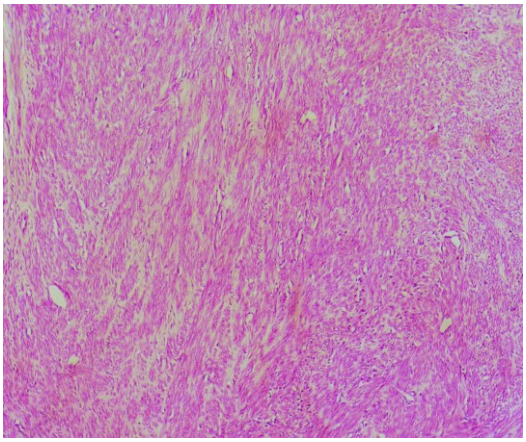


Figure 2: Microscopic image of the lesion showing spindle-shaped smooth muscle cells with eosinophilic cytoplasm.

Subsequently, she had excision of the anterior vaginal wall fibroid through the vaginal route under subarachnoid block. The urethra was catheterized, a circumferential incision was made at the base of the mass down to its capsule and the mass was removed via further sharp and blunt dissections. The resultant defect was closed with interrupted stitches using vicryl 1 suture in double layers and there was minimal bleeding intra-operatively.

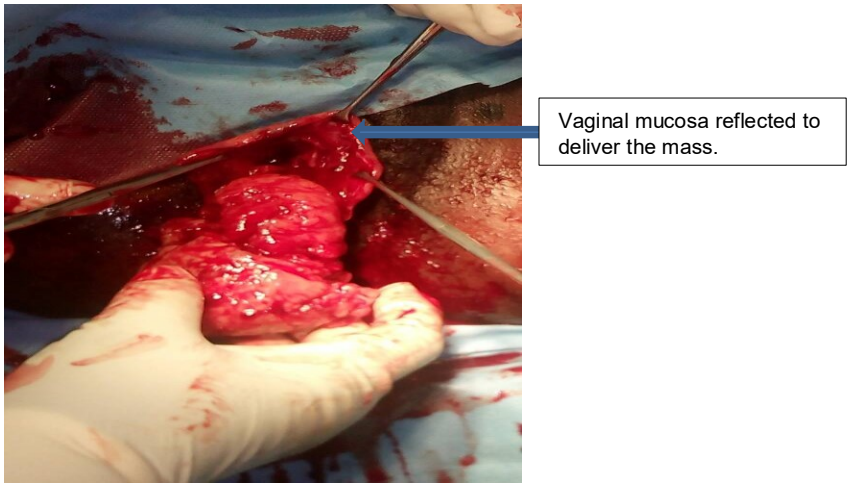


Figure 3: The vaginal mass (leiomyoma) about to be completely excised from the vaginal wall

Mrs. AD was continued on analgesia and antibiotics and was discharged 5 days after the surgery. The follow-up visit at the clinic was uneventful.

Discussion and conclusion

Leiomyoma of the vagina is a very rare primary tumor of the vagina with only about 300 reported cases worldwide (1) and it constitutes about 4.5% of all solid vaginal tumors (2). The commonest site of vaginal leiomyoma is the anterior wall and occasionally in the lateral wall and vulvar area (3). The actual etiology is still unknown but, some researchers, however, believed that it may be due to residual embryonic vascular tissue and smooth muscle fibers in the vaginal wall (4). It is mostly seen in women between the age of 35 to 50 years but, it has been reported in patients of pubertal age to the age of 71 years (5). Mrs. A.D had an anterior vaginal wall fibroid and is 40years old thus fits the category of women in whom this rare tumor can occur.

Vaginal leiomyoma is usually firm but, may undergo degeneration to become soft. The variation in the consistency from firm to soft makes diagnosis more difficult (3, 6). It is usually asymptomatic until it reaches a larger size (4, 7). Symptoms often vary depending on the location of the tumor and may include genital organ prolapse, dyspareunia, vaginal discomfort,

vaginal bleeding, urinary symptoms, lower abdominal pains, and low back pain (4, 7, 8).

A meticulous vaginal examination should be employed in the diagnosis of vaginal masses to differentiate various masses that can arise in the vagina. The differential diagnoses of vaginal leiomyoma include; cystocele, Gartner's duct cyst, Skene's duct cyst, Mullerian remnant cyst, epithelial inclusion cyst, ectopic ureterocoele, leiomyosarcoma, urethral, and bladder malignancy (2, 8, 9). The initial diagnosis for this patient was an infected vaginal wall cyst and a bladder tumor was also a differential. A high index of suspicion is necessary for the clinical diagnosis of this rare vaginal wall tumor.

Examination under anesthesia with biopsy of the mass and cystoscopy are very vital in arriving at a definitive diagnosis of vaginal leiomyoma as demonstrated in this case.

Cystoscopy helps rule out bladder tumors as it offers direct visualization of the bladder mucosa. It usually shows distorted bladder walls in cases of bladder tumors (10). The similarity of anterior vaginal wall leiomyoma and bladder tumor makes cystoscopy an extremely important procedure as was done for Mrs. AD. Hysteroscopy could be done in some cases to further exclude the likelihood of the mass originating from the endometrium especially in instances where the diagnosis is problematic (10). This was not done for Mrs. AD because the cervical os was seen and distinct from the mass.

A vaginal approach is the most preferred route of removal for average-sized tumors while the abdominoperineal approach is usually recommended for the larger masses that may extend into the pelvis (8, 11). It is very important to do a biopsy to rule out malignancy before proceeding on surgical excision. Recurrent vaginal leiomyoma is extremely rare and only a few cases have been reported (12). Mrs. AD was properly counseled on this uncommon complication.

Vaginal leiomyoma is an uncommon condition and may be misdiagnosed as uterovaginal prolapse or even bladder neoplasm especially when it is located in the anterior vaginal wall. The diagnostic dilemma could be easily resolved with proper examination preferably under anesthesia, biopsy, cystoscopy, and histological confirmation. We have documented this rare condition to contribute to available literature and raise awareness locally, nationally, and internationally. It is pertinent for clinicians to keep in mind some rare vaginal tumors while evaluating vaginal masses and evaluation should not only be tailored towards common lesions.

Declarations

Ethics consideration

Written informed consent for publication was obtained from the patient whose management is being reported.

Consent for publication

The authors hereby give consent for the publication of this work under the Creative Commons CC Attribution. Non-commercial 4.0 license.

Availability of data and materials

All data generated or analyzed in this study are included in this article and are available on request.

Competing interests

The authors declare no competing interest in the publication of this case report.

Funding

The authors did not receive any financial support for this publication.

Contributions of authors

History taking: JOS/EGG/AAS
Ward rounds/review JOS/EGG/AAS/AIF/PA
Surgeries EGG/BOR/JOS/PA
Surgical findings interpretation: EGG/BOR/AIF/PA/JOS/AAS
Writing of case report: EGG/JOS/AAS
Editing of case report: PA/AAS/BOR/AIF
Proof-reading and revision of case report for final submission: JOS/EGG/AAS/PA/AIF/BOR

Acknowledgments

Nil

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Okondu *et. al.* BUMJ 2021 4(2):112-119
https://doi.org/10.38029/bumj.v4i2.83

RESEARCH ARTICLE OPEN ACCESS

Dietary Knowledge and Practices among Non-Medical Staff at Babcock University in Ogun State, Nigeria

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Submitted: 28th June 2021
Accepted: 10th September 2021
Published: 30th December 2021

Abstract
Objective: Good nutrition is important in promoting health and is dependent on the quality of food eaten. Little has been researched on the dietary practices among the workforce in Nigeria. This study aimed at assessing the dietary knowledge, practices, and factors influencing dietary practices and work productivity among the non-medical staff of Universities.
Methods: This is a descriptive cross-sectional survey of 398 non-medical staff of Babcock University who were selected using the multi-stage sampling technique. Data were analyzed using the Statistical Package for Social Sciences (SPSS 21) to compute frequency distributions, means, and standard deviations. Nutritional knowledge, dietary practices, and barriers to work productivity were assessed. Inferential statistical analysis was conducted using Pearson's correlation coefficient.
Results: The mean age among respondents was 38.68±11.04, with the majority being female 54.6%. of the respondents (61.1%) of Yoruba origin, about three percentiles (66%) were members of staff while (34%) were faculty members. The computed level of knowledge and dietary-based practices scores were (2.57±0.61) and (3.64±1.44) respectively, indicating poor knowledge and dietary practices, while the barriers that influence work productivity among workers (11.34±5.286) were high at 87.2%. No significant association was found between nutritional knowledge and dietary practices of staff and faculty (p=.154), but a significant association was found between dietary practices and work productivity of staff and faculty (p=.019)
Conclusion: Health education and promotion of good nutrition should be incorporated in the workplace, interventions that will improve work productivity among workers are also encouraged. This will culminate in a well-fed and healthy workforce.

Keywords: Nutrition, Knowledge, Dietary practice, Staff, Work productivity

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Plain English summary
Adequate dietary knowledge and good dietary practice are important in living a healthy life and maintaining optimum work productivity. This study provides an insight into dietary knowledge and practice among the non-medical staff of Babcock University, Nigeria. We found that the dietary knowledge and practice were poor, and barriers to work productivity were high. This study suggested that good nutrition should be promoted at the workplace through health education.

Background
Many factors contribute to productivity in the workplace. One of such factors often neglected in the equation of attaining optimum workplace performance is food. While food is an essential component in adopting and maintaining a healthy lifestyle, it must be taken in the right proportion suitable for meeting the daily energy requirement especially in the workplace where many spend at least one-third of their daily hours (1, 2).
Nutrition is simply defined as the process of taking in food and using it for metabolism, growth, and repair (3). The need for proper nutrition cannot be overemphasized. In 2018, it was estimated that 820 million people did not get enough to eat (4). Similarly, the World Health Organization has stressed that the world is facing a double burden of malnutrition which includes undernutrition and overnutrition especially in low-and-middle-income countries (5). A study also reported poor nutritional status among citizens of many African countries, Nigeria inclusive (6). Proper dietary habit has been defined as the habitual decisions made by people regarding the food, they consume which should include all the classes of food in the right proportion (7). If this is done, the World Health Organization has observed that it will culminate in more productivity which will create more opportunities, thus breaking the cycles of poverty (5).
Poor dietary practices have been linked with poor productivity at work just as the International Labour Organization has stressed that poor diet on the job accounts for 20% of loss of productivity (8). Similarly, a report showed that unhealthy eating is linked with a 66% increase in loss of productivity (9). Not only will unhealthy eating habits reduce work productivity, but it has also been associated with conditions like diabetes, hypertension, osteoporosis, cardiovascular diseases and some cancers (10).
It is important to note that nutritional requirements vary from one individual to another (11). For instance, the nutritional requirement for a child will differ from that of an athlete, depending on the level of productivity. Similarly, that of a pregnant woman will be different from that of a middle-aged person. Productivity at work has been shown to decrease as a result of poor nutrition, and this contributes to feelings of tiredness, sluggishness, thus leading to inadequate energy for the body to function optimally (5, 11). Similarly, long hours of works without adequate portions of well-balanced meals will contribute to inefficiency and low work output, thus meeting the Key Performance Index (KPI) becomes a challenge for a work environment, and overall daily activity (12).
One of the ways to reduce intake of less nutritious foods is proper dissemination of information and clear labeling of products (13). Moreover, the demands of a workplace, in addition to poor nutritional health can lead to adverse psychological and physical health effects, consequently, hindering workplace productivity (12).
With these in mind, the study aimed to ascertain knowledge, dietary practices, and factors influencing dietary practices and work productivity among non-medical staff at Babcock University. We hypothesized that there is no significant relationship between nutritional knowledge and dietary practices of non-academic staff and faculty and between dietary practices and work productivity of members of staff of the University. Findings from this study will assist in developing interventions to promote optimal dietary practices concerning work productivity among the study population, the local and international communities.

Methods
Study design
This research was a descriptive cross-sectional study.

Study Area
Babcock University is a private Christian University owned and operated by the Seventh-day Adventist Church in Nigeria. It is located equidistant between Ibadan and Lagos. The school which is located in Ikenne local government is bounded in the North by Remo North local government, south by Sagamu local government, in the east by Odogbolu and Ijebu North-East local governments, and in the west by Obafemi Owode local government. The schools of learning in Babcock University include the School of Science and Technology, Veronica

Adeleke School of Social Sciences, School of Management Sciences, School of Computing and Engineering Sciences, College of Health and Medical Sciences, School of Education and Humanities, School of Law and Security Studies, School of Nursing Sciences, School of Public and Allied Health, and Academic Library. The divisions of the Staff members include Presidency Division, Academic Administration Division, Management Services Division, Financial Administration Division, Student Development Services Division, and Subsidiaries.

Study Population
This study included male and female academic and non-academic members of the staff of Babcock University. Inclusion criteria included those who were at least 18 years of age, and those who have worked for nothing less than 12 months in the university, while who were working part-time were excluded from the study.

Sampling Technique
All faculties except the College of Health and Medicine were purposively selected for this study. A random sampling technique was used to select departments from the faculties through a balloting system. Afterward, a convenience sampling technique was used to select members of staff from the relevant departments.

Sample size estimation
The sample size was calculated using the Cochran formula (14). A total of 384 respondents was obtained. 5% attrition rate was considered making 403 respondents. A total of 398 questionnaires were eventually retrieved.

The instrument for Data collection
Data were collected using a self-designed questionnaire, pre-tested and the calculated Cronbach's alpha coefficient was 80%. The questionnaire was divided into four sections namely:
Section A: Socio-demographic characteristics. This included the age (as at last birthday), gender, school, ethnicity, and respondents' level of education.
Section B: Knowledge of nutrition. This section elicited the respondent's level of knowledge on nutrition information. Questions like ''fruits must be taken before and after a meal'' and ''porridge, yam, bread are energy-rich foods?'' were asked with options of 'Yes' and 'No'. knowledge questions had 10 items and knowledge score was computed from the item questions; 0-3 as poor, 4-6 as average, and 7-10 as good knowledge respectively with mean and standard deviation score of 2.57±0.61.
Section C: Dietary Practice section had 10 items and the practice score was computed from the item questions; with a mean and standard deviation of 3.64±1.44. This section was on a Likert Scale with questions like frequency of reading food labels, eating breakfast, eating three square meals, seeking out nutrition information, and snacking on food. Always was scored as 4, Often as 3, Sometimes as 2, and Never as 1 on a scale of 10-40. Scores ≥ 25 were considered good practice and scores < 25 were considered bad practice.
Section D: This section assessed barriers influencing work productivity. This was scored on a scale of 1-10 with 13 factors listed for the respondents to choose from. Barriers influencing work productivity were assessed with scores 0-4 scored as low, 5-9 as average, and 10-13 as high.

Instrument reliability
The instrument was pretested among 20 participants in a similar population (Olabisi Onabanjo University, Ogun State) to determine the reliability of the instrument, Cronbach's Alpha test for internal consistency was 0.73.

Data Management and Analysis
Data were analyzed using IBM Statistical Package for Social Sciences (SPSS) version 21. Descriptive statistics such as percentage representations, charts, tables, and figures were used to present the results while the Pearson correlation coefficient was used to determine the relationship between the variables.

Results
The mean age of respondents was 38.68±11.04, the majority of the respondents were females (54.6%) compared to their male (45.4%) counterparts. Most of the respondents were of Yoruba (61.1%) origin. Members of staff that participated in this study were (66%) while (34%) were faculty members. Educational status revealed that the majority are learned with 87% having tertiary education (see table 1).

Table 1. Frequency of Demographic Variables

Variables	Respondents in this study N=398	
	Frequency (n)	Percentage (%)
Age (in years)		
20 – 29	45	12.23
30 – 39	156	42.40
40 – 49	113	30.70
50 – 59	46	12.50
60 – 69	08	02.17
Gender		
Male	167	45.40
Female	201	54.60
Marital Status		
Single	99	26.90
Married	248	67.40
Widowed	15	04.10
Divorced	06	01.60
Years of work		
1-10	283	76.90
11-20	69	18.80
21-30	16	04.30
Ethnicity		
Yoruba	225	61.10
Igbo	104	28.30
Hausa	08	02.20
Others	31	08.40
Educational Status		
No formal education	15	04.10
Primary	18	04.80
Secondary	15	04.10
Tertiary	320	87.00

Mean Age = 38.68±11.04

More than half 53.87%) of the respondents had poor knowledge of nutrition while 46.13% had good knowledge of nutrition (see figure 1).
The mean score for dietary practice is (3.64±1.443). The mean score signifies a poor dietary practice. Dietary practices measured among the respondents indicate that 49.4% of the respondents seek out nutrition information while 67.2% of the respondents read food labels before buying. Meanwhile, 71.8% do take breakfast and 83.4% claim to consume carbohydrates. More so, 32.3% of the respondents do not snack on foods, while 90.5% do not take alcohol (see table 2).



Figure 1: Knowledge on nutrition

Table 2 Dietary Practices

Variables for Consideration	Respondents in this Study N=398	
	Frequency (n)	Percentage (%)
I read food labels before buying at the mall or market	247	67.2
I eat breakfast every day	264	71.8
I complete three square meals per day	137	37.2
I do not take alcohol	333	90.5
I snack on food	249	67.7
How frequently do you consume carbohydrates?	207	83.4
How frequently do you consume protein?	287	78.0
How frequently do you consume vitamins?	256	69.5
How frequently do you consume fats and oil?	236	64.1
How frequently do you seek out nutrition information?	182	49.4

Table 3 indicates that many factors are influencing work productivity among workers at Babcock University: income (57.9%), stress (58.7%), work environment (54.6%), food eaten at work (59.5%) while lifestyles choices and depression account for 52.2% respectively.

Table 3: Barriers to Work Productivity: Correct responses

Variables for Consideration	Respondents in this Study, N=398	
	Frequency (n)	Percentage (%)
Income	213	57.9
Dietary pattern	173	47.0
Stress	216	58.7
Absenteeism	112	30.4
Health Related conditions	207	56.3
Work Environment	201	54.6
Sickness	129	35.0
Sleep hours	195	52.9
Food	219	59.5
Workplace Health Promotion	192	52.2
Lifestyle Choices	192	52.2
Depression	131	35.6
Inadequate Facilities	210	57.0

Table 4 shows that the level of knowledge computed mean and standard deviation score (2.57±0.61) indicates that the knowledge of what constituted dietary practices in this study was poor (25.7%), dietary practices as observed was also poor (3.64±1.443) at 36.4% while barriers to work productivity was high (11.34±5.286) at 87.2%.

Table 4: Descriptive Summary of Composite Statistics

Variables	Maximum point scale	Mean	Standard deviation	Standard Error of Mean	Prevalence %
Knowledge	10	2.57	0.61	0.032	25.7
Dietary practices	10	3.64	1.443	0.075	36.4
Work productivity	13	11.34	5.286	0.276	87.2

Hypothesis One:

There is no significant relationship between nutritional knowledge and dietary practices of

Babcock University staff. The study shows a perfect fit model and positive correlation (+1) and a coefficient of 0.75 translating to the magnitude of the relationship at p=.154. Therefore, we fail to reject the null hypothesis. Hence, there is no significant relationship between knowledge and dietary practices of Babcock University staff (Table 5).

Table 5: Correlation between knowledge and dietary practices

Variables	Pearson correlation (r)	Correlation Coefficient (r^2)	p-value
Knowledge on Nutrition Dietary practices	1 1	0.75	0.154
Work productivity Dietary practices	1 1	0.037	0.019

Hypothesis Two:
There is no significant relationship between dietary practices and the work productivity of Babcock University staff. The study shows a perfect fit model and positive correlation (+1) and a coefficient of 0.037 translating to the magnitude of the relationship at p=.019. Therefore, the null hypothesis is hereby rejected. Hence, there is a significant relationship between dietary practices and work productivity of Babcock University staff (see Table 5)

Discussion
Evidence from this study showed poor knowledge of nutrition by Babcock University staff. This was not expected as non-academic and academic members of staff of the University ought to have a good knowledge of their nutrition, especially the highly educated staff members even as 87% of the respondents in this study had tertiary education. This finding is similar to a study on nutrition-related knowledge conducted in the United States among teaching staff, which showed that only 3.0% of teachers correctly answered at least 4 questions on nutrition (15). This was similar to the finding among Head Start Teachers in Texas where none of the teachers could correctly answer all the five questions on nutrition (16). This highlights the need for nutritional educational interventions among the staff of educational institutions (17). This was supported by research that confirmed the need for intensive nutrition education to emphasize the importance of adopting good dietary practices among students, staff, and faculty members (18). In this current study, the respondents had poor dietary practices. This was similar to a study conducted among University staff in Southeast Nigeria that found that 69.0% took unhealthy snacks daily (19). Similarly, another study conducted among 57 teachers in Brazil revealed an excessive consumption of lipids (20). Poor dietary practices found in these studies highlight the need for interventions that should be targeted at correcting these practices. On alcohol consumption, we found that 9.5% of the respondents in our study consume alcohol. Alcohol consumption was also found among 8.5% of the 423 urban schoolteachers in a school in Ibadan, southwest Nigeria (21). This suggests the need for adequate health education for staff of educational institutions on the danger of alcohol consumption.
The findings from this study suggest that some factors such as income, stress, etc. influence work productivity, supporting a similar study conducted in Calabar confirming the impact of stress on nutrition and productivity among workers (22). Additionally, other factors like health and dietary practices act as barriers to work productivity. Research has suggested that numerous workplace interventions have shown significant improvements in employees' health and work productivity (23).
This study has equally shown that there is no relationship between nutritional knowledge and dietary practice, as opposed to a study conducted in Ireland among a randomly selected working population which indicated that higher nutritional knowledge is associated with better dietary practices, indicating a significant relationship between nutritional knowledge and dietary practices (24). Our finding was also at variance with a systematic review which found a significant, positive but weak association between knowledge on nutrition and dietary intake (25). However, this study showed a significant relationship between dietary practices and work productivity. Similarly, a study conducted in Turkey confirmed this finding, suggesting that there is a link between good dietary practice and high work productivity (26).
Strength and Limitation
This study has provided an insight into the dietary knowledge and practices in a tertiary institution in Southwest Nigeria. The findings could help the

school administration, the local and international population in the design of interventions that will be aimed at improving nutritional knowledge and dietary practices to improve work productivity. However, since this study was based on self-report, it is subject to social desirability bias as the respondents might tend to under-report poor dietary practices. Therefore, this limitation should be considered when interpreting this finding.

Conclusion and Recommendation

The study has shown that the majority of the respondents have poor knowledge of nutrition. It is suggested that there should be nutrition awareness programs. Workplace health promotion such as health talks, group discussions on nutrition should be incorporated into the school system.

Declarations

Ethics Consideration

Ethical approval was obtained from the Babcock University Health Research Ethical Committee (BUHREC617/17) before the commencement of the research. Confidentiality and anonymity were ensured. Informed consent was obtained from the study participants before data collection and the voluntary nature of the study was stressed.

Consent for publication

The authors hereby give consent for the publication of this work under the Creative Commons CC Attribution. Non-commercial 4.0 license.

Availability of data and materials

All data generated or analyzed in this study are included in this article and are available at any request.

Competing interests

No competing interests.

Funding:
None

Authors' contributions

Study design: OOE, MJO, AM
Data collection: AM, MBT, AE, CCF
Data analysis: OOE, MJO, AM
Study supervision: OOE, AK, CCF
Manuscript writing: AO, AE, UEN, MBT, FDD, OTD
Critical revisions for important intellectual content: AO, FDD, OTD, UEN

Acknowledgments

We would like to thank all the authors that contributed to the research.

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Ahmed *et. al.* BUMJ 2021 4(2):120-132
https://doi.org/10.38029/bumj.v4i.88

RESEARCH ARTICLE OPEN ACCESS

A Comparative Study of Predictors of Health Service Utilization among Rural and Urban Areas in Ilorin East Local Government Area of Kwara State

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Submitted: 20th July 2021
Accepted: 17th September 2021
Published: 30th December 2021

Abstract
Objective: Health facilities utilization among Nigerians is affected by access to hospitals and, availability of personnel. This study compared the predictors of health service utilization in rural and urban areas of Ilorin East Local Government Area of Kwara State.
Method: A cross-sectional study, involving 250 rural and 250 urban respondents selected through multi-stage sampling techniques. Quantitative data were collected using an interviewer-administered questionnaire. Qualitative data collection was done with an FGD guide. Data were analyzed using SPSS version 16. Chi-square, t-test, and z-test were used to test for significance. The level of significance was set at $p < 0.05$.
Results: The mean age of urban respondents was 37.1±7.9 years and 42.6 ±13.7 years for rural. Utilization among the urban respondents were 71.2%, and 89.2% among rural (z-score = 27.93; p-value = 0.01). Health services factors such as waiting time (Adjusted OR=1.012; p-value=0.989) were found to be a strong predictor of utilization among urban respondents compared with the availability of drugs (Adjusted OR= 1.696; p-value=0.407) and availability of drugs (Adjusted OR= 1.696; p-value=0.407) which were the strongest predictor among rural respondents, though they were all not statistically significant. Other factors identified were lack of staff 46.5% among rural and lack of drug 26.1% among urban communities respectively.
Conclusion: The study demonstrated higher utilization among the rural community. Knowledge of available health services was important for utilization; waiting time, and availability of drugs were major predictors of health service utilization among urban and rural communities respectively.

Keywords: Health, Service, utilization, Urban; Rural; Kwara State

Plain English summary

The study aimed to assess the predictors of healthcare utilization between urban and rural communities in a Local Government Area in Kwara State, North-Central, Nigeria. The study found utilization among the urban respondents to be 71.2% and 89.2% among rural. The utilization of services was predicted by the waiting time and availability of drugs among urban respondents, and the availability of drugs was the strongest predictor among rural respondents. We recommend continuous training and retraining of staff on triaging of patients, especially in urban clinics and hospitals where patient's turnout could be overwhelming,

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to ensure quality service delivery. The state and local authorities should reduce drug costs through subsidies and make essential drugs available as the availability of medications in this thought to improve hospital visits.

Background

The utilization of health care services is fundamental to healthy living, socio-economic and infrastructural development (1). Health care utilization is influenced by certain characteristics including the availability of healthcare facilities (1, 2). Availability has a wide dimension which entails distance, accessibility, awareness, transport, language, cultural barrier, and preference. Others are the cost of health care service, and quality of service provided by health care personnel (3).

The utilization of health care still differs greatly between urban and rural communities due to the availability of basic equipment and the presence of trained medical personnel in the urban area with a relatively low supply of same at the rural community where more than 60% of the population resides (4, 5). The disproportionate utilization between rural and urban communities in Nigeria has resulted in varied morbidity and mortality rates. For instance, the 2018 NDHS results show that the infant mortality rate was 67 deaths per 1,000 live births for the 5 years preceding the survey. The child mortality rate was 69 deaths per 1,000 live births, while the under-5 mortality rate was 132 deaths per 1,000 live births (6). The under-5 mortality rate is higher in rural areas than in urban areas (157 and 92 deaths per 1,000 live births, respectively) (6).

While 84% of women in urban areas had supervised delivery by a doctor, nurse, or midwife compared with only 56% of women in rural areas (7).

Overall progress in health indicators has been slowed down, Nigeria ranks among the countries with the highest maternal mortality ratio. The maternal mortality ratio for the 7 years before the 2018 NDHS is estimated at 512 maternal deaths per 100,000 live births (6). The figures are worse in the rural communities where utilization of modern health facilities is limited and most inhabitants patronize local traditional birth attendants (8, 9). The utilization of health facilities among rural and urban communities is greatly affected by the distribution of health facilities and the availability of health care personnel at the facilities. Others are the condition of service, lack of working equipment, lack of infrastructure, and poor communication service and access road have been blamed for these seemingly persistent gaps (10).

It is important to note that private health care providers operate in urban settings where income levels are generally high and clients are perceived to have the ability to pay for service rendered. Conversely, there is poor access to qualified and competent health professionals for people living in rural and deprived areas that bear a great portion of the disease burden (10). High cost of health services have equally been blamed for the seemingly disproportional utilization of health services for instance, as much as 43% of respondents in a study reported high cost of transportation, cost of medication and service at the health center, and man-hour lost, were obstacles to utilizing health care services both at the rural and urban facilities (11). A study by Fatusi et al (12) on poverty reduction strategy identified that about 40% of their respondents were living in poverty and close to 27% live in extreme poverty (12). Most of these population lives in the rural community with limited access to health care service (13).

Health care utilization among rural dwellers is characterized by longer travel times and greater distances to health centers constituting barriers to repeat visits (14). The inadequacies in access to health facilities have reduced the life expectancy of rural inhabitants, urban slum dwellers, and increased infant mortality (15). Although the urban communities have access to health care services in terms of the road network and availability of personnel, the cost of accessing these services is a form of constraint to urban dwellers, especially the less privileged (16).

The need to address the differences in utilization of health care services among rural and urban communities is important to providing equitable health care services and reducing morbidity and mortality. This study “Comparison of predictors of health service utilization among rural and urban areas in Ilorin East LGA, Kwara State, North-central, Nigeria” sought to identify the differential factors that determine healthcare utilization and the predictors of the determinants. This study bridged the information gap on healthcare utilization and its predictors among selected communities in Ilorin East Local Government Area (LGA) of Kwara State.

Methods

Study design

This is a cross-sectional study that employed both qualitative and quantitative methods using an interviewer-administered questionnaire and focus group discussions (FGD). It involved comparative assessment of predictors of health service utilization among rural and urban communities in Ilorin East Local Government Area.

Study area

The study was carried out in Ilorin East Local Government Area of Kwara State. Ilorin East LGA is one of the sixteen (16) LGAs that made up Kwara State (17). The people of the local government are mainly civil servants, farmers, traders, artisans, and organized private sectors (17, 18, 19). The 2006 national population census puts the population of Ilorin East Local Government at 207,462 (Male 104,801; Female 102,661) (20, 21).

Study population

The study population consisted of heads of households in the selected communities. Heads of households were used because they have information on health service utilization activities of members of the household and provides financial support for most activities in the household regardless of their gender. The respondents were adults above the age of 18 years who had lived in the community for not less than 18 months, this is believed to be long enough for the respondent to acquit themselves with socio-cultural activities in the community.

Sample size determination

The minimum sample size for this study was determined using the formula for comparison of two proportions. The sample size for each group i.e., urban and rural communities calculated thus:

$$n = \frac{(Z_\alpha + Z_\beta)^2 \times (P_1(1-P_1) + P_2(1-P_2))}{d^2} \quad (22)$$

Where n was minimum sample size required; α = 5%; β = 20% (80% power was desired); Z_α = Standard normal deviate (SND) value for α (alpha) error = 1.96, and Z_β = Standard normal deviate (SND) value for β (beta) error = 0.84 (value corresponding to power of 80% on the z-score table). Also, P_1 = 55.1% = 0.551 = Proportion of respondents in an urban community who have used the health facility over a one-month period (14). P_2 = 33.8% = 0.338 = Proportion of respondents in a rural community who have used the health facility over a one-month period (23). Finally, d = minimum difference to be detected (P_1-P_2).

After adjusting for 10% non-response, the minimum sample size calculated was 91. However, 250 respondents were used for the study population in each of the two communities (rural and urban) respectively. The reason for the expanded sample size was to allow for appropriate analysis such as cross-tabulation; to provide the desired level of accuracy in the estimate of proportion and to allow a validity of significance test and generalizability of the findings.

Sampling techniques

The study population was selected using a multi-stage sampling technique. The sample selection was divided into two strata (i.e., rural and urban communities). A sampling of the two strata occurred independently of each other due to the comparative nature of the study. Ilorin East had a good representation of urban and rural communities.

Stage 1: Selection of wards

From the list of rural and urban communities, a simple random sampling technique by balloting (without replacement) was used to select one-third of the wards which translated to two (2) in the rural and two (2) wards in the urban area respectively. One-third was chosen because of limited resources.

Stage 2: Selection of communities/settlements.

From the selected wards two villages were randomly selected out of the list of villages in each ward in the Local Government Area. There were over fifty (50) villages and the selection of two was due to limited financial and human resources.

Proportional allocation was done for each of the selected communities/settlements to determine the number of respondents from each community/settlement depending on the population of the respective community.

This was carried out using the formula:

$$= \frac{\text{Population of community}}{\text{Population of all communities}} * \text{Sample size} \quad (22)$$

Thus, proportionally allocated populations for the respective communities/settlements were:

Urban settlements; 1) Okelele (77), 2) Dada (50), 3) Karuma (84), and 4) Ojagboro (72). For the rural villages, there were; 1) Oke-Ose (49), 2) Idi-Igba (43), 3) Panada (66), and 4) Budo-Oyo (59).

Stage 3: Selection of houses

For each community, the houses that made up the community were counted using the existing National Programme on Immunization numbers. The listing of the houses in the community constitutes the sampling frame. A systematic

sampling technique was employed in selecting the houses that were involved in the study. However, a sampling interval was calculated to determine the mode of selection of the enumerated houses in the respective villages/settlements selected in stage 2. Therefore, the n^{th} value (i.e., Sampling interval) for urban and rural communities were as calculated above with different values due to differences in the population sizes.

Random numbers were allocated to selected houses for easy identification and selection. The first house was selected from the list of generated random numbers. Further selections were conducted following the calculated sampling interval until the sample size was completed.

In houses where there was more than one household, simple random sampling techniques by balloting were used in selecting the head of household to be interviewed. In situations where the head of a selected household cannot be interviewed or declined to be interviewed the next household was visited until an eligible respondent was obtained while maintaining the sampling interval. It is important to note that the head of a household was anyone that the household members recognize as the head and seen as the decision-maker. Households were groups of individuals eating from the same pot, whether related by birth or otherwise (24). The study participants (heads of households) for the focus group discussion (FGD) were selected using the purposive non-random sample selection method- it provides the researcher the power to select suitable participants freely depending on the ability to provide needed information.

Data collection instruments

The study utilized an interviewer-administered structured questionnaire for quantitative data collection and the qualitative aspect involved an FGD guide tailored along the general and specific objectives of the study. The questionnaire contained questions to obtain information in line with the general and specific objectives of the study.

The questionnaire was divided into section A: which elicited the socio-demographic characteristics of the respondents. Section B: part had questions on the knowledge of respondents on the availability of health care services in their community. Section C: contained questions on the utilization of health services. Section D: Had questions on factors that influence health service utilization.

The FGD guide was subdivided into five sections or thematic areas. An initial opening statement, section A: made up of questions on knowledge of participants on availability of health care services in their areas, section B: client's utilization of services provided by the health personnel; section C: factors that influence clients' utilization of health services provided, at the end of which there were closing questions. The FGDs were made up of two homogenous groups, consisting of male/female were interviewed separately and were members of the selected communities in Ilorin East Local Government Area.

Pre-testing of instrument

Ten percent (10%) of the estimated sample size (for the urban and rural communities) comprising the questionnaire and FGD guide was pre-tested in Alanamu and Odore (about 30km and 50km from the study area, respectively) in Ilorin West Local Government Area of Kwara State because they had similar socio-demographic characteristics with Ilorin East Local Government Area. After which appropriate corrections were made to the questionnaire to ensure validity. Pre-tested questionnaires were used to identify problems with the validity of the test instrument and interpretation and analysis of data obtained from it.

Data collection and analysis

The data analysis was done using SPSS software version 16. A scoring system was used for rating the respondent's knowledge on utilization of health services by awarding '1' for correct answer and '0'for wrong answer. The knowledge scores were generated giving minimum and maximum obtainable scores of 0 and 9 respectively. A respondent with a score of 0-3 was assessed as having poor knowledge, a score of 4-6 as having fair knowledge, and a score of 6-9 was rated as having good knowledge (24). Dependent variables were summarized using frequencies and percentages and comparisons were done between the rural and urban communities. Test of association was done using chi-square, level of significance set at $\alpha < 0.05$ (5%). The predictive factor was determined using multiple regression analytic methods. The independent variables entered into the logistic regression model were those that were significant at 5% ($p < 0.05$) on multivariate analysis.

The FGD consisted of eight (8) participants in each homogenous group, a total of four sessions were conducted (two in the rural community and two sessions in the urban community), and each

group had one session, which lasted about one and half hours. Research assistants were trained as recorders (using a tape recorder and note-taking) of the session while the Researcher conducted the interview sessions. The line of discussion was tailored towards the general and specific objectives of the study. The sitting arrangement was circular using chairs and/or benches with the interviewer positioned in such a way that he faced the group to ensure eye contact. The essence of the FGDs was explained to the respective groups and their consent was obtained. The tools for the FGD included an FGD guide, a tape recorder, note pads, and a camera. However, consent of the respondents was sought before photographs were taken.

The FGD recorded sessions on tape were transcribed into notes. The transcripts were then processed, coded and interpreted, and summarized using the prose version of reporting method along the thematic areas. A logbook was prepared and used to chart all the responses from the participants

Results

In table 1, the mean age of the urban respondents was 37.1±7.9 years and 42.6 ±13.7 years for rural. Total male participation was 202(40.4%) out of which rural accounted for 109(53.96%) and urban 93(46.04%)) while total female participation was 298(59.6%). Majority of respondents in both rural 200(80.0%) and urban 151(60.4%) were married, monogamy setting was 122(80.8%) in urban versus 171(76.3%) in the rural community (p-value= 0.01). About 203(81.2%) urban and 241(96.4%) rural respondents were employed. Almost half of rural respondents 112(46.5%) were farmers while about two-thirds 124(61.1%) of urban respondents were traders, this was found to be statistically significant (p-value=0.01)

Table 1: Socio-demographic variables of rural and urban.

Variables	Urban (%)	Rural (%)	χ^2	df	p-value
Age Groups (years)	**n = 250**	**n = 250**			
20 – 29	39 (15.6)	32 (12,8)			
30 – 39	99 (39.6)	78 (31.2)			
40 – 49	90 (36.0)	68 (27.2)			
50 – 59	22 (8.8)	45 (18.0)			
≥ 60	0 (0)	27 (10.8)			
Mean ± S D	**37.1 ± 7.9**	**42.6 ± 13.7**			
Sex					
Male	93 (46.04)	109 (53.96)			
Female	157 (52.68)	141 (47.32)			
Marital status	**n =250**	**n = 250**			
Single	99 (39.6)	26 (10.4)			
Married	151 (60.4)	200 (80.0)			
Divorced	0 (0)	15 (6.0)			
Widowed	0 (0)	9 (3.6)	48.385	2	0.01
Marriage type	**n =151**	**n =223**			
Monogamy	122 (80.8)	171 (76.3)			
Polygamy	29 (19.2)	52 (23.7)	1.048	1	0.31
Religion	**n =250**	**n =250**			
Islam	154 (61.6)	149 (59.6)			
Christianity	96 (38.4)	95 (38.0)			
Traditional	0 (0)	6 (2.4)	0.015	2	0.91
Employment status	**N=250**	**N=250**			
Employed	203 (81.2)	241 (96.4)			
Unemployed	47 (18.8)	9 (3.6)	29.038	1	0.01
Occupation	**n = 203**	**n =248**			
Farming	0 (0)	112 (45.0)			
Trading	124 (61.1)	72 (29.0)			
Civil servant	77 (37.9)	32 (13.0)			
Artisan	2 (1.0)	32 (13.0)	69.124	3	0.01

Estimated monthly income in naira	**n =207**	**n =238**			
<5000	0 (0)	23 (9.7)			
5000-14999	48 (23.2)	42 (17.6)			
15000-24999	41 (19.8)	63 (26.5)			
25000-34999	83 (40.1)	40 (16.8)			
35000-44999	22 (10.6)	11 (4.6)			
45000 and above	13 (6.3)	59 (24.8)	74.343	5	0.01
Average income (Naira)	30,000	20,000			

From table 2, on sources of information on available services, health workers 131(37.2%) were the predominant source of information among rural respondents versus relatives of respondents 123(34.9%) in the urban community (χ^2 = 7.356, p-value = 0.01). Most of the health facilities were PHCs-rural communities had 211(84.4%) of the distribution and urban had 138(55.2%). Others were secondary facilities which constituted 73(14.6%) of the total number of health facilities in the study communities (rural had 22(8.8%) and urban 51(20.4)) these distributions were found to be statistically significant (p-value=0.01). When respondents were rated on the knowledge of available health facilities and services provided, most respondents had a fair knowledge rating of 368 (73.6%), those with good knowledge were 53(10.6%) and poor knowledge were 79(15.8%).

Table 2: Respondents' knowledge on sources of information and available healthcare facilities in urban and rural communities

Variables	**Urban (%)**	**Rural (%)**	**χ^2**	**Df**	**p-value**
Sources of Information	**n =259****	**n =352****			
Health Workers	56 (21.6)	131 (37.2)	17.085	1	0.01
Relatives	64 (24.7)	123 (34.9)	7.356	1	0.01
Friends	23 (8.9)	54 (15.3)	5.655	1	0.02
Radio	51 (19.7)	15 (4.3)	36.869	1	0.01
Newspaper	41 (15.8)	22 (6.3)	14.808	1	0.01
Television	24 (9.3)	7 (2.0)	16.409	1	0.01
Available Health facilities	**n =250**	**n =250**			
Primary Health Facility	138 (55.2)	211 (84.4)			
Secondary Health Facility	51 (20.4)	22 (8.8)			
Tertiary Health Facility	61 (24.4)	17 (6.8)	25.421	2	0.01
Knowledge of services provided	**n =250**	**n =250**			
Yes	197 (78.8)	234 (93.6)			
No	53 (21.2)	16 (6.4)	23.017	1	0.01
Services provided	**n =261****	**n =442****			
Outpatient treatment	94 (36.0)	130 (29.4)	1.279	1	0.21
Delivery	32 (12.3)	112 (25.3)	48.194	1	0.01
Immunization/Family planning services	68 (26.1)	83 (18.8)	4.618	1	0.01
Antenatal care	29 (11.1)	66 (14.9)	11.695	1	0.01
Surgical operations	21 (8.0)	8 (1.8)	3.737	1	0.02
Pharmacy/Sales of drugs	17 (6.5)	43 (9.8)	11.803	1	0.01
Knowledge rating					
Good (7-9)	25 (10.0)	28 (11.2)			
Fair (4-6)	183 (73.2)	185 (74.0)			
Poor (0-3)	42 (16.8)	37 (14.8)	0.497	2	0.779
Mean Knowledge score	t = 0.508				0.612

**Multiple responses

Table 3 shows the utilization of health facilities, among urban respondents' utilization, were 178(71.2%) compared with the rural communities 223(89.2%) (z- Score = 27.93). This was found to be statistically significant (p-value = 0.01). However, 145(81.5%) of urban respondents had made 1-2 visits to the health facility in the community in the last 1 month compared with

159(71.3%) among the rural respondents (χ^2 = 13.298, p-value = 0.04). About 139(31.5%) of rural respondents had utilized outpatient services as against 98(37.5%) of urban respondents. A higher proportion of respondents in the rural communities 106(24.0%) utilized delivery services compared to urban respondents of 36(13.8%). The uptake of immunization and family planning activities was higher among urban respondents 60 (23.0%) compared to the rural respondents 84 (19.0%). This was also found to be statistically significant (p-value = 0.01).

Furthermore, in table 3 reasons for using health facilities again were presented, such as friendliness of health care workers 78(34.1%) in the rural and 63(32.9%) in the urban. Availability of drugs was also a major reason for visiting facility again 54(28.3%) in urban and 42(18.3%) in the rural. This finding was statistically significant (p-value = 0.02). In addition, waiting time at the health facilities was found to be a better determinant of reasons for using health facilities with a mean value of z-score=1.408; p-value = <0.01.

Table 3: Respondent's utilization of healthcare facilities among rural and urban communities.

Variables	Urban (%)	Rural (%)	χ^2	df	p-value
Ever used health care facility	**n = 250**	**n = 250**			
Yes	178 (71.2)	223 (89.2)			
No	72 (28.8)	27 (10.8)			
Mean ± SD	**0.768± 0.54**	**0.960 ± 0.96**			
Current Use in Last 1 Month	**n = 178**	**n = 223**			
Nil	14 (7.9)	17 (7.6)			
1-2	145 (81.5)	159 (71.3)			
3-4	19 (10.6)	34 (15.3)			
5 and above	0 (0)	13 (5.8)			
Mean No. of Visit	**1.44± 0.38**	**1.58 ± 0.35**			
Health services utilized (ever used)	**n = 261****	**n = 442****			
Outpatient treatment	98 (37.5)	139 (31.5)	1.389	1	0.24
Delivery	36 (13.8)	106 (24.0)	48.194	1	0.01
Immunization/Family planning services	60 (23.0)	84 (19.0)	5.618	1	0.02
Antenatal care	31 (11.9)	62 (14.0)	12.695	1	0.01
Surgical operations	19 (7.3)	8 (1.8)	4.737	1	0.03
Pharmacy/Sales of drugs	17 (6.5)	43 (9.7)	12.803	1	0.01
Reasons for using health facility(ever used)	**n = 193**	**n = 229**			
Friendliness of health workers	63 (32.6)	78 (34.1)	5.411	1	0.02
Availability of drugs	54 (28.1)	42 (18.3)	5.826	1	0.02
Waiting time	7 (3.6)	24 (10.5)	23.601	1	0.01
Proximity to residence	45 (23.3)	49 (21.4)	2.274	1	0.03
Cheap and affordable	24 (12.4)	36 (15.7)	10.163	1	0.01

**Multiple Responses

In table 4, most of the respondents in the rural community 237(94.8%) attested to having geographical accessibility to the health facility in their community compared with 201(80.4%) with similar accessibility in urban communities (χ^2 = 23.866, p-value = 0.01). More than half of the rural 126(53.2%) and urban 117(58.2%) respondents lived within <5.0km distance from the health facility while a higher proportion of rural respondents 30(12.6%) traveled>10km distance before accessing modern health care compared to their urban counterpart 18 (9.0%). The mean distance travel by rural respondents was 4.813±2.1km which was higher compared to 4.382±1.2km traveled by the urban respondents.

The views of some of the urban FGD participants corroborate the findings in the quantitative study, some of the responses were that" They *do lots of work in the health center especially the government own, for instance, our women deliver there, we the men also go there for treatment anytime we are sick".* A similar opinion was expressed by the rural FGD participants on the effect of distance and health care utilization by the community members" I *stay in a very distant place but I still make effort to go to the hospital because health is wealth, so I take "Okada" to and from or sometimes trek if time is on my side.* Another participant commented, *"There are some far away villages that use this health facility*

(PHC) for some of them they come here by commuter buses or private vehicle especially people who stay in Oke-Oyi".

The cost was also a significant factor in access to care, in this study 202 (80.8%) of urban respondents believed that cost of care was expensive compared to 58 (23.2%) of rural respondents who believed the cost of care was expensive. A greater proportion 136 (54.4%) of rural respondents believed that care was moderate compared to 29 (11.6%) of urban counterparts who said costs were moderate. The mean cost of indirect care i.e., cost of cards (265±29.7 naira) and transportation (279±38.4 naira) were higher among urban respondents compared with the cost for cards (154±17.9 naira) and transportation (108±19.9 naira) among rural respondents, these were statistically significant (p-value = 0.01). The direct cost of care contrast sharply with indirect cost, rural respondents paid a far higher amount (1,320±141.9 naira) compared to the urban respondents (750±90.8 naira) and were also statistically significant (p-value=0.01).

Table 4: Geographical accessibility/distance Cost of accessing care among rural and urban

Variables	Urban (%)	Rural (%)	χ^2	df	p-value
Geographical accessibility					
	n =250	**n =250**			
Yes	201 (80.4)	237 (94.8)			
No	49 (19.6)	13 (5.2)	23.866	1	**0.01**
Distance to the health facility					
	n =201**	**n =237****			
< 5.0km	117 (58.2)	126 (53.2)			
5.0 - 10.0km	66 (32.8)	81 (34.2)			
> 10.0km	18 (9.0)	30 (12.6)			
Mean Distance	**4.382±1.20**	**4.814±2.1**			
Cost of Health Services	**n =250**	**n =250**			
Expensive	202 (80.8)	58 (23.2)			
Moderate	29 (11.6)	136 (54.4)			
Cheap	19 (7.6)	56 (22.4)	**85.606**	**2**	**0.01**
Indirect cost	**Mean± SD (#)**	**Mean ± SD (#)**	**t-test**		
Cost of card	265 ± 29.7	154 ± 17.9	36.961		0.01
Cost of Transportation	279 ± 38.4	108 ± 19.9	47.002		0.01
Direct cost	**Mean ±SD (#)**	**Mean ± SD (#)**			
Overall cost of care	750±90.8	1,320±141.9	32.356		0.01

**Multiple Responses

Table 5- shows the predictors of utilization of health services, friendliness of health care workers, availability of drugs, the proximity of residence, and cheap and affordable services were identified as factors statistically significant at p-value< 0.05 and were responsible for the utilization of health care facilities among urban respondents. Of all the factors it was, however, observed that waiting time was the strongest of the predictors (OR-1.012, CI-0.192-5.337) identified among urban respondents with an odds ratio of 1.012, though not statistically significant (p-value = 0.989). In addition, the availability of drugs was the strongest of the predictors (OR-1.696, CI-0.486-5.912) identified among rural respondents with an odds ratio of 1.696 this was also not statistically significant (p-value = 0.407).

Table 5: Predictors of Utilization of Health Care Services by Urban and rural communities

Variables	Odds ratio	95 % C. I	p-value
Urban Community			
Others (RC)			
Friendliness of health care workers	0.750	0.406-1.387	0.359
Availability of drugs	0.683	0.360-1.297	0.243
Prompt attention	1.012	0.192-5.337	0.989¥
Proximity of residence	0.879	0.425-1.816	0.727
Cheap and affordable	0.980	0.388-2.475	0.967
Rural Community			

Others (RC)			
Friendliness of health care workers	0.702	0.315-1.564	0.387
Availability of drugs	1.696	0.486-5.912	0.407$^{\sigma}$
Prompt attention	0.372	0.155-0.896	0.027
Proximity of residence (RC)	0.736	0.314-1.728	0.482
Cheap and affordable	0.549	0.232-1.298	0.172

RC-Reference category
¥-Strongest predictive factor for the urban community.
σ – Strongest predictive factor for rural community

Discussion

This study found most respondents had secondary education, although there were more tertiary-educated respondents in the urban than the rural community. Education is good as a foundation to understanding health demands and seeking health when the need arises both in the rural and urban communities. The importance of education and knowledge development was again emphasized by a study conducted among rural Pakistanis (25) on health-seeking behavior and health service utilization, reasonably the high proportion of respondents with secondary education in this study is a positive influence on health-seeking behavior both among the rural and urban communities. The significance of improving knowledge to ensure adequate health care utilization was also demonstrated in the Akure study (18), the study found that to improve healthcare utilization there must be adequate knowledge by community people. Most of the respondents in both the rural and urban communities had a fair knowledge of available health facilities and the services they provided. This finding is good as it would encourage participation and improve healthcare utilization by both rural and urban communities (24).

This study found the proportion of healthcare utilization (ever used) among the urban respondents to be slightly lower than what was observed among the rural respondents, this contradicted the findings in Cross-River (10), Ibadan (26), and Kogi (27) states all in Nigeria, where lower utilization was reported among rural inhabitant compared with their urban counterpart. A similar study in Ekiti (23) revealed that rural women were less likely to use antenatal care than urban women. Two important factors played role in the findings in our study, in the first instance a tertiary health center, the university teaching hospital is located close to one of the selected rural communities, and therefore, it was easy for the rural inhabitant to access the health facility. However, there is an increasing awareness of the importance of health care utilization among these rural community members and it is a confirmation of the need to provide health facilities close to rural communities (28, 29, 30).

Utilization in the preceding one month before the study showed that most respondents in the rural community had visited health facilities in their community between 1-2 times more than their urban counterparts. The findings in this study were supported by the result of an appraisal of factors preventing utilization of health services among the rural population in Owerri, South-East, Nigeria (28). The study showed that health care providers in the rural areas were not only a few but have been deprived of necessary tools for service delivery, as a result, rural health care is at risk; the consequences to healthcare delivery were identified in a southern Nigerian study (31) as inadequate health personnel, diagnostic services available in some urban centers were also found to be non-existent in rural areas by Siraff T. in Ashanti region of Ghana (32).

From the foregoing, this study showed that if facilities in the rural communities had enough personnel and resources, rural dwellers would use healthcare services as much as their urban counterparts. Apart from surgical services which were better utilized by the urban respondents more than the rural counterpart, all other services were more utilized by rural dwellers as indicated in this study. This finding contradicts some publications which predicted more service utilization among the urban respondents (10, 23, 26, 27). The higher utilization of surgical services seen among the urban community was due to the availability of necessary equipment and personnel to carry out surgical procedures as against rural facilities where such might be lacking. However, data from current usage, showed that rural communities would use all services if personnel and equipment were made available (23, 27).

The factors identified in this study that influence healthcare utilization were either health-related or non-health-related factors. The non-health-related factors were geographical accessibility. The study showed that in terms of distance, the clinics were accessible as most of the participants

lived within 5km of such facility. Also, in this study, a substantial proportion of the rural respondents affirmed that they were geographically accessible to health facilities within their community. Most of the rural respondents claimed to visit health facilities by trekking within <5km distance to their houses. The implication of this finding to healthcare utilization is that if the government provides health facilities within <5km distance it would go a long way in improving healthcare utilization.

In the same vein, a study in Ekiti (23), Ghana (32), and South Africa (33) revealed that distance was a stronger predictor of attendance of antenatal care in a study on urban-rural differentials of antenatal care utilization. This discovery, therefore, reinforced the need to ensure the availability of health facilities within proximity especially in the rural community where means of transportation could be a major problem to health care utilization.

Health service-related factors affecting healthcare utilization in this study were the friendliness of health personnel, availability of drugs, waiting time, and proximity of health facilities to place of residence. This study found that waiting time was a strong determinant of healthcare utilization among urban respondents, compared with the availability of drugs in the health facilities which was the strongest predictor among rural respondents.

A study in Ibadan (26) found that good services, facilities near to residence, waiting time, drugs were available, services were available, health workers were competent, services were accessible and drugs were affordable as factors that determined utilization of primary health care among urban respondents. Although the Ibadan study (26) does not subject their findings to logistic regression, a higher proportion of the urban respondents believed that good service and facilities close to their houses were the most favored determinants of utilization. The overall implication of this finding was that to ensure adequate utilization of modern health facilities among the rural community members there must be access to subsidized and quality drugs in the PHC facilities and the need for government to strengthen drug revolving scheme to ensure availability of drugs.

This study found a mean earning among urban respondents to be almost twice as high as their rural counterparts, this is not uncommon as urban respondents were mostly civil servants while their rural populace was mostly peasant farmers who earn from the proceed of farm produce. Despite low earning among the rural community members, a study (30) showed that they pay disproportionately more to access healthcare compared with their urban counterparts. This might not be unconnected with a higher mean cost of direct and indirect health expenditure in the rural compared with the findings among the urban respondents. Economic power to utilize health services was not so very different globally, for instance, the World Health Organization report estimated 76 percent of Total Health Expenditure in India were out of pocket which directly affects health care utilization especially among the rural poor and urban living in slums scattered across the country (29).

The cost of health care services has been identified as a major factor in utilization. The influence of cost on health facility utilization was reported in a study in South-west, Nigeria which concluded that cost/payment for services was more likely to predict the use of public health facilities than the usual health care providers (34). This study found a mean cost of assessing health services among urban respondents to be lower compared with the cost of assessing health care in the rural community.

The findings in this study were similar to that of a related study in Afon and Ajasse areas of Kwara State, North-central, Nigeria (35) which revealed that the poor spend disproportionately more than the “rich” on health care. The poorest quintile in the study spends on an average higher proportion of their annual per capita consumption on out-of-pocket for health care and transportation to health facilities as compared with the richest quintile that spends a lower proportion of their annual per capita consumption out-of-pocket and on transportation for health care (35). The implication of this high rate of out-of-pocket payment could have been responsible for alternative health-seeking behaviors such as patronage of herbalists and self-medication as discovered among the FGD rural participants who lamented that***” treatment in the hospital is more expensive than traditional setting that is why some people prefer to go to them.”***

A study on crises and challenges in the Nigerian health sector emphasized the significant impact other sectors played in the need to provide equitable health and sustainable development in a way to maximally advance public health (36). These were captured among the opinion of respondents in this study on the trend of health system-related problems facing health care facilities in rural and urban communities. Some of the problems identified in this study facing health

service delivery in both the rural and urban communities include long travel distances, poor road network, lack of drugs especially in public health facilities, obsolete equipment, lack of staff, and expensive service delivery. A study in Ilorin, North-central, Nigeria identified similar factors as a hindrance to access and utilization of approved health facilities in related settings (37).

Conclusion

This study demonstrated a higher proportion of rural respondents had ever used health facilities compared to urban respondents. It also showed that knowledge is a vital requisite for health utilization, this study identified several predictors of healthcare utilization among the rural and urban respondents among which were the friendliness of health care workers, availability of drugs, waiting time, and proximity of residence to the health facility with cheap and affordable services. Information on healthcare utilization has an important policy implication in health systems development.

Sequel to the findings from this study, the following recommendation was therefore made to improve healthcare utilization among rural and urban communities:

1. There must be increase awareness among the people of the need to be healthy; this can also be achieved through enhancing the educational status of especially women in rural communities.
2. Training and retraining of health personnel on friendliness and putting up good attitude to encourage hospital visits among clients.
3. Also training and retraining of healthcare personnel on triaging of patients especially in urban clinics and hospitals where patient's turnout could often time be overwhelming.
4. The government at the state and local governments should reduce drug costs through subsidies and making essential drugs available. The availability of drugs in this study has been shown to improve hospital visits.
5. The access road is very important to ease of accessing healthcare services, government should continue to improve access to health facility especially in the rural communities.

Declarations

Ethics Consideration

Ethical approval for the study was obtained from the Ethical Review Committee, University of Ilorin Teaching Hospital with protocol number ERC PIN/2014/02/0157. Permission was sought from the heads of the selected wards and the Chairman of Ilorin East Local Government Area. The purpose and benefits of the study were explained accordingly. Informed written consent was also obtained (signature or thumbprint) from the study subjects before conducting the interview. Confidentiality of information provided was maintained. No injuries or adverse events were expected by participating in this study, and as such, no compensation was required.

Consent for publication

The authors hereby give consent for the publication of this work under the Creative Commons CC Attribution. Non-commercial 4.0 license.

Availability of data and materials

All data generated or analyzed in this study are included in this article and are available at any request.

Competing interests

The authors declare that they have no competing interests

Funding

None

Authors' contributions

Study design: AAK
Data collection: AA
Data analysis: AAK, OOY
Study supervision: ATM, OGK
Manuscript writing: AAK, OOY
Critical review for important intellectual content: AAK, OOY, AA, ATM, OGK

Acknowledgments

We express our thanks to all individuals who participated in the study: respondents, data collectors, and administrative officials.

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Tella *et. al.* BUMJ 2021 4(2):133-139
https://doi.org/10.38029/bumj.v4i2.93

Effect of a health-risk reduction training program on the knowledge and safe waste-handling practices among Waste-pickers in dumpsites in Ogun State, Nigeria

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Submitted: 21st September 2021
Accepted: 18th November 2021
Published: 30th December 2021
ID: Orcid ID

Abstract
Objective: This study assessed the effect of a health-risk reduction training program on waste-pickers waste-handling practices in dumpsites in Ogun State, Nigeria.
Methods: A quasi-experimental study was conducted among 60 waste-pickers recruited by multistage sampling technique divided into intervention and control group. There was a baseline assessment of waste-handling practices in both intervention and control groups using a structured interviewer-administered questionnaire. Thereafter, health-risk reduction training was given using lectures, and demonstrations. Three months after the intervention, another assessment of the same waste-pickers was conducted with the same instrument. Waste-handling practices and knowledge responses were measured on a 54-point rating scale and 17-point rating scale respectively. Data were analyzed using IBM SPSS version 23 to generate descriptive and inferential.
Results: At baseline, the waste-pickers in the control group had a mean waste-handling score of 17.80±6.89 while the experimental group had a mean of (17.97±5.47). After the training program, there was a statistically significant increase in the mean waste-handling score of the experimental group (47.30±3.28; *p*= 0.000) while there was no increase in the mean waste-handling score of the control group (17.80±6.89). This significant increase in the mean waste-handling score of the experimental group (53.83±0.38; p=0.000) was also observed at 3 month follow-up period.
Conclusion/Recommendation: The health-risk reduction training was effective in improving the waste-handling practices of waste-pickers. It is recommended that waste-pickers should be trained on proper waste-handling by the government.

Keywords: Dumpsite, Health-risk reduction, Knowledge, Waste-pickers, Waste-handling

Plain English Summary

Waste-pickers working in open dumpsites face the most direct risk of exposure to solid waste affecting their health. Hence, this study assessed the effect of a health-risk reduction training program on waste-pickers waste-handling practices in dumpsites in Ogun State, Nigeria. The quasi-experimental design was adopted involving a sample of 60 waste-pickers selected from two dumpsites in Ogun State assigned into the control and intervention groups. Before the training program, there was no statistically significant difference in the waste-picker mean waste-handling score in the control group and the intervention group (p>0.05) After the training program there was a statistically significant increase in the mean waste-handling score of the experimental group (47.30±3.28; *p*= 0.000) while there was no increase in the mean waste-handling score

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of the control group (17.80±6.89). This significant increase in the mean waste-handling score of the experimental group (53.83±0.38; p=0.000) was also observed during the third-month follow-up period. The results of that study showed that health-risk reduction training was effective in improving the waste-handling practices of waste-pickers.

Background

Nigeria with an estimated 200 million people accounts for 20% of the total population in sub-Saharan African (1). Municipal solid waste generation has been increasing due to waste generated daily by individuals in the country (2). This rapid population growth and industry has led to an increase in the use of materials capable of producing hazardous wastes. Waste is always generated when human beings engage in economic activities and various materials are used. Such waste can be hazardous or non-hazardous. When waste is not handled properly, it can pose a risk to the atmosphere, the water, soil, and living organisms (3). The waste generation rate in Nigeria is estimated at 0.65-0.95 kg/capita/day which gives an average of 42 million tonnes of wastes generated annually. This is more than half of 62 million tonnes of waste generated in sub-Sahara Africa annually and how and where to dispose of this waste becomes a huge problem for the nation; only about 20-30% of the waste is gathered and 70% are dumped in treacherous places (2, 4). It is common to find large heaps of garbage lying in a disorganized manner in and around cities as a result of the failure of municipal corporations to handle large quantities of waste (4).

Disposal of solid waste at a landfill site is the primary disposal method used in most developing countries including Nigeria (5). Most of the wastes dumped are decomposable materials while the remaining recyclables are picked up by waste pickers or scavengers (6). Waste-pickers were described as those who make a living by collecting and selling recyclable materials out of municipal solid waste (7). Scavenging is a widespread and regular activity in nearly all cities in developing countries. Some waste pickers work at a single site that holds a great quantity of waste like dumpsites, or transfer stations. While some are dynamic, collecting materials from factories, offices, stores, schools, hospitals, and residential areas. Others work at dumpsites, canals, and rivers where people dump their refuse (8). It is projected globally, that about two million persons work informally as waste pickers. These groups of persons are the first to suffer the consequences of the poor management of solid wastes (9). They engage in waste separation, waste reuse, aiding recycling, and reducing pressure on the environment. They often do not wear any protective equipment and face great risks of injuries linked to the type of material they are collecting (10). These waste pickers are vulnerable to injuries owing to a lack of the needed personal protective equipment (PPE) and consequently are faced with deplorable working conditions. Scavenging is therefore considered a treacherous occupation (11). Researchers have proposed that protective equipment which includes proper clothing, gloves, and boots should be made available to scavengers, to reduce pathogenic infections and improve their activities (12, 13, 14). Hence this study determines the effect of health-risk reduction training programs on knowledge and safe waste-handling practices among waste-pickers in dump-sites in Ogun State, Nigeria.

Methods

The present study was carried out at the Oke-Saje dumpsite and Ikoto dumpsite in Ogun State. A quasi-experimental study design was applied to assess the effect of health-risk reduction training on waste-pickers knowledge and waste-handling practices.

For the intervention program, 60 waste-pickers were selected; 50% of waste pickers (30) were subjected to the pre-developed educational health-risk training program (Intervention group) while the other 50% (30) was not and was designated as (Control group). Both groups were subjected to a pre-test and two post-tests, one immediately after the end of the intervention program, and the other, three months later. A predesigned and pre-coded interviewer-administered questionnaire was filled by the waste-pickers, to assess their waste-handling practices.

The knowledge question on solid waste-handling consists of seventeen questions. This evaluates the waste pickers' knowledge of solid waste handling/exposure, and the health effects of waste. It comprises multiple-choice and dichotomous of Yes/ No. The knowledge questions were scored as follows: score "1" for a correct answer, Score "0" for an incorrect answer, and for don't know. The total mean knowledge score was calculated for each question by summing up every category, and total scores were calculated (17x1=17) ranging from (0-17

points), then were adjusted out of 100 (0%-100%) and were graded as follows: poor knowledge (0-8.5points) and good knowledge (8.6-17).
The safe waste-handling practice questions were scored as follows: Score "2" for 'every time' answer, Score 1 for sometimes answer, and Score 0 for never answer
The total mean safe waste-handling score was calculated for each question by summing up every category, and total scores were calculated (27x2=54) ranging from (0 - 54 points); then were adjusted out of 100 (0%-100%) and were graded as follows: Good level of waste-handling practice (28-54 points) >50%, Poor level of waste-handling practice (0-27 points) ≤ 50%.

Intervention program
An intervention program was designed according to the results of the pre-test. The program was structured according to the needs of the waste-pickers under study. The training manual was prepared, reviewed, and tested before use. The training program was facilitated by the researcher who is an environmental health consultant.
Four training modules were delivered over four weeks; the participants' attended the sessions in the morning from 10:00 am to 11:30 am, once weekly. The methods used in the intervention program included: lectures and demonstrations. The contents of the four sessions of the health training intervention program were as follows: Environmental effect of solid waste, the importance of preventing exposure to solid waste from entering the body, diagnosis, first-aid, and treatment of disease-related to waste handling and disposal. There is also a practical demonstration of the use of PPE and personal hygiene.

Statistical analysis
Data were collected, revised, coded with their input to the statistical software IBM SPSS (Statistical Package for the Service Solution) version 23. Descriptive statistics including frequency distribution and percentages were performed. For quantitative variables, mean and standard deviation were calculated. Inferential statistics include *t*-test and Cohen d effect size. The two-tailed tests, alpha error of 0.05, and p-value less than 0.05 were considered significant.

Results
Socio-demographic Characteristics of the Waste-Pickers
The mean ages of the waste-pickers in the intervention and the control groups were 25.27±4.90 and 29.90±4.44 respectively. Their ages ranged from 18 to 43years. Most of the participants in the two groups were within the 24-29 age brackets. All the participants in the two groups were male. Half of the participants in the intervention were married while 60% in the control group were married. Most of the participants in the two groups were of the Islamic faith. While only 16.7% and 33.3% of the participants were Christians in the experimental and the control group respectively. Fifty percent of the participants in the experimental group had no formal education with only 6.7% of the participants with tertiary education, while 20% of the participants in the control group had no formal education with only 3.3% of the participants with tertiary education. Most of the participants in the two groups lived in temporary shelters in the dumpsite. Most of the participants in the two groups had been scavenging for between 5-6 years (See, Table 1).

Table 1: Socio-demographic characteristics of waste-pickers in the Experimental and Control Group

Variables	Experimental F (%)	Control N F (%)	Statistics	*p*-value
Age(years)	**25.27±4.90**	**29.90±4.44**	**F = 14.746**	**0.000**
18-23	13 (43.3)	1(3.3)		
24-29	13 (43.3)	15 (50.0)		
30-35	2 (6.7)	12(40.0)		
36-41	2 (6.7)	0 (0.0)		
42-47	0 (0.0)	2 (6.7)		
Gender				
Male	30(100)	30(100)		
Religion			**F = 2.231**	**0.141**
Christian	5 (16.7)	10 (33.3)		
Islam	25 (83.3)	20 (66.7)		
Marital Status			**F =0.592**	**0.445**

Married	15 (50.0)	18 (60.0)		
Single	15 (50.0)	12 (40.0)		
Educational Status			**F = 2.328**	**0.132**
Non-Formal	15 (50.0)	6 (20.0)		
Primary School	12 (40.0)	20 (66.7)		
Secondary School	1 (3.3)	3 (10.0)		
University Education	2 (6.7)	1 (3.3)		
Where do you live			**F = 4.193**	**0.045**
Rented Apartment	2 (6.7)	3 (10.0)		
Relative/Friends	1 (3.3)	1 (3.3)		
Own Home/ Family	0 (0.0)	1 (3.3)		
Temporary shelter in dump site	27 (90.0)	25 (83.3)		
How long have you been scavenging?			**F = 1.627**	**0.207**
1-5	7 (23.3)	6 (20.0)		
6-10	19 (63.3)	17 (56.7)		
11-15	4 (13.3)	7 (23.3)		

Baseline Knowledge and Safe Waste-handling Practices of Waste-pickers

The mean ± SD scores for the waste-pickers level of knowledge on waste handling practices in the experimental and control groups were 7.17±1.64 and 6.53±2.43. Only 30% in the experimental group, had good knowledge of waste handling practices while a much lower proportion 16.7 % in the control group, had good knowledge. When the waste-pickers mean scores of levels of knowledge on waste handling practices measured in this study were compared for the control and experimental groups at baseline, independent t-test computation showed that there was no significant difference (*P*>0.05) (See, Table 2).

Furthermore, the waste-pickers mean score and standard deviation for the control and the experimental groups were 17.97±5.47 and 17.80±6.89. All of the participants in the intervention group had a low practice of waste handling while 93.3% of the control group had low practice. When waste-pickers waste handling mean scores measured in this study were compared for the control and the intervention group at baseline, independent t-test computations showed no significant difference (*P*>0.05) (See, Table 2).

Table 2: Baseline knowledge and Safe Waste-handling Practices of Waste-pickers

Knowledge of Waste Handling Practices	Experimental F (%)	Control F (%)	Statistics t=value	*p*-value
Measured on a 17-point Rating Scale				
Poor (0-8.5)	21 (70.0)	25 (83.3)		
Good (8.6-17)	9 (30.0)	5 (16.7)		
Mean ± SD	7.17 ± 1.64	6.53± 2.43	1.18	0.24
Safe Waste-handling Practices				
Measured on a 54-point Rating Scale				
Poor	30 (100.0)	28 (93.3)		
Good	0 (0.0)	2 (6.7)		
Mean ± SD	17.97± 5.47	17.80± 6.89	0.104	0.918

The effect of the Training Program on Waste-picker Knowledge and Safe Waste-handling Practices

The effects of the training program are summarized in table three. Overall, the intervention group showed significantly higher mean knowledge scores than the control group at immediate post-intervention and follow-up period (P<0.05). The intervention group and control group had a mean knowledge score of 11.93±1.64 and 7.17±1.64 respectively at immediate post-intervention. At the follow-up period, the intervention group had a mean knowledge score of 14.37±2.86 while there was no increase in the mean knowledge score of the control group (7.17±1.64).

Furthermore, the waste-pickers safe waste-handling practices mean score for the

experimental group increases significantly at immediate post-intervention (47.30±3.28) compared with the control group mean score (17.80 ± 6.89) (p<0.05). Also, there was a significant increase in waste-handling practices of the intervention group compared with the control group at the follow-up period (p<0.05).

Table 3: The Effects of the Training Program on Waste-picker Knowledge and Safe waste-handling practices

Knowledge	Experimental Group			Control Group		
	Post intervention	Follow-up	p-value	Post intervention	Follow-up	p-value
Poor	0(0.0)	0(0.0)	0.001	25(83.3)	25(83.3)	0.62
Good	30(100)	30(100)		5(16.7)	5(16.7)	
Mean ± SD	11.93±1.64	14.37±2.86		6.53±2.43	6.53±2.43	
Waste-handling practices						
Poor	0(0.0)	0(0.0)	0.001	28(93.3)	28(93.3)	0.49
Good	30(100)	30(100)		2(6.7)	2(6.7)	
Mean ±SD	47.30±3.28	53.83±0.38		17.80±6.89	17.80±6.89	

*N/A-Cannot be computed

Comparison of the effect of the mean score of waste-pickers knowledge and Safe waste-handling practices between the baseline and the follow-up period

Evaluating the impact of the intervention on the waste-pickers level of knowledge on waste handling practices by comparing the baseline and the three months' follow-up means scores for the experimental group using paired sample t-test revealed that there was a statistically significant difference in the mean scores and the effect size computed indicating the magnitude of the differences in means between baseline and the 8th-week follow-up was significant. The intervention group had an effect size of -3.141 with a p-value of 0.000. However, the control group had no effect size since there was no difference in the mean scores between the baseline and follow-up period (ES=0.000; p=0.67) (See Table 4).

In addition, evaluating the impact of the intervention on waste-pickers safe waste handling practices by comparing the baseline and the follow-up means scores for the experimental group using paired sample t-test, revealed that there were statistically significant differences in the mean scores and the effect size computed indicating the magnitude of the differences in means between baseline and the follow-up period was significant. The intervention group had an effect size of -9.407 with a p-value of 0.000. However, the control group had no effect size since there was no difference in the mean score between the baseline and the follow-up period (ES=0.000; p=0.49) (See, Table 4).

Table 4: Comparison of the effect of the mean score of waste-pickers knowledge and waste-handling practices between the baseline and the follow-up period

Knowledge	Experimental Group				Control Group			
	Baseline	Follow-up	p-value	*ES	Baseline	Follow-up	p-value	*ES
Poor	21 (70.0)	0(0.0)	0.001	3.14	25(83.3)	25(83.3)	0.67	0.000
Good	9 (30.0)	30(100)			5(16.7)	5(16.7)		
Mean ± SD	7.17 ± 1.64	14.37±2.86			6.53±2.43	6.53±2.43		
Waste-handling practices								
Poor	30 (100.0)	0(0.0)	0.001	9.40	28(93.3)	28(93.3)	0.49	0.000
Good	0 (0.0)	30(100)			2(6.7)	2(6.7)		
Mean ± SD	17.97± 5.47	53.83±0.38			17.80±6.89	17.80±6.89		

*ES: Effect size

Discussion

This study evaluated the effect of a health-risk reduction intervention training program on waste-pickers knowledge and waste-handling practices in dumpsites in Ogun State, Nigeria. The result of the analysis of the present study revealed that all the respondents in the intervention and the control group were male; this is similar to the findings by Magaji and Dakyes (15) who established in their research that the practice was mainly conducted by males in Abuja. However, the result is at variance with a study done at Onderstepoort dumpsite in South Africa where it was reported that both males and females engaged in the business of waste picking (16). This disparity in result could be a result of the difference in the study area. The overall mean age of respondents in the intervention and the control group was 27.58±5.2years with the age bracket of 24-29years. The study showed that more than half of the respondents in the intervention and control group had primary education. This finding conforms to those of Simatele and Etambakonga (17), where it was established that the highest level of education attained by their respondents was a primary school. Contrary to this study was a study in South Africa where the majority of the respondents attained secondary educational status in both groups (16). The result also showed that most of the respondents in both groups lived in a temporary shelter near the dumpsite.

Furthermore, this study shows that the baseline data on knowledge and waste-handling practices of the waste-pickers in the experimental group and the control group had no significant differences. This explains that the experimental and control group were matched before the intervention. This finding is similar to the finding of Thirarattanasunthon et al, (18). The present study revealed significant improvement in waste-pickers knowledge regarding waste-handling after the intervention as compared with the control group. This indicates that the training program had a very good effect. This is due to the content of the training intervention program. The findings of the present study are supported by Thirarattanasunthon et al, (18) and Kumar, Somrongthong et al (19).

Concerning the waste-pickers waste-handling practices, this study revealed that there was a significant increase in the waste-pickers waste-handling practice after the training program, while the control remains the same. This finding is similar to the findings of Thirarattanasunthon et al, (19).

In conclusion, the health-risk reduction training led to a significant increase in the waste-pickers knowledge regarding waste-handling and also, improvement in their waste-handling practices. This implies that waste-pickers exposed to solid waste at dumpsites should be trained on how to properly use their protective equipment and adhere strictly to safety recommendations concerning routine work at these sites to help reduce health risks.

Declarations

Ethics approval and consent to participate

Written approvals from Babcock University Health Research Committee (BUHREC) and Ogun State Waste Management Authority (OGWAMA) were obtained, indicating that an academic research study within Oke-Saje and Ikoto dumpsites was to be done. The sample participants agreeing to participate voluntarily in the study were informed of the date of the program. Confidentiality was ensured throughout the study period and only code numbers were used instead of the participants' names.

Consent for publication

The authors hereby give consent for the publication of our work under the creative commons CC Attribution-Non-commercial 4.0 license.

Competing Interests

There is no competing interest.

Funding

The research was funded by researchers.

Authors' Contributions

TA formulated the title, collected data, did the data analysis, and prepared the manuscript. AM reviewed the literature and collected the data.

Acknowledgments

We wish to acknowledge the waste-pickers that took part in the study for their immense support.

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Daniel *et. al.* BUMJ 2021 4(2):140-150
https://doi.org/10.38029/bumj.v4i2.92

Knowledge, perception and preventive practices of COVID-19 among Primary Health Care workers in Ogun State, Nigeria

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Submitted: 21st September 2021
Accepted: 10th December 2021
Published: 30th December 2021
ID: Orcid ID

Abstract
Objective: This study was carried out to determine the COVID-19 knowledge, perception, and preventive practices among primary health care workers in Ogun state.
Methods: A descriptive cross-sectional study was carried out among 339 primary health care workers in Ogun state using self-administered questionnaires. Knowledge of COVID-19 was graded as good with a minimum score of 75% while perception was graded as good with a score greater than the mean scores. Preventive practices were categorized as good with minimum scores of 75%. Associations between knowledge, practice, and categorical variables were assessed using the chi-square test with the level of significance set at $p < 0.05$
Results: The mean age of respondents was 42.30 ± 8.73 years. The major source of information on COVID-19 was health training (99.7%). A total of 50.7% had good knowledge of COVID-19 while 42.8% had a good perception of COVID-19. The majority (92.9%) had good COVID-19 preventive practices. Length of years in service was significantly associated (p=0.024) with knowledge of COVID-19.
Conclusion: About half of the health care workers had good knowledge of COVID-19 while the perception of COVID-19 was poor. However, preventive practices carried out among the healthcare workers were good. Efforts should be made to further improve the knowledge and perception of primary health care workers as they play a vital role in the delivery of health care services in the state.

Keywords: COVID-19, knowledge, perception, preventive practices, health care workers

Plain English summary

COVID-19 came into the global picture in January 2020 and health care workers needed to respond immediately to contain the spread of the disease. Therefore, there is a need to assess the COVID-19 knowledge, perception, and preventive practices among healthcare workers to ensure that they do not aid the spread of the disease by their lack of knowledge which could make them prone to misinforming the public. This study set out to assess the knowledge, perception, and preventive practices of COVID-19 among primary health care workers in Ogun state. It was a study done at a specific point in time among 339 primary health care workers. From the study, the average age of the respondents was 42.30 ± 8.73 years. The major source of information on COVID-19 for respondents was health training. A total of 50.7% had good knowledge of COVID-19 while 42.8% had a good perception of COVID-19. The majority (92.9%) had good COVID-19 preventive practices. In conclusion, about half of the health care workers had good knowledge of COVID-19 while the perception of COVID-19 was poor. However, a preventive practice carried out among the healthcare workers was good. Efforts should be made to further improve the knowledge and perception of primary health care workers as they play a vital role in the delivery of health care services in the state.

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Background

Severe Acute Respiratory Disease Syndrome Coronavirus-2 (SARS-CoV-2) is a new form of coronavirus which was first reported in December 2019 following the occurrence of several cases of atypical pneumonia in the city of Wuhan in China. The virus has been confirmed to cause a form of illness known as COVID-19 (1). The World Health Organization declared the disease a public health emergency on January 30, 2020, and a pandemic by March 11, 2020 (2).

As of 28th June 2021, there were 180,654,652 confirmed cases globally and 3,920,463 deaths with the Americas being the most affected having slightly less than 50% of all the confirmed cases and the Western Pacific is the least affected with < 2% of confirmed cases. Africa is the second least affected with less than 4 million confirmed cases of the disease (3). As at that time, Nigeria had 167,467 confirmed cases and 2,119 deaths with the highest number of cases in Lagos state. Ogun state which is near Lagos had 4,684 cases and 51 deaths recorded (4).

The transmission of the disease was initially thought to be from animals to humans and thereafter human-to-human transmission has been reported. The latter occurs through direct, indirect, or close contact with people through infected secretions or respiratory droplets (5, 6). Airborne transmission can occur during medical procedures that generate aerosols even though it is not yet clear if it occurs in the absence of such procedures (5, 6). Transmission may also occur indirectly through touching surfaces that are contaminated with the virus in the immediate environment of an infected person. Although the virus has been detected in other biological samples such as urine and feces of some patients, there has been no published report of its transmission via feces or urine (5, 6).

COVID-19 usually presents with symptoms such as fever, fatigue, dry cough, malaise, and difficulty in breathing (7). Regular hand washing, social distancing, and respiratory hygiene such as covering the mouth and nose when coughing and sneezing are some of the primary preventive measures against the disease (8, 9).

Health care workers are very important stakeholders in the prevention and control of diseases within the healthcare settings and as agents of change within the community in which they live. They are likely to perform these roles effectively when they are armed with sufficient knowledge about the disease and how to prevent the spread of the disease both in the health care setting and in the community. Some studies have shown that health care workers have poor knowledge of the transmission of COVID-19. This is compounded with the recent infodemic around the COVID-19 epidemic (10, 11).

Primary Health Care (PHC) is the entry point to the nation's health care system and as such health care workers at this level come in contact with suspected or asymptomatic cases of COVID-19 in the course of their daily work activities which puts them at a high risk of exposure to the virus. Currently, there is no widely accepted treatment for the disease and this makes prevention of the disease crucial to its control. Therefore, a lack of understanding of the disease and how to prevent it will place the health care workers at risk of infection, and if infected can transmit the infection to members of their family and the community at large. In addition, there may be a delay in prompt diagnosis and subsequent management or referral of such patients suspected of having the virus if health care workers lack adequate information and a high index of suspicion for the disease.

At the onset of the pandemic in Nigeria, the Ogun State Government in collaboration with partners such as World Health Organization (WHO) and Nigeria Centre for Disease Control (NCDC) organized training for health care workers to strengthen preventive strategies and raise awareness of the disease. This study is important in a setting like the COVID-19 pandemic to understand health care workers' knowledge especially with rapid turnover of information within a context of ongoing misinformation about the disease. Hence this study aimed to assess the knowledge, perception, and preventive practices of COVID-19 among primary health care workers in Ogun State.

Methods

Study area and study period

This study was carried out in Ogun East Senatorial District in Ogun State, Nigeria between January and April 2021. Ogun State is located in southwest Nigeria. It has a total land area of 16,409.26sq.km. Its boundaries are Oyo and Osun States in the North, Ondo State in the East, Lagos in the South, and Republic of Benin in the West. The Capital of Ogun State is Abeokuta which lies about 100 km north of Lagos, Nigeria's business capital. The projected population of the State is 3,728,098 disaggregated into 1,847,243 males and

1,880,855 females according to the national census carried out in 2006. The main ethnic group in the state is the Yoruba ethnic group of Nigeria.
The state has 20 local government Areas and is divided into three (3) senatorial districts: Ogun East, Ogun Central, and Ogun West. The state has two (2) federal tertiary hospitals, one (1) state tertiary hospital, thirty-nine (39) public secondary health facilities, four hundred and fifty (450) primary health facilities, one (1) private tertiary facility, and nine hundred and four (904) private health facilities. Ogun East senatorial district comprises of 9 LGAs; Sagamu, Ikenne, Remo North, Odogbolu, Ijebu North, Ijebu North East, Ijebu Ode, Ijebu East, and Ogun Waterside

Study design
This study was a descriptive cross-sectional study.

Study population
Health care workers in primary health centers in Ogun East Senatorial District.

Sample size and sampling method
A total of 339 respondents were recruited for the study. Participants were selected using a two-stage sampling method. The first step was the selection of five Local Government Areas out of 9 using a simple random sampling method. Next, four Primary Health Care facilities were selected from within each selected Local Government by simple random sampling. Every primary health care staff available at the time of the study were then recruited.

Data collection
Data were collected using a self-administered, semi-structured questionnaire made up of three sections. The first section contained questions on sociodemographic characteristics of the participants while the second, third, and fourth sections consisted of questions on knowledge, perception, and preventive practices of COVID-19 respectively. The questionnaires were pretested among health workers in another senatorial district within Ogun state before administration and adjustments were made where needed.

Measurements
Knowledge of COVID-19 was measured using 13 items. Each correct item was coded as '1' while an incorrect answer was coded as '0'. The total score was calculated (range 0-13) and categorized. Respondents who had scores ≤ 75% were considered as having poor knowledge. while those with scores above 75% were considered as having good knowledge.
Perception of COVID-19 was measured using 13 items. These were answered using a 5-point Likert scale: strongly agree, agree, not sure, disagree, strongly disagree. These were scored from five (strongly agree) to one strongly disagree for positively worded questions. Negatively worded questions were recoded to ensure adequate scoring. Higher values indicated good perception. The cumulative perception score was then computed (range 13-65). Respondents who scored ≤ mean score were categorized as having poor perception while those who scored above the mean score were categorized as having good perception.
The practice of COVID-19 prevention methods was measured using 12 items with 'Yes', 'No', or 'Sometimes' as answers. A score of '2' was given for a 'Yes', '0' for 'No' and '1' for 'Sometimes'. The total practice score was computed (range 0-24). Respondents with scores of < 75% were categorized as poor practice while those with scores ≥ 75% were categorized as good practice.

Data Analysis
Data collected was cleaned and analyzed using IBM SPSS Statistics for Windows, Version 20. Results were presented as tables and charts. Descriptive analysis was done for variables as necessary. Chi-square was used for the bivariate analysis of variables with the level of significance set at $p < 0.05$.

Results

Table 1: Sociodemographic characteristics

Variable	Frequency	Percentage
Age group		
<45	196	57.8
≥45	143	42.2
Mean = 42.30 ± 8.73		
Sex		
Male	43	12.7
Female	296	87.3
Marital status		

Single	43	12.7
Married	277	81.7
Divorced/separated/widowed	19	5.6
Family type (n=330)		
Monogamous	249	75.5
Polygamous	81	24.5
Educational Level		
Primary	8	2.4
Secondary	25	7.4
Tertiary	306	90.3
Tribe		
Yoruba	322	95.0
Igbo	9	2.7
Hausa	6	1.8
Others	2	0.5
Religion		
Christianity	273	80.5
Islam	61	18.0
Others	5	1.5
Occupation		
Doctor	6	1.8
Nurse	30	8.8
Community Health Extension Worker	143	42.2
Environmental Health Officer	42	12.4
Others	118	34.8
Service years		
≤ 10 years	98	28.9
11-20 years	150	44.2
>20 years	91	26.8
Mean service years = 15.69 ± 8.32		
Attended Covid training		
Yes	241	71.1
No	98	28.9

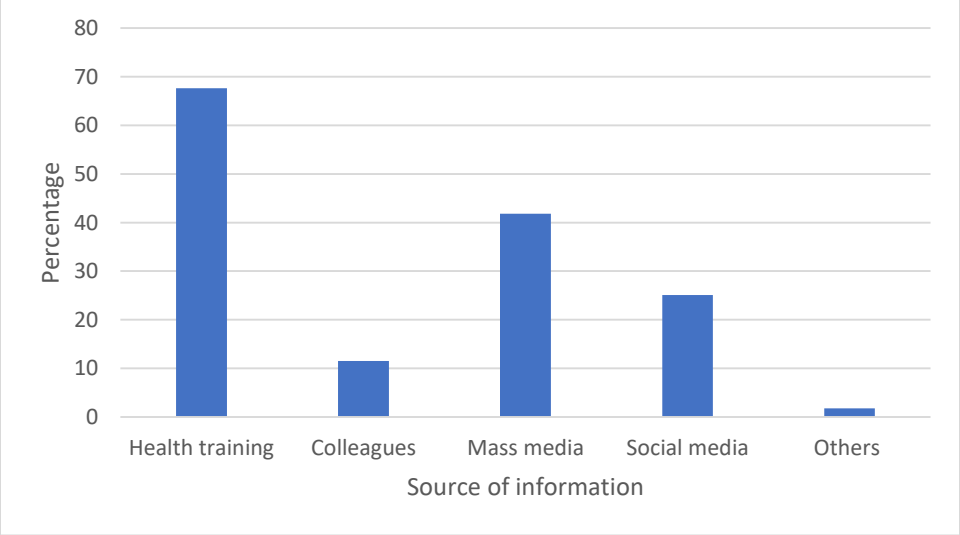


Figure 1: Source of information on COVID-19

Table 1 shows the sociodemographic characteristics of the respondents. Over half of them were aged ≤42 years with the majority of them being females (87.3%). About three-quarters of the respondents were married and 73.5% were from a monogamous family. Most participants had tertiary-level education with a large number being Christians. More than half of them (71.1%) had attended a COVID-19 training with 70.1% having attended training that lasted for less than one week.

The majority of the respondents got their information from health training (67.6%) followed by mass media (41.8%%), social media (25.1%), and colleagues (11.5%).

Table 2a: Knowledge of COVID-19 among primary health care workers

Variables N = 339	Frequency	Percentage
What is the cause of COVID-19?		
Bacteria	17	5.0
Fungi	1	0.3
Virus	309	91.2
I don't know	12	3.5
***How is COVID-19 transmitted?**		
Air droplets (from patient sneezing or coughing)	272	80.2
Mosquitoes/flies	2	0.6
Contact with contaminated surfaces	163	48.1
Close contact with people who have the virus	214	63.1
How long does it take from contacting the disease to the showing of symptoms (Incubation period)?		
Less than 7 days	53	15.6
1-14 days	206	60.8
2-21 days	13	3.8
I don't know	67	19.8
***Which is a symptom of COVID-19?**		
Fever	330	97.3
Runny nose	282	83.2
Dry cough	306	90.3
Breathing difficulty	324	95.6
Muscle pain	161	47.5
Fatigue	162	47.8
Bleeding	41	12.1
Who can get infected with COVID-19?		
Old people only	5	1.5
Young adults only	4	1.2
Anyone can be infected	330	97.3
Is it possible for a COVID-19 positive person to show no symptoms?		
Yes	246	72.6
No	81	23.9
I don't know	12	3.5

*Multiple responses allowed

Table 2b: Knowledge of COVID-19 among primary health care workers

Variable N = 339	Frequency	Percentage
***What can kill the organism that causes COVID-19?**		
Diluted chlorine	217	64.0
Alcohol based sanitizers	314	92.6
Soap/detergents	287	84.7
Water alone	2	0.6
I don't know	4	1.2
Is handwashing important in the prevention of COVID-19?		
Yes	339	100
If Yes, how long should you wash your hands to kill the organism causing COVID-19?		
Less than 20 secs	93	27.4
20secs to 60 secs	210	61.9
I don't know	36	10.6
Does COVID-19 have a cure?		
Yes	248	73.2
No	87	25.7
I don't know	4	1.2

***If Yes, what is the cure?**		
Chloroquine	95	28.0
Antibiotics	92	27.1
Drinking hot water	94	27.7
Drinking hot ginger/turmeric	70	20.6
Drinking alcohol	8	2.4
Other (specify	34	10.0
Is there a vaccine for COVID-19?		
Yes	162	47.8
No	76	22.4
I don't know	101	29.8

*Multiple responses allowed

Knowledge of COVID-19

Almost all (99.7%) of the respondents had heard about COVID-19. Tables 2a and b show the knowledge of COVID-19 among respondents. A total of 309(91.2%) correctly identified the cause of the disease with 60.8% identifying the incubation period for the disease. About three quarters correctly identified the mode of transmission as air droplets while 63.1% identified close contact with people who have the virus as a mode of transmission. Only 48.1% were aware that COVID-19 could be transmitted via contact with contaminated surfaces. For overall knowledge, the mean score was 9.35±1.32 with the least score being 4 and the maximum score 12. Out of 339 respondents, 49.3% had poor knowledge and 50.7% had good knowledge concerning COVID-19.

Table 3: Perception of COVID-19

Variable	Strongly agree n (%)	Agree n (%)	Not sure n (%)	Disagree n (%)	Strongly disagree n (%)
COVID-19 is a deadly disease	225 (66.4)	92 (27.1)	9 (2.7)	5 (1.5)	8 (2.4)
I am at risk of contracting COVID-19	107 (31.6)	130 (38.3)	28 (8.3)	52 (15.3)	22 (6.5)
COVID-19 is highly infectious	197 (58.1)	120 (35.4)	20 (5.9)	2 (0.6)	
COVID-19 infection is just being exaggerated	25 (7.4)	22 (6.5)	30 (8.8)	138 (40.7)	124 (36.6)
I don't believe COVID-19 infection exists	11 (3.2)	17 (5.0)	12 (3.5)	132 (38.9)	167 (49.3)
COVID-19 infection is an intention for corruption by the government	17 (5.0)	21 (6.2)	37 (10.9)	172 (50.7)	92 (27.1)
Even in areas experiencing outbreaks, meat products can be safely consumed if these items are cooked thoroughly and properly handled during food preparation	98 (28.9)	139 (41.0)	57 (16.8)	35 (10.3)	10 (2.9)
If anyone has a fever, cough, and difficulty in breathing, COVID-19 should be suspected	229 (67.6)	92 (27.1)		7 (2.1)	11 (3.2)
As per WHO guidelines for COVID-19, you only need to wash your hands when they are visibly dirty	56 (16.5)	40 (11.8)	10 (2.9)	97 (28.6)	136 (40.1)
The use of facemask is important in preventing COVID-19 infection	236 (69.6)	93 (27.4)	4 (1.2)	4 (1.2)	2 (0.6)
Social distancing is important in preventing COVID-19 infection	240 (70.8)	91 (26.8)	6 (1.8)		2 (0.6)
Strict infection control policy is important in preventing COVID-19 in	190 (56.0)	108 (31.9)	24 (7.1)	12 (3.5)	5 (1.5)
Vaccines are not needed in the control of COVID-19 in Nigeria	23 (6.8)	35 (10.3)	52 (15.3)	120 (35.4)	109 (32.2)

Perception of COVID-19

Table 3 shows respondents' perception of COVID-19. Over half of the respondents strongly agreed that COVID-19 is a deadly disease while only 31.6% and 38.3% strongly agreed or agreed that they were at risk of contracting the disease. Less than 10% of the respondents strongly agreed that COVID-19 is

just being exaggerated and 5% strongly believed that COVID-19 is an intention for corruption by the government. Overall, the mean perception score was 32.64 with minimum and maximum scores of 17 and 47 respectively. A total of 194 (57.2%) respondents had a poor perception of COVID-19 while the remaining respondents had a good perception of COVID-19.

Table 4: Practice of COVID-19 prevention measures

Variable	Always n (%)	Sometimes n (%)	Not at all n (%)
Educate your patients about COVID-19	316 (93.2)	21 (6.2)	2 (0.6)
Use facemasks in crowds	326 (96.2)	13 (3.8)	0 (0.0)
Cover your nose and mouth with a tissue during sneezing or coughing	297 (87.6)	16 (4.7)	26 (7.7)
Avoid touching your eyes, nose, or mouth as far as you can	301 (88.8)	33 (9.7)	5 (1.5)
Use soap or hand sanitizer to wash your hands regularly	315 (92.9)	21 (6.2)	3 (0.9)
Throw used tissue in the trash	288 (85)	26 (7.7)	25 (7.4)
Practice social distancing as recommended	308 (90.9)	29 (8.6)	2 (0.6)
Strictly follow national/state protocol for triage and isolation of suspected COVID-19 cases	299 (88.2)	30 (8.8)	10 (2.9)
Disinfect tables and working rooms before and after work	280 (82.6)	42 (12.4)	17 (5.0)
Ensure that patients are adequately spaced while giving health education or waiting to be attended to	312 (96.2)	15 (4.4)	8 (2.4)
Have a holding area for isolation of suspected COVID-19 cases	260 (76.7)	20 (5.9)	59 (17.4)
Ensure that all patients wear facemask before entering your facility or being attended to by health workers	318 (93.8)	18 (5.3)	3 (0.9)
Have IEC materials for educating patients on COVID-19 in your facility	250 (73.7)	21 (6.2)	68 (20.1)
Have a copy of the national/state protocols or guidelines for triage and isolation of suspected COVID-19 cases in your facility	229 (67.6)	13 (3.8)	97 (28.6)
Are you willing to take the COVID-19 vaccine when available?	200 (59.0)	7 (2.1)	132 (38.9)

*IEC: Information, Education, and Communication

The practice of COVID-19 preventive measures

Table 4 shows the practice of COVID-19 preventive measures. The majority of the respondents (93.2%) educate their patients about COVID-19 and 96.2% use facemasks in crowds. Only 76.7% have a holding area for the isolation of suspected COVID-19 cases. Just a little over half (59.0% were willing to take the COVID-19 vaccine when available. Overall, the mean practice score was 22.22±2.79 with minimum and maximum scores of 12 and 24 respectively. The majority (92.9%) had good practice while 7.1% had poor practice.

In addition, almost all (98.2%) of the respondents had the necessary personal protective equipment. The most readily available personal protective wear was the face mask (96.5%). Personal protective equipment was provided by 67.8% of the respondents themselves.

Table 5: Factors affecting knowledge of COVID-19

Variable (N=339)	Knowledge			
	Poor n (%)	Good n (%)	χ2	p value
Age group				
<45	104(62.3)	92(53.5)		
≥45	63(37.7)	80(46.5)	2.683	0.101
Sex				
Male	20(12.0)	23(13.4)		
Female	147(88.0)	149(86.6)	0.149	0.699
Marital status				
Single	22(13.2)	21(12.2)		

Married	135(80.8)	142(82.6)		
Separated/Divorced/widowed	10(6.0)	9(5.2)	0.179	0.914
Family type (n=330)				
Monogamous	119(72.3)	130(78.3)		
Polygamous	45(27.7)	36(21.7)	1.474	0.225
Educational Level				
Primary/secondary	20(12.0)	13(7.6)		
Tertiary	147(88.0)	159(92.4)	1.882	0.170
Tribe				
Yoruba	157(94.0)	165(95.9)		
Others	10(6.0)	7(4.1)	0.655	0.418
Religion				
Christianity	131(78.4)	142(82.6)		
Others	36(21.6)	30(17.4)	0.915	0.339
Occupation				
Doctor/Nurse	13(7.8)	23(13.4)		
Community Health Extension Workers	76(45.5	67(39.0)		
Environmental Health Officers	24(14.4)	18(10.5)		
Others	54(32.3)	64(37.2)	4.976	0.174
Service years				
≤ 10 years	50(29.9)	48(27.9)		
11-20 years	83(49.7)	67(39.0)		
>20 years	34(20.4)	57(33.1)	7.489	0.024*
Attended Covid training				
Yes	113(67.7)	128(74.4)		
No	54(32.3)	44(25.6)	1.881	0.170
Duration of covid training=241				
<1 week	95(84.1)	113(88.3)		
≥1 week	18(15.9)	15(11.7)	0.900	0.343

*Significant association

Length of years in service was significantly associated with knowledge of COVID-19 (X^2=10.404; p value=0.0034) with those who have been in service between 11-20 years more likely to have good knowledge.

Discussion

Health care workers play a critical role in the prevention and control of epidemic diseases including COVID-19. Their role as frontline workers responding to the epidemic and source of health information in the community where they reside make them a vital stakeholder in the control of the current COVID-19 pandemic, more especially at the primary health care level which is the entry point into the country's health care system.

Only about half of the respondents in this study had good knowledge of COVID-19. This is however higher than 9.3% reported in a study of community health workers in a rural area in Cross-River State, Nigeria (11). The higher level of knowledge obtained in this current study could be because the respondents in the study were made up of health care workers from both urban and rural areas who had been exposed to training on COVID-19 both by government and other non-governmental organizations as a result of the rapid response to the emerging pandemic in the state.

The finding from this study is, however, lower than 88.59%, 90% and 83.7% (12, 13, 14) reported in Anambra State, Bayelsa State, and Kano State, Nigeria respectively. These studies could be biased because the respondents were selected from web-based participants who were likely to have access to other health information on the web as a result of their activity. Similarly, studies conducted among health workers in Nepal and China reported that 63.2% and 88.4% had good knowledge of COVID-19 (15, 16). This could be attributed to the fact that some of these studies were carried out in tertiary facilities with better infrastructure, access to information, training, and continuing medical education which may not be readily available at the primary health care level of the health care system. In addition, the categories of healthcare workers interviewed in these other studies were more nurses and physicians compared to community health extension workers in this study.

This current study found an association between the length of years spent in service by the healthcare worker and the level of knowledge on COVID-19 (p = 0.024), with those

who had been in service for more than 10 years more likely to have a good level of knowledge compared to those who had spent fewer years in service. This could be because in practice, people in higher cadres are more likely to be sent for training on emerging issues and this perhaps could have resulted in them developing networks whereby, they have access to current information relevant to health compared to people in lower cadres.

A study done in Kano State, identified marital status, professional categorization, and type of health facility as factors associated with good knowledge among respondents. Respondents who were divorced had 90% less knowledge compared to those who were single and doctors were the most knowledgeable. The study also reported that respondents working in the tertiary facilities were most knowledgeable about COVID-19. However, the study did not find any association between age, gender, highest qualification, and knowledge of COVID-19 (12). Similarly, a study carried out in Bayelsa state reported an association between knowledge scores and category of health workers with nurses and doctors having a significantly higher knowledge score compared to other health workers. It also identified that respondents who were younger than 30 years old had higher mean scores compared to those who were older and this was statistically significant (13). In consonance with the current study, both studies did not find any association between age, gender, highest qualification, and knowledge of COVID-19.

Good perception of the risk of COVID-19 was recorded among 42.8% of the respondents. It is, however, lower than 78.9% reported in Kano State (12). About 32% and 38% of the respondents strongly agreed and agreed respectively that they were at risk of contracting COVID-19. This is similar to what was reported in Addis Ababa, Ethiopia where 43% and 30% strongly agreed and agreed that they were at risk of contracting COVID-19 (14). The low level of good risk perception reported in this current study is quite worrisome considering that the health workers are expected to be the agents of change in the communities where they work.

The majority (92.9%) of the respondents in this study had good preventive practices towards the virus. This is higher than 77.6% reported in Kano State (12) and 81.39% reported in Anambra State (15). The finding is similar to studies conducted in Addis Ababa and China (14, 16) where the majority of the respondents had high levels of preventive practice towards COVID-19. The high level of good preventive practice in this current study could be attributed to the fact that more than half (68%) of the respondents thought that they were at risk of contracting COVID-19 and this perhaps made them willing to protect themselves from being infected with the virus by providing personal protective equipment for themselves even when their employers did not provide such. This study, however, did not find any association between preventive practices and sociodemographic risk factors though some studies have reported an association between knowledge of COVID-19 and good preventive practices among healthcare workers (12, 13, 14).

Conclusion

In conclusion, only about half of the respondents had good knowledge of COVID-19 with a poor perception rate. The majority had good practices to prevent themselves from contracting the disease. Efforts should be made to further improve the knowledge of primary health care workers as they play a vital role in the delivery of health care services, especially in this period of the ongoing COVID-19 pandemic. The government needs to provide adequate personal protective equipment for health care workers to discharge their responsibility without the fear of being infected or infecting members of their families.

List of abbreviations

CHEW: Community Health Extension Workers
LGA: Local Government Area
NCDC: Nigeria Centre for Disease Control
WHO: World Health Organization

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Ministry of Health Ogun State (HPRS/381/354 dated 28/01/2021) before the commencement of the research. In addition, permission was sought from the heads of the facilities used for the study. Informed consent was obtained from each of the participants before administering the questionnaires. The questionnaire was translated to Yoruba which is the predominant language in Ogun East Senatorial district for better understanding and translated back to English to ensure that the original meaning was retained. The information obtained had no identifier that could link the information back to the participants.

Consent for publication

The authors hereby give consent for the publication of our work under the creative

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Competing Interests
There is no competing interest.

Funding
None.

Authors' Contributions
Conceptualization and study design: DO, BJ, GA
Data collection: BJ, GA, OA, AO
Data analysis: DO, BJ, OA, AO
Study supervision: DO, BJ, GA
Manuscript writing: DO, BJ, GA, OA, AO
Revision of manuscript for intellectual content: DO, BJ, GA

Acknowledgments
We express our thanks to all individuals who participated in this study.

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