Original Research Article

AWARENESS OF CAUSES AND HEALTH RISKS ASSOCIATED WITH HIGH BLOOD CHOLESTEROL AMONG MEN IN AWKA ETITI, ANAMBRA STATE, NIGERIA

ABSTRACT

Aim: The study aimed to determine the awareness of causes and health risks associated with high blood cholesterol (HBC) among men in Awka-Etiti, Nigeria.

Study design: A descriptive survey research design was used.

Place and duration: Awka-Etiti, Anambra State, Nigeria in 2019.

Methodology: The sample of the study comprised three hundred adult men aged 25 and above. A structured questionnaire was the main instrument used for data collection. Face validity was used to check for the validity of the instrument. The split-half method was used to check the reliability of the instrument and obtained a coefficient of 0.61.

Results: Generally there were low levels of awareness of causes (56%) and a moderate level of awareness for risks (65%) associated with HBC in the study area. Younger age and older age as well as higher educational attainment were identified determinants of better awareness of causes and associated risks of HBC. Significance test found associations between age and awareness of causes of HBC (*P*=.006); and age and awareness of associated risks of HBC (*P*=.001). There were no significant associations between marital status and awareness of causes of HBC (*P*=.221); and marital status and awareness of associated risks of HBC (*P*=.221).

Conclusion: There are still poor awareness levels of HBC among some minority groups in the study population. Public Health education and promotion of healthy lifestyles are recommended to reduce this burden.

Keywords: Hypercholesterolemia, high blood cholesterol, marital status, age, hypertension

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INTRODUCTION

High blood cholesterol, also referred to as hypercholesterolemia, is widely regarded as a form of hyperlipidemia, and hyperlipoproteinemia. It is a known risk factor for coronary heart disease (CHD)[1]. The rise in serum low-density lipoprotein cholesterol (LDL-C) leads to cardiovascular disease-related disabilities[2, 3], illnesses, and deaths, while a severe rise of LDL-C ≥ 190mg/dL may be a pointer to familial hypercholesterolemia (FH) [4]. Globally, non-communicable diseases are the major cause of death. These diseases include cancers, diabetes, lung disease, and cardiovascular diseases [5]. Over 30 million people die annually from NCDs, with a significantly high 80% of these deaths occurring in low and middle-income countries[5]. The risk factors associated with NCDs are mostly modifiable. These include unhealthy diets, drug and alcohol abuse, and physical inactivity[5]. CHD which was previously reported to be rare in Sub-Saharan Africa has recently been reported to be ranked 8th among the leading causes of mortality in the region[6]. The *Helicobacter pylori* infection which causes ulcers and carcinomas is auxotrophic for cholesterol[7]. Accumulation of excess cholesterol facilitates phagocytosis of *H. pylori* by the action of macrophages and dendritic cells while enhancing antigen-specific T-cells[7]. Similarly, Lim et al[8] found that the clinical risk factors of the *H. pylori* infection included a higher cholesterol level ≥240mg/dl, among other demographic variables like older age, sex, socioeconomic class, and living in rural areas.

The rise in the prevalence of these forms of morbidity is thought to be attributed to poor development and implementation of key strategies to reduce the effects of these diseases by governments, private organizations, and key stakeholders[5]. Analyses according to Munter et al[9] have shown that good governmental policies for awareness, control, treatment, and prevention of HBC can help to alleviate the ripple effect of the condition.

In 2003, 73.1% of adults reported previous screening for cholesterol levels, and of this proportion, 31.1% reported ever being aware of their status after such screening [10]. Young adults with CVD risk factors have an increased likelihood of having CHD and atherosclerosis in later adulthood[11]. Pilleron et al[12] also found that hypercholesterolemia increased the likelihood of hypertension occurring in individuals. Studies have further shown that mid-age individuals with favorable levels of the key CVD risk factors possess a

significantly lower incidence of CVD and longer life expectancies, thereby pointing out the need to identify and treat CVD risk factors in early life [11]. Hopkins et al[13] reported that FH can be regarded as a common cause of premature CHD. It however sheds light on the fact that genetics also presents as a risk factor for hypercholesterolemia.

Despite the emphasis on preventive practices against CVD, population awareness among different sociodemographic thresholds is still lacking. Some parts of Africa including Nigeria may not be targeted with interventions on CVDs due to other diseases, mostly communicable, that are endemic in the region. Some such diseases include HIV/AIDS, malaria, dengue, etc.[5]. Center for Disease Control and Prevention[10] however stated that the risks associated with high blood cholesterol can be reduced by early screening interventions. Framework tools such as the National Health Interview Survey and the National Health Nutrition Examination Survey (NHANES) have been developed for the monitoring of national progress as it relates to screening and controlling HBC[10]. These tools are mostly being utilized by the more developed countries while the developing countries still struggle amidst bad governance to reproduce the milestones of their developed counterparts. Given the impacts of HBC on CVD in the developing climes, further knowledge of HBC awareness, management, treatment, and control among Africans could help inform Public Health policies and thereby facilitate strategies for prevention.

Accordingly, the study aimed to assess the awareness of causes and health risks associated with HBC among males in a Nigerian community. Quantifying these rates using sociodemographic measures of age, educational level, and marital status will aid in understanding the gaps in preventive measures to inform interventions that will improve the health-seeking behaviors of all community members and the society at large, hence improving cardiovascular outcomes.

2. METHODS

2.1 Study design

To achieve the objectives of this study, a descriptive survey design was used. The design was used in an attempt to collect data from members of the population for one or more variables.

2.2 Study Area

Awka-etiti is located in Idemili south local government area of Anambra State, Nigeria. It comprises of seven villages, in order of age established. These include Nkolofia, Umunocha, Ejighinandu, Iruowelle, Umudunu, Nnnaba, and Ogunzele. Awka-etiti shares boundaries with towns like Ichida, Ezigbo, Nnokwa, Nnewi, Nnobi, and Amichi. The main language spoken in Awka-etiti is the Idemili variant of the Igbo language.

2.3 Study population

The target population for the study consisted of all the adult men from the existing villages in Awka-etiti. The accessible population for the study consisted of an estimated 3,000 adult men in villages in Awka-etiti [14].

2.4 Sample Size Determination and Sampling Techniques

The sample for this study was determined using Lwanga and Lemeshow[15] formula:

$n=Z^2p(1-p)/d^2$

Where

n= desired sample size

Z= standard normal variate of confidence level (95%)= 1.96

P= Estimated proportion in the population with characteristic of interest from previous study= 0.74

d= desired precision= 0.05

Therefore, the sample size calculated was 296. Finite population correction for population less than 10,000 was applied thus:

$$Nf=\frac{n}{1+\frac{n}{N}}$$

Where n= calculated sample size of 296 and N= study population of 3,000

Therefore Nf= 269.

Adjusting for perceived non-response rate of 10%, n= 298.88. This was rounded up to 300. Sample size for the study consisted of 300 adult males in Awka Etiti of Anambra, Nigeria.

A two-stage sampling procedure was used for the study. In stage one, all the adult men in Awka-etiti community were clustered into seven representing the seven villages in the community. Simple random sampling by balloting with replacement was used in drawing five villages. In stage two, the first 60 men to arrive were selected from each stratum during their various village town hall meetings on a face to face basis. At the end of these procedures, a total of 300 adult males were used for the study.

2.5 Instrument for data collection

A structured interview guide was the main instrument used for data collection. The questionnaire was subdivided into three sections. Section A was aimed at providing sociodemographic information of the respondents, section B aimed to ascertain awareness information on causes of high blood cholesterol among men, and section C aimed to ascertain awareness information on health risks associated with high blood cholesterol.

2.6 Validity of the instrument

The self-structured interview was face validated by lecturers in the Department of Public Health of Madonna University, Elele. The validators were requested to examine the content of the instrument alongside the objective of the study, research questions, and hypotheses to confirm the possibility of eliciting appropriate responses for the study. The validator also examined the language used.

2.7 Reliability of the instrument

The split-half method was employed to establish the reliability of the instrument. The instrument was administered to thirty adults attending village meetings in a neighboring town -Nnobi. The test was administered once. The scores of odd number items were correlated with the scores of the even-numbered items. This yielded a coefficient of 0.61.

2.8 Method of data collection

Three hundred copies of the questionnaire were distributed to 300 men in Awka-etiti Idemili South L.G.A. The voluntary village resource personnel assisted in the distribution of the questionnaire on face to face basis during the various village town meetings. The distribution and collection of the questionnaire lasted for four weeks. 280 questionnaires were properly filled and returned for analysis.

2.9 Method of data analysis

Data collected were tallied and analyzed using descriptive statistics, frequency, percentage, and ground average as well as inferential statistics of the chi-square test of association.

3 RESULTS

Research questions were answered using percentages while the formulated hypotheses were tested using Chi-square (χ^2). 280 copies of the instrument were used to analyze data. The findings of the study are presented in the tables below according to the research questions and hypotheses which guided the study.

Data in Table 1 shows that most respondents (56%) were aware of the causes of high blood cholesterol. Specifically, respondents recorded the highest response (80%) in their awareness that high cholesterol in the body has been known to cause fat deposition in the arterial walls. Also, most respondents (70%) were unaware that physical inactivity increased blood cholesterol.

Table 1: Frequency and Percentage of the Level of Awareness of the causes of HBC among men in Awka-etiti in Idemili south LGA (n=280)

		Aware	Unaware

S/N	Item	f	%	f	%
1	Eating much-fried food causes an increase in blood cholesterol.	196	70.0	84	30.0
2	High cholesterol in the body has been known to cause fat deposition in the arterial walls.	224	80.0	56	20.0
3	Much consumption of red meat causes an increase in blood cholesterol.	168	60.0	112	40.0
4	Physical inactivity increase blood cholesterol	84	30.0	196	70.0
5	A high level of cholesterol in the body can make one overweight and obese.	112	40.0	168	60.0
	Overall % average		56		44

Data in Table 2 shows that generally, 65 % of the respondents indicated that they were aware of the causes of high blood cholesterol. Specifically, 70% indicated that high blood cholesterol in the body is a health risk factor to diabetes mellitus; high cholesterol in the body is a health risk factor to cardiovascular disease like high blood pressure, coronary heart disease, chest pain, stroke; and excess cholesterol in the body is a health risk factor to a respiratory disorder. Respondents were least aware (50%) that excess cholesterol in the body is a health risk factor to erectile dysfunction in men.

Table 2

Frequency and Percentage of the Level of Awareness of Health risks Associated with High Blood Cholesterol.

S/N	Items	Aware		Unaware	
		f	%	f	%
6.	Excess cholesterol in the body is a health risk of diabetes mellitus.	196	70.0	84	30

7.	Excess cholesterol in the body is a health risk factor for cardiovascular disease like high blood pressure, coronary heart disease, chest pain, stroke, etc.	196	70.0	84	30
8.	Excess cholesterol in the body is a health risk factor for respiratory diseases.	196	70.0	84	30
9.	Excess cholesterol in the body is a health risk factor to erectile dysfunction in men.	140	50.0	140	50
	Overall % Average		**65**		**35**

From table 3, 60% of respondents in age groups 25-34 years and >44 were more aware of the causes of high blood cholesterol. 46.7 % of respondents in the age group of 35-44 years were the least aware of the issue.

Table 3

Frequency and Percentage of the Level of Awareness of Causes of High Blood Cholesterol among men based on their age (n=280).

AGE							
		25-34 (n= 78)		**35-44 (n=84)**		**45 & above (n=118)**	
S/N	Items	**Aware f (%)**	**Unaware f (%)**	**Aware f (%)**	**Unaware F (%)**	**Aware f (%)**	**unaware f (%)**
1.	Item 1	26(33.3)	52(66.7)	84(100)	0(0)	86(72.9)	32(27.1)
2.	Item2	52(66.7)	26(33.3)	56(66.7)	28(33.3)	116(98.3)	2(1.7)
3.	Item 3	78(100)	0(0)	28(33.3)	56(66.7)	62(52.5)	56(47.5)

4.	Item 4	52(66.7)	26(33.3)	0(0)	84(100)	32(27.1)	86(72.9)
5.	Item 5	26(33.3)	52(66.7)	28(33.3)	56(66.7)	58(49.2)	60(50.8)
	% Average	**60%**	**40%**	**46.7%**	**53.3%**	**60%**	**40%**

From table 4, those with Bachelor of Science or its equivalent had better awareness of causes of HBC (60.5%) than other respondents with Secondary School Certificate Examination (SSCE) (59.7%), and Junior School Certificate Examination (JSCE) (50.04%). Those with a First school living certificate (FSLC) recorded the lowest awareness (43.6%) on the issue.

Table 4

Frequency and percentage distribution of awareness of the causes of high blood Cholesterol among men based on their educational qualification (n=280).

EDUCATIONAL QUALIFICATION									
		FSLC (n=28) aware unaware		JSCE(NECO) (n=56) aware unaware		SSCE(WASSCE) (n=85) aware unaware		NCE/OND/BSC (n= 111) aware	unaware
S/N	Items	f(%)	f(%)	f(%)	f(%)	f(%)	f(%)	f(%)	f(%)
1.	Item 1	23(89.3)	3(10.7)	0(0)	56(100)	57(67)	28(32.9)	106(95.5)	5(4.5)
2.	Item2	5(17.9)	23(82.1)	55(98.2)	1(1.8)	55(64.7)	30(35.3)	110(99.1)	1(0.9)
3.	Item 3	26(92.9)	2(7.1)	28(50.0)	28(50)	68(80)	17(20)	44(39.6)	67(60.4)
4.	Item 4	3(10.7)	25(89.3)	53(94.6	3(5.4)	28(32.9)	57(67.1	9(8.1)	102(91.1)

				)			)		
5.	Item 5	2(7.1)	26(92.9)	3(5.4)	53(94.6)	46(54.1)	39(45.9)	67(60.4)	44(39.6)
	% Average	**43.6%**	**56.4%**	**50.04%**	**49.96%**	**59.7%**	**40.3%**	**60.5%**	**39.5%**

From table 5, divorced respondents had better awareness (73.9%) of the causes of HBC. Single respondents had the lowest awareness of the issue (52.8%).

Table 5

Frequency and percentage distribution of awareness of causes of high blood cholesterol among men based on their marital status (n=280)

MARITAL STATUS							
		Married (n=195)		Single (n=71)		Divorced (n=14)	
		Aware	Unaware	Aware	Unaware	Aware	Unaware
S/N	Items	f(%)	f(%)	f(%)	f(%)	f(%)	f(%)
1.	Item 6	145(74.4)	50(25.6)	40(56.3)	31(43.7)	11(78.6)	3(4.2)
2.	Item 7	141(72.3)	54(27.7)	38(53.5)	33(46.5)	11(78.6)	3(21.4)
3.	Item 8	147(75.4)	48(24.6)	37(52.1)	34(22.1)	9(64.3)	5(35.7)

4.	Item 9	97(49.7)	98(50.3)	35(49.3)	36(50.7)	8(57.1)	6(42.9)
	% Average	**68%**	**32%**	**52.8%**	**47.2%**	**73.9%**	**26.1%**

From table 6, 83.5% of respondents in the age group 25-34 years were better aware of the health risks associated with HBC than those aged 35-44 (58.3) and > 44 (57.6%).

Table 6

Frequency and percentage distribution of awareness of health risks associated with high blood cholesterol among men based on their ages (n=280)

AGE						
	25-34 (n= 78)		**35-44 (n=84)**		**45 & above (n=118)**	
Items	**Aware f (%)**	**Unaware f (%)**	**Aware f (%)**	**Unaware f (%)**	**Aware f (%)**	**Unaware f (%)**
Item 6	78(100)	0(0)	56(66.7)	28(33.3)	62(52.5)	56(47.5)
Item7	78(100)	0(0)	28(33.3)	56(66.7)	90(76.3)	28(23.7)
Item 8	52(66.7)	26(33.3)	84(100)	0(0)	60(50.8)	58(49.2)
Item 9	52(66.7)	26(33.3)	28(33.3)	56(66.7)	60(50.8)	58(49.2)
% Average	**83.35%**	**16.65%**	**58.3%**	**41.7%**	**57.6%**	**42.4%**

From table 7, 77.95% of respondents with higher educational qualifications had better awareness of risks associated with HBC. Those with JSCE had the lowest awareness of the issue.

Table 7

Frequency and percentage distribution of awareness of the health risks associated with high blood cholesterol among men based on their educational qualification (n=280)

EDUCATIONAL QUALIFICATION									
		FSLC (n=28) aware unaware		JSCE(NECO) (n=56) aware unaware		SSCE(WASSCE) (n=85) **aware** **unaware**		NCE/OND/BSC (n= 111) aware unaware	
S/N	Items	f(%)	f(%)	f(%)	f(%)	f(%)	f(%)	f(%)	f(%)
1.	Item 6	28(100)	0(0)	74(87.1)	11(12.9)	74(87.1)	11(12.9)	76(68.5)	35 (31.5)
2.	Item 7	26(92.9)	2(7.1)	68(80)	17(20)	68(80)	17(20)	95(85.6)	16(14.4)
3.	Item 8	26(92.9)	2(7.1)	52(61.2)	33(38.3)	52(61.2)	33(38.3)	95(85.6)	16(14.4)

4.	Item 9	0(0)	28(100)	67(78.8)	18(21.2)	67(78.8)	18(21.2)	80(72.1)	31(27.9)
	% Average	**71.5%**	**28.5%**	**60.3%**	**39.7%**	**76.8%**	**23.2%**	**77.95%**	**22.05%**

From table 8, divorced respondents had better awareness (73.9%) of risks associated with HBC. Single respondents had the lowest awareness of the issue (52.8%).

Table 8

Frequency and percentage distribution of level of awareness of health risks associated with high blood cholesterol among men based on their marital status (n=280)

MARITAL STATUS							
		Married (n=195)		Single (n=71)		Divorced (n=14)	
		Aware	Unaware	Aware	Unaware	Aware	Unaware
S/N	Items	f(%)	f(%)	f(%)	f(%)	f(%)	f(%)
5.	Item 6	145(74.4)	50(25.6)	40(56.3)	31(43.7)	11(78.6)	3(4.2)
6.	Item 7	141(72.3)	54(27.7)	38(53.5)	33(46.5)	11(78.6)	3(21.4)
7.	Item 8	147(75.4)	48(24.6)	37(52.1)	34(22.1	9(64.3)	5(35.7)

					)		
8.	Item 9	97(49.7)	98(50.3)	35(49.3)	36(50.7)	8(57.1)	6(42.9)
	% Average	**68%**	**32%**	**52.8%**	**47.2%**	**73.9%**	**26.1%**

Hypotheses were tested to check for associations between awareness of HBC causes and risks, with age and marital status. Table 9 indicates the calculated χ^2 values and their respective corresponding p-values for the level of awareness of causes of HBC. The table further shows the overall χ^2 calculated value with its corresponding P-value for the level of awareness of causes of high blood cholesterol to be χ^2=60.5, *P*= .006). Since the *P* < 0.05, the null hypothesis of no significant difference among men of different ages in their level of awareness of causes of high blood cholesterol, is, therefore rejected. This implies that the level of awareness of the causes of high blood cholesterol is dependent on their various ages.

Table 9

Observed and expected values on the level of awareness of the causes of high blood cholesterol among men based on their ages.

AGE																
S/N	Items	25-34 years (n=78)				35-44years (n=84)				>44years (n=118)				$\chi^{2\text{-cal}}$	P-value	Dec
		A		U		A		U		A		U				
		O	E	O	E	O	E	O	E	O	E	O	E			
1.	Item 1	26	54.6	52	23.4	84	58.8	0	25.2	86	82.6	32	35.4	86.403	0.001	**
2.	Item 2	52	62.4	26	15.6	56	67.2	28	16.8	116	94.4	2	23.6	42.712	0.001	**

3.	Item 3	78	46.8	0	31.2	28	50.4	56	33.6	62	70.8	56	47.2	79.623	0.001	**
4.	Item 4	52	23.4	26	54.6	0	25.2	84	58.8	32	35.4	36	82.6	86.403	0.001	**
5.	Item 5	26	31.2	52	46.8	28	23.6	56	50.4	58	47.2	60	70.8	7.119	0.028	**
	Overall													**60.5**	**0.006**	**

Table 10 indicates the calculated χ^2 values and their respective corresponding p-values for the indices of the level of awareness of health risks of HBC. The table further shows the overall χ^2 calculated value with its corresponding P-value for the level of awareness of causes of high blood cholesterol to be (χ^2=53.868, *P*= .001). Since *P* < .05, the null hypothesis of no significant difference among men of different ages in their level of awareness of health risks of high blood cholesterol, is, therefore rejected. This implies that the level of awareness of the health risks of high blood cholesterol is dependent on their various ages.

Table 10

Observed and expected values on the level of awareness of health risks of high blood cholesterol among men based on their ages

AGE																
		25-34 years (n=78)				35-44years (n=84)				>45years (n=118)						
S/N	Items	A O	E	U O	E	A O	E	U O	E	A O	E	U O	E	$\chi^{2\text{-cal}}$	P-value	Dec
1.	Item 6	78	54.6	0	23.4	56	58.8	28	25.2	62	82.6	56	35.4	50.998	0.001	**

2.	Item 7	78	54.6	0	23.4	28	58.8	56	25.2	90	82.6	28	35.4	89.416	0.001	**
3.	Item 8	52	54.6	26	23.4	84	58.8	0	25.2	60	82.6	58	35.4	57.024	0.001	**
4.	Item 9	52	39.0	26	39	28	42	56	42	60	59	58	59	18.034	0.001	**
	Overall													**53.868**	**0.001**	**

Table 11 indicates the calculated χ^2 values and their respective corresponding p-values for indices of the level of awareness of causes of high blood cholesterol. The table further shows the overall χ^2 calculated value with its corresponding P-value for the level of awareness of causes of high blood cholesterol to be (χ^2=7.8445, *P*= .22). Since *P* > .05, the researchers fail to reject the null hypothesis of no significant difference among men of different marital status in their level of awareness of health risks of high blood cholesterol. This implies that the level of awareness of the causes of high blood cholesterol is not dependent on their marital status.

Table 11

Observed and expected values on the level of awareness of the causes of high blood cholesterol among men based on their marital status.

		MARITAL STATUS													
		Married (n=195)				Single (n=71)				Divorced (n=14)					
S/N	Items	A O	U E	A O	U E	A O	U E	A O	U E	A O	U E	A O	U E	$\chi^{2\text{-cal}}$	P-value	Dec

										E						
1.	Item 6	145	136.5	50	58.5	40	49.7	31	21.3	11	9.8	3	4.2	8.565	0.014	**
2.	Item 7	141	132.3	54	62.7	38	48.2	33	22.8	11	9.5	3	4.5	9.198	0.010	**
3.	Item 8	147	134.4	48	60.6	37	48.9	34	22.1	9	9.7	5	4.4	13.310	0.001	**
4.	Item 9	97	97.5	98	97.5	35	35.5	36	35.5	8	7.0	6	7.0	0.305	0.859	*
	Overall													**7.8445**	**0.221**	*

Table 12 below indicates the calculated χ^2 values and their respective corresponding p-values for indices of the level of awareness of health risks of high blood cholesterol. The table further shows the overall χ^2 calculated value with its corresponding P-value for the level of awareness of causes of high blood cholesterol to be (χ^2=7.8445, *P*= .22). Since *P* > .05, the researchers fail to reject the null hypothesis of no significant difference among men of different marital status in their level of awareness of health risks of high blood cholesterol. This implies that the level of awareness of the health risks of high blood cholesterol is not dependent on their marital status.

Table 12

Observed and expected values on the level of awareness of health risks of high blood cholesterol among men based on their marital status

MARITAL STATUS								
		Married (n=195) A U		Single (n=71) A U		Divorced (n=14) A U		P-

S/N	Items	O	E	O	E	O	E	O	E	O	E	O	E	$\chi^{2\text{-cal}}$	value	Dec
1.	Item 6	145	136.5	50	58.5	40	49.7	31	21.3	11	9.8	3	4.2	8.565	0.014	**
2.	Item 7	141	132.3	54	62.7	38	48.2	33	22.8	11	9.5	3	4.5	9.198	0.010	**
3.	Item 8	147	134.4	48	60.6	37	48.9	34	22.1	9	9.7	5	4.4	13.310	0.001	**
4.	Item 9	97	97.5	98	97.5	35	35.5	36	35.5	8	7.0	6	7.0	0.305	0.859	*
	Overall													**7.8445**	**0.221**	*

4 DISCUSSION

This study assessed the awareness of men in Anambra State on the causes and risks associated with HBC. Age and marital status were tested for significance with the awareness of HBC. These variables, particularly the marital status variable, were selected because there is a paucity of data as it regards these correlations. Also, previous studies have not shown consistent results to bridge this knowledge gap. Generally, there were low levels of awareness of causes (56%) and a moderate level of awareness for risks (65%) associated with HBC in the study area. Findings on the level of awareness of causes of HBC were consistent with a study of HBC awareness, treatment, and control among Hispanics/ Latinos by Rodriguez et al [16] which found that 49.3% of respondents were unaware of their condition. Also, findings for risks associated with HBC in this study were consistent with Bucholz et al[11] who found a moderate level of awareness (62.7%) for hypertension and diabetes which are some of the major risks associated with HBC.

Specifically, 60% of respondents in age groups 25-34 years and >44 were more aware of the causes of high blood cholesterol. 46.7 % of respondents in the age group of 35-44 years were the least

aware of the issue. These findings have a mixed level of consistency with other studies. For instance, the findings from this research concerning the age groups with higher awareness levels of causes of HBC contrasted with findings by Bucholz et al[11] who found higher HBC awareness to be dependent on older ages. On the other hand, this study also showed that those in the highest age groups (>44) had an equally high awareness level associated with risks of HBC, consistent with Bucholz et al[11] and Rodriguez et al[16]. The test of significance for this variable (age) and awareness levels of HBC causes and associated risks found $P<.05$, hence identifying a significant association. Better awareness of causes among older adult men may be attributed to their regular visit to health facilities due to the presence of comorbid disturbances. Equally better awareness of the causes of HBC among the younger adults may be attributed to more likelihood of the younger generation to have multiple streams of information other than from health facilities. The younger age groups also had a significantly higher awareness of the risks associated with HBC, a feat that can also be attributed to better access to information on social media. This study also found those with higher educational levels to be more aware of both the causes and risks associated with HBC. This can be attributed to their access to the bulk of information in a tertiary space that allows for more interactions with digital equipment. Tertiary institutions are also equipped with many interactive resources that build individuals' capacities.

This study also found that divorced respondents had a better awareness level of causes and associated risks of HBC (both 73.9%) than the single and married respondents. This study further tested for significant associations between awareness level of causes and risks of HBC with marital status. With $P>.05$, significant associations were not found between the awareness level of causes and associated risks of HBC with marital status. All observed and expected scores in both hypotheses remained the same. With $P>.05$, no significant associations were found between the awareness level of associated risks of HBC and marital status. This could probably be attributed to the limited proportion of some of the categories. These findings were consistent with Abu-Saad[17] who identified similar reasons not to have found associations between the aforementioned variables.

Challenges however existed in the course of this study. There were issues of non-compppliance due to busy schedules of the respondents. This was solved by adjusting field hours to fit the schedule of

the subjects. Another issue was the language and literacy barrier. One of the researchers and assistants were knowledgeable of the local spoken language of the people. This however helped to ease fears of random filling of the questionnaires. This study also had some weaknesses. The study is subject to confounding that may have influenced estimates. Also, the study involved only males which may have altered the accuracy in correctly predicting HBC in the general population. However, the researchers understand that due to the cultural perspectives in Nigeria, men are less likely to seek health care which is one of the reasons why they have a shorter life expectancy.

5 CONCLUSION

This study tested 4 hypotheses and found significant associations in 2. Both younger and older ages were found to be significantly associated with both the causes and associated risks awareness of HBC. Most recent studies have only found that older ages were significantly associated with increased awareness of causes and associated risks of HBC. However this study did not find research consistent with the inference that younger people have a better awareness of HBC, hence a key finding from this study. Marital status was shown to be nonsignificant with the causes and risks awareness of HBC. The study further found a higher educational level to be a determinant of a higher level of awareness although no hypothesis was tested with this variable.

A proportion of the sampled population still lacks awareness of high blood cholesterol. Minority groups lacked awareness of HBC concepts and preventive practices and had trouble understanding simplified medical terms. However, countless individuals have suffered the diseases that occur as a result of high blood cholesterol. Based on these findings, it is recommended that:

- There should be consumption of diets devoid of calories and discouragement of other lifestyle practices that pose health risks and cause high blood cholesterol should be encouraged by health professionals, health educators in schools, community health workers Non-governmental organizations (NGOs), etc.

- The government should provide funds and materials to equip already existing health facilities in the villages for easy access to guidance and counseling as well as frequent medical checkups in these facilities.
- Since health is everyone's business, individuals should walk into any health facilities for regular medical checkups such as blood pressure level, cholesterol level, etc. By this, if a health risk is identified, lifestyle modification can be recommended to live a healthy life.

DECLARATIONS

This research was approved by the Ethics and Research Committee of the Department of Public Health, Madonna University, Nigeria.

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