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Knowledge of risk factors for lifestyle induced chronic diseases among secondary school students in Obio/Akpor LGA, Rivers State

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The study determined knowledge of risk factors for lifestyle induced chronic diseases among secondary school students in Obio/Akpor LGA, Rivers State. The sample for the study consisted of 480 secondary school students. The sample was drawn using multistage sampling procedures. The instrument for data collection was a researcher-designed structured questionnaire. Three experts validated the instrument. Reliability of the instrument was established using Split-half method and Spearman-Brown Correction Formula. The reliability coefficient of the instrument was 0.60. Data analysis was performed using frequency and percentages while inferential statistics of Chi-square (χ^2) was employed to test the null hypotheses. Results showed that students had average knowledge (57.8%) of risk factors for lifestyle induced chronic diseases. Recommendations such as implementation of vigorous awareness campaign through health education on health risks of lifestyle induced diseases in schools, integration of nutrition education into the curricula of subjects such as Health Education, Home Economics, Biology and Health Science will help educate students on risk factors for lifestyle induced chronic diseases were made. In addition, interventions directed at reducing or modifying unhealthy lifestyles such as smoking, substance abuse/misuse and sedentary behaviours should be designed and effectively implemented at schools.

Key words: Physical activity, risk factors, adolescents, unhealthy lifestyles, chronic diseases.

INTRODUCTION

Chronic diseases of lifestyle are a group of conditions accounting for millions of deaths globally each year. In 2008, for example, chronic diseases of lifestyle accounted for 36 million deaths worldwide with 80% of these deaths in low-income countries (Afghanistan and Bangladesh) and middle-income countries (Algeria and

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South Africa), with a projected global increase between 2010 and 2020 of 15% (WHO, 2012). Chronic diseases are a serious threat to health and longevity in developing countries. In all but the poorest countries, the death and disability from chronic diseases now exceeds that from communicable diseases-comprising 49%, compared with about 40% for communicable disease and 11% for injuries (Lopez et al., 2006). Sub-Saharan Africa (SSA), consisting of those countries that are fully or partially located in south of the Sahara Desert, are currently experiencing one of the most rapid epidemiologic transitions characterized by increasing urbanization and changing lifestyle factors (Fezue et al., 2006), which in turn have increased the incidence of non-communicable diseases (NCDs), especially cardiovascular diseases (CVDs).

In countries such as Nigeria, Ghana and South Africa, the prevalence of chronic diseases is increasing, while the threat of communicable and poverty-related diseases (malaria, infant mortality, cholera, malnutrition) still exists (Yach et al., 2004). The influences of urbanization are also apparent in most Nigerian cities; this is usually accompanied by other high risk dietary and lifestyle behaviours (Tesfaye et al., 2009).

Lifestyle diseases are diseases that appear to increase in frequency as countries become more industrialized and people live longer. They can include atherosclerosis, asthma, some kinds of cancer, chronic liver disease or cirrhosis, chronic obstructive pulmonary disease, heart disease, depression and obesity (WHO, 2008). Lifestyle diseases also known as chronic lifestyle diseases (CDLs) are a group of diseases that share similar risk factors, because of exposure, over many decades, to unhealthy diets, smoking, lack of exercise, and possibly stress. These results in various long-term disease processes, causing high mortality rates attributable to heart attack, tobacco and nutrition induced cancers, and many others. Universally, these diseases are also known as non-communicable diseases (South African Medical Research Council, 2013). Lifestyle induced chronic diseases share similar modifiable risk factors, which include tobacco smoking, nutrition, alcohol and physical activity.

A risk factor is any attributable, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury (WHO, 2014). Chronic diseases have multiple preventable risk factors, which operate at different levels, from the most proximal (that is, biological), to the most distal (that is, structural). These risk factors can be classified as ‘modifiable’ and ‘non-modifiable’. Modifiable determinants include factors that can be altered, such as individual and community influences, living and working conditions and socio-cultural factors. On the other hand, non-modifiable determinants include those factors that are beyond the control of the individual, such as age, sex and hereditary factors.

Lifestyle diseases common among adolescents include: obesity and overweight, respiratory diseases, cancers (breast, oral cavity, oesophagus, and pharynx), depression (Kiberd, 2006; Soerjomataram et al., 2007; Perlitz, 2009; Anderson et al., 2009; Ferlay et al., 2010; Soerjomataram et al., 2010). Other factors have also been implicated in the prevalence of chronic diseases among adolescents in developing countries. Rapid urbanization and economic development have also led to the emergence of a nutritional transition characterized by a shift to a higher caloric content diet and/or reduction of physical activity. Together, these transitions create enormous public health challenges, and failure to address the problem may impose significant burden for the health sector and the economy of sub-Saharan African countries (Afshaw, 2005).

At an individual level, efforts to encourage people including secondary school students to be knowledgeable of risk factors for chronic diseases of lifestyle may inadvertently reduce the focus on other disease prevention factors such as lifestyles modifications. This concern is supported to some extent by models of health behavior and coping. The common sense model of self-regulation in health and illness (CSM) (Leventhal et al., 1998) is the most widely used model to explain how people interpret and cope with current and potential health events or threats. The CSM posits that individuals facing a health threat go through several stages, including active processing of cognitive representations of the health threat (including personal ideas about disease etiology or causal beliefs) and using the representations formed to steer the development of action plans for coping with the problem (Lau-Walker, 2006). The CSM explicitly states that people’s cognitive representations of disease (including causal beliefs) directly influence the coping strategies they select to reduce the disease threat (Leventhal et al., 1998). Confidence in the ability of a given intervention or behaviour to reduce disease risk has been labelled ‘perceived response-efficacy’ (Witte and Allen, 2000) or ‘outcome expectancies’ (Schwarzer and Fuchs, 1999), and is widely acknowledged to be one of the key cognitive predictors of behavior change (Norman and Conner, 1999). The CSM suggests a direct relationship between causal beliefs and perceived response efficacy.

Several definitions of knowledge have been presented in literature. Knowledge is a set of structural connectivity patterns and its contents have to be viable for the achievement of goals (Guldenberge, 1999). Knowledge is a familiarity, awareness or understanding of someone or something, such as facts, information, descriptions, or skills, which is acquired through experience or education by perceiving, discovering, or learning (Guldenberge, 1999). Knowledge can refer to a theoretical or practical understanding of a subject. It can be implicit (as with practical skill or expertise) or explicit (as with the theoretical understanding of a subject); it can be more or

less formal or systematic. However, several definitions of knowledge and theories to explain it exist (Atherton, 2013). Knowledge acquisition involves complex cognitive processes: perception, communication, and reasoning; while knowledge is also said to be related to the capacity of acknowledgment in human beings (Atherton, 2013).

Variables associated with knowledge of risk factors for lifestyle induced chronic diseases among in-school adolescents include: age, gender and class of study. WHO (2010) identified adolescence as the period in human growth and development that occurs after childhood and before adulthood, from ages 10 to 19. It represents one of the critical transitions in the life span and is characterised by a tremendous pace in growth and change that is second only to that of infancy (WHO, 2014). Adolescence and youthful periods have been considered the healthiest period of a person's life due to low mortality rate, recent trends have, however, given rise to concerns in many quarters. Blum (2009) noted that there has been a major shift in causes of morbidity and mortality among young people over the past 25 years. In particular, the author highlighted that "what distinguishes the causes of death of young people is that most deaths have behavioural causes exacerbated by national policy or failures of health service delivery systems, or both". The leading health challenges of young people globally are sexual and reproductive health issues, accidental and intentional injuries, mental health problems, substance use and abuse, and unhealthy eating behaviours (Tylee et al., 2007).

Adolescents are different from both young children and adults. Specifically, adolescents are not fully capable of understanding complex concepts or the relationship between a certain inimical behaviour and its consequences, or the degree of control they have or can have over health decision making. Thus, these attributes make adolescents including schooling adolescents in Obio/Akpor LGA vulnerable to unhealthy lifestyles and other risk factors which eventually may initiate onset of chronic diseases. The study was conducted in Obio/Akpor LGA. Obio/Akpor LGA is located in Port Harcourt, Rivers State (Appendix B). Prevention and control of chronic diseases of lifestyle or other cardiovascular diseases has not received due attention among adolescents in many developing countries including adolescents in Obiakpor LGA, Rivers State. It has been established in literature that adolescents exhibit risk factors for chronic diseases with attendant health consequences. Investigating prevailing risk factors for chronic diseases of lifestyle among schooling adolescents will assist in the recognition of predominant risk factors and provide insights into measures for preventing and modifying the risk factors. Therefore, the study sought to determine knowledge of risk factors for chronic diseases of lifestyle among schooling adolescents in Obiakpor LGA, Rivers State with a view to informing policy making and laying the premise for valid public health interventions.

Purpose of the study

The main purpose of this study was to determine knowledge of risk factors for chronic diseases of lifestyle among in-school adolescents in Obio/Akpor LGA, Rivers State. In addition, knowledge of risk factors lifestyle induced chronic diseases was examined based on selected sociodemographic variables such as age, gender and class of study. Based on this, the following null hypotheses were formulated:

(1) There is no significant difference in the knowledge of risk factors for lifestyle induced chronic diseases among secondary school students in Obio/Akpor LGA, Rivers State based on age.
(2) There is no significant difference in the knowledge of risk factors for lifestyle induced chronic diseases among secondary school students in Obio/Akpor LGA, Rivers State based on gender.
(3) There is no significant difference in the knowledge of risk factors for lifestyle induced chronic diseases among secondary school students in Obio/Akpor LGA, Rivers State based on class of study.

MATERIALS AND METHODS

The study utilized descriptive survey research design. The population of this study comprised 22,229 male and female secondary school students in the 20 registered secondary schools in Obio/Akpor LGA, Rivers State (Rivers State Universal Basic Education Board Obio/Akpor Local Government Authority, 2014). The sample for the study constituted 480 students in Obio/Akpor LGA Rivers State. This represented 2.02% of the population. There was no valid estimate for prevalence of lifestyle-induced chronic diseases among students due to dearth of similar study on specific population of secondary school students in Obio/Akpor LGA, thus, the researchers, therefore, assumed that 50% of the secondary schools students would have at least engaged in one unhealthy lifestyle with potential to induce chronic disease at 95% confidence level and 5% margin of error. The sample size was determined using Fisher's (Vaughan and Morrow, 1989) sample size determination formula. The formula and calculation of the sample size are illustrated as:

$$\mathrm{ME} = z\sqrt{\frac{p(1-p)}{n}}$$

where ME is the desired margin of error, z is the z-score, that is, 0.05 for a 95% confidence interval,
p is our prior judgment of the correct value of prevalence of expected attribute/characteristic (50% of students expected to have at least engaged in one lifestyle that has potential to induce chronic disease), and n is the sample size (to be found).
So. in this case, we set ME equal to 0.05, z =1.96 and p=0.5, and n becomes

$0.05 = 1.96\sqrt{0.5\ (1-0.5)/n}$
$0.5 \times 0.5/n = (0.05/1.96)^2$
$0.25/n = 0.00065$

n = 0.25/0.00065 = 384

However, 480 students were eventually included in the study to make up for attrition and non-response. This decision is supported by Gorard's (2003) recommendation that in a survey, due to factors such as non-response, attrition and respondents' mortality, that is, some participants will fail to return copies of questionnaires, abandon research, return incomplete or spoiled copies of the questionnaire, it is advisable to overestimate the sample required, to build in redundancy. All these factors were taken into cognizance during sample size determination for this study. A multi-stage sampling procedure was adopted to select the sample. The first stage involved the use of purposive sampling technique to select four schools out of the existing 20 public secondary schools in Obio/Akpor LGA, Rivers State (Appendix A). This is necessitated by the fact that the four schools selected have large number of students. In similar vein, purposive sampling technique was used to select four classes out of the existing six classes that constituted the secondary school educational system in Nigeria. The rationale for this decision was due to the non-existence of Junior Secondary School Class Three (JSS 3) and Senior Secondary School Class Three (SSS 3) students in the schools at the time of questionnaire administration and retrieval. These groups of students left the schools after their National Examination Council (NECO) and West African Examinations Council (WAEC) conducted exams. Thus, only JSS 1, JSS 2, SS 1 and SS 2 classes were sampled for the study. The third stage involved the use of simple random sampling technique of balloting without replacement to select 30 students each in the four selected classes. This procedure produced a total of 120 students in each of the four selected schools.

Research instrument

A 12-item researcher designed structured questionnaire on risk factors for chronic diseases of lifestyles among students, referred to as Questionnaire on Knowledge of Risk Factors for Lifestyle Induced Chronic Diseases (QKRFLICD) was used to generate quantitative data. The QKRFLICD comprised two major sections, namely: Sections A and B. Section A generated information on socio-demographic variables (age, gender and class of study) of secondary school students. Section B, which comprised nine structured questions with a dichotomous response option of "Yes" or "No" generated information on knowledge of risk factors for lifestyle induced chronic diseases among secondary school students. The respondents were asked to tick (√) either "Yes" or "No" against the questionnaire items. The face validity of QKRFLICD was established by three experts in the Department of Public Health, Faculty of Health Sciences, Madonna University, Nigeria, Elele, Rivers State. Each of the experts was given a draft copy of the questionnaire and accompanied with specific purposes of the study, research questions and hypotheses. The expert's verdict, inputs, corrections and suggestions were used to design the final draft of QKRFLICD. The reliability of the instrument was established using the split-half method and Spearman-Brown Correction Formula. The reliability of instrument was ensured via its administration on 20 secondary school students in Ikwerre local Government Area, Rivers State, which were not part of the study. Copies of the questionnaire were administered once.

In order to gain access to the schools and reach the students, a letter of introduction was collected from the Head, Department of Public Health Madonna University Elele, Rivers State explaining the purpose of study and introducing the investigators. Data collection was done by administering the copies of QKRFLICD to the respondents on face to face basis. The researchers, researcher assistants (RAs) and teachers assisted in administering the questionnaire. Out of 480 copies of the questionnaire distributed, 392 copies were valid and used for data analysis, thus giving 81.7% return rate. A big bag was provided for the secondary school students. They were requested to drop completed copies of the questionnaire into the bag. This helped in ensuring anonymity of the respondents. The completion of the questionnaire was done out of the students' volition.

The data generated were analyzed using Statistical Package for Social Sciences (SPSS version 20). The data were analysed on an item-by-item basis, frequency and percentages were used to analyze the data generated from section B. Chi-square statistic was adopted for data analysis of the formulated null hypotheses. The corresponding p-values of the calculated chi-square (χ^2) values were compared at .05 level of significance and appropriate degrees of freedom.

Inclusion criteria

The inclusion criteria included being a bonafide student of any of the selected schools during 2014/2015 academic session in Obio/Akpor LGA and willingness to participate in the study after given informed consent.

Exclusion criteria

These include not responding to all the items in the copies of the questionnaire, or inappropriate or inconsistent response to the questionnaire items based on the investigators' discretion.

Ethical consideration

Students were given informed consent letters seeking their permission to participate in the study. The students were not coerced to participate in the study.

RESULTS AND DISCUSSION

The prevalence of chronic lifestyle diseases and metabolic syndrome has shown an unprecedented increase in developing nations including Nigeria over the past few decades. Ezzati et al. (2002) reported that in both developing and developed regions, alcohol, tobacco, high blood pressure, and high cholesterol are major causes of the disease burden. There is dearth of information on knowledge of risk factors for lifestyle induced chronic diseases among in-school adolescents. This study was conducted to ascertain of knowledge of risk factors for lifestyle induced chronic diseases among students in Obio/akpor LGA, Rivers State.

Results in Table 1 showed that students had average knowledge (57.8%) of risk factors for lifestyle induced chronic diseases. This finding is in tandem with the findings of Morris et al. (2003) who reported that half of the respondents (49%) agreed that genes can increase the likelihood of medication side effects, 39% endorsed genetic risk for chronic diseases caused by smoking, 27% for influenza and 23% agreed that genes can increase the likelihood of illness in response to environmental exposures such as pesticides.

Data in the Table 2 showed that students within age brackets of 15-19 and 20-24 years had good knowledge of risk factors for lifestyle induced chronic diseases

Table 1. Knowledge of risk factors for lifestyle induced chronic diseases among secondary school students in Obio/Akpor LGA, Rivers State (n = 392).

S/N	Items	Yes		No	
		f	%	f	%
4	Lack of physical activity can lead to obesity and overweight	313	79.8	79	20.2
5	Tobacco use is a risk factor for cancer	274	69.9	118	30.1
6	Eating meals with large calorie content can lead to obesity and overweight	190	48.5	202	51.5
7	Alcohol consumption can lead to cancer	189	48.2	203	51.8
8	Cigarette smoking can cause lung cancer and other respiratory diseases	235	59.9	157	40.1
9	Excessive alcohol consumption is a risk factor for liver disease	243	62.0	149	38.0
10	Consumption of diets with high cholesterol is a risk factor for cardiovascular diseases e.g. hypertension and stroke	142	36.2	250	63.8
11	Abnormal basal metabolic rate is a risk factor for obesity	203	51.8	189	48.2
12	Ageing is a risk factor for stroke and hypertension	250	63.8	142	36.2
	% Average	-	57.8	-	42.2

0-39% = Poor Knowledge; 40-59% = Average Knowledge; 60-79% = Good Knowledge; 80-100% = Very Good knowledge.

Table 2. Knowledge of risk factors for lifestyle induced chronic diseases of among secondary school students based on age (n = 392).

S/N	Items	Age (years)											
		10-14 (n=182)				15-19 (n=176)				20-24 (n=34)			
		Yes		No		Yes		No		Yes		No	
		f	%	f	%	f	%	f	%	f	%	f	%
4	Lack of physical activity can lead to obesity and overweight	143	78.6	39	21.4	153	86.9	23	13.1	17	50.0	17	50.0
5	Tobacco use is a risk factor for cancer	64	35.2	118	64.8	176	100.0	0	0.0	34	100	0	0.0
6	Eating food with large calorie content can lead to obesity and overweight	111	61.0	71	39.0	62	35.2	114	64.8	17	50.0	17	50.0
7	Alcohol consumption can lead to cancer	150	82.4	32	17.6	22	12.5	154	87.5	17	50.0	17	50.0
8	Cigarette smoking can cause lung cancer and other respiratory diseases	64	35.2	118	64.8	154	87.5	22	12.5	17	50.0	17	50.0
9	Excessive alcohol consumption is a risk factor for liver disease	72	39.6	110	60.4	154	87.5	22	12.5	17	50.0	17	50.0
10	Consumption of diets with high cholesterol is a risk factor for CVDs	103	56.6	79	43.4	22	12.5	154	87.5	20	58.8	14	41.2
11	Abnormal basal metabolic rate is a risk factor for obesity	32	17.6	150	82.4	154	87.5	22	12.5	19	55.9	15	44.1
12	Ageing is a risk factor for stroke and hypertension	79	43.4	103	56.6	137	77.8	39	22.2	34	100.0	0	0.0
	% Average	-	49.9	-	50.1	-	65.4	-	36.6	-	62.7	-	37.3

0-39% = Poor Knowledge; 40-59% = Average Knowledge; 60-79% = Good Knowledge; 80-100% = Very Good knowledge.

Table 3. Percentage of knowledge of risk factors for lifestyle induced chronic diseases among secondary school students according to gender (n = 392).

S/N	Items	Gender							
		Male (n=97)				Female (n=295)			
		Yes		No		Yes		No	
		f	%	f	%	f	%	f	%
4	Physical inactivity can lead to obesity and overweight	68	70.1	29	29.9	245	83.1	50	16.9
5	Tobacco use is a risk factor for cancer	54	55.7	43	44.3	220	74.6	75	25.4
6	Eating food with large calorie content can lead to obesity and overweight	57	58.8	40	41.2	133	45.1	162	54.9
7	Alcohol consumption can lead to cancer	56	57.7	41	42.3	133	45.1	162	54.9
8	Cigarette smoking can cause lung cancer and other respiratory diseases	54	55.7	43	44.3	181	61.4	114	38.6
9	Excessive alcohol consumption is a risk factor for liver disease	59	60.8	38	39.2	184	62.4	111	37.6
10	Consumption of diets with high cholesterol is a risk factor for cardiovascular diseases e.g. hypertension and stroke	37	38.1	60	61.9	108	36.6	187	63.4
11	Abnormal basal metabolic rate is a risk factor for obesity	41	42.3	56	57.7	164	55.6	131	44.4
12	Ageing is a risk factor for stroke and hypertension	60	61.9	37	38.1	190	64.4	105	35.6
-	% Average	-	55.7	-	44.3	-	58.7	-	41.3

15-19 years = 65.4% > 20-24 years = 62.7%), while students in age group 10-14 years had average knowledge (49.9%) of risk factors for lifestyle induced chronic diseases. This finding was expected. Evidence from literature reveals that maturation or chronological age is associated with comprehension of certain concepts including risk factors for chronic diseases. As adolescents advance in age their capacity to understand socio-behavioural practices and their inimical consequences improves. The finding is in consistent with those of Sanderson et al. (2011) who found that awareness of genetic risk factors for both diseases was the lowest in the youngest age group, the 16-30-year-olds, which might suggest a need to improve current educational curriculums on genetics. They further stressed that it may be worth targeting genetic educational efforts at young adults, particularly given they are the ones who will be exposed to future genomic developments. The greater awareness of genetic risk factors for chronic diseases amongst older adults may also be due to their greater exposure to death and disease in people close to them, and their consequent greater concern about being healthy and seeking out medical information (Mills and Davidson, 2002). Thus, this finding is tenable.

Data in the Tables 3 and 5 showed that students irrespective of gender had average knowledge of risk factors for lifestyle induced chronic diseases (Female students = 58.7% > Male students = 55.7%). However, female students' percentage score was higher than that of male students. In other words, female students had higher knowledge of risk factors for lifestyle induced chronic diseases than male students. This finding is consistent with those of Peacey et al. (2006) who found high awareness of genetics as a risk factor for breast cancer in an international survey of female students. Results of the study showed that 57% of women were aware of genetic causes overall, and awareness was particularly high among female students in some countries such as the US (94%) and the UK (73%). Female students' consistent exposure to risks associated with chronic diseases may have resulted into acquired experience which might have translated into improved level of knowledge.

Results in the Table 4 showed that JSS 1 and JSS 2 students had good knowledge (JSS 1 = 65.5% > JSS 2 = 63.4%) of risk factors for lifestyle induced chronic diseases, while SS1 and SS2 students had average knowledge (SS 1 = 55.4% > SS 2 = 46.8%) of risk factors for lifestyle induced chronic diseases, respectively. This is a novel finding, because it contradicts results from previous studies conducted on awareness of risk factors for chronic diseases. The finding contradicted the finding of Sanderson et al. (2011) who found that people were significantly more likely to identify genetic factors as influencing heart disease risk if they had higher levels of educational attainment. The inconsistency in

Table 4. Knowledge of risk factors for lifestyle induced chronic diseases among students based on class of study (n = 392).

S/N	Items	Class of Study							
		JSS 1 (n=97)		JSS 2 (n=99)		SS 1 (n=98)		SS 2 (n=98)	
		Yes	No	Yes	No	Yes	No	Yes	No
		f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)
4	Physical inactivity can lead to obesity and overweight	95 (97.9)	2 (2.06)	69 (69.7)	30 (30.3)	89 (90.8)	9 (9.2)	58 (59.2)	40 (40.8)
5	Tobacco use is a risk factor for cancer	72 (74.2)	25 (25.8)	99 (100)	0 (0.0)	46 (46.9)	52 (53.1)	57 (58.2)	41 (41.8)
6	Eating food with high calorie content can lead to obesity and overweight	69 (71.1)	28 (28.9)	30 (30.3)	69 (69.7)	71 (72.4)	27 (27.6)	20 (20.4)	78 (79.6)
7	Alcohol consumption can lead to cancer	44 (45.4)	53 (54.6)	32 (32.3)	67 (67.7)	63 (64.3)	35 (35.7)	50 (51.0)	48 (49.0)
8	Cigarette smoking can cause lung cancer and other respiratory diseases	72 (74.2)	25 (25.8)	67 (67.7)	32 (32.3)	46 (46.9)	52 (53.1)	50 (51.0)	48 (49.0)
9	Excessive alcohol consumption is a risk factor for liver disease	95 (97.9)	2 (2.06)	67 (67.7)	32 (32.3)	54 (55.1)	44 (44.9)	25 (25.5)	73 (74.5)
10	Consumption of diets with high cholesterol is a risk factor for cardiovascular diseases e.g. hypertension and stroke	19 (19.6)	78 (80.4)	34 (34.3)	65 (65.7)	22 (22.4)	76 (77.6)	70 (71.4)	28 (28.6)
11	Abnormal basal metabolic rate is a risk factor for obesity	53 (54.6)	44 (45.4)	69 (69.7)	30 (30.3)	35 (35.7)	63 (64.3)	48 (49.0)	50 (51.0)
12	Ageing is a risk factor for stroke and hypertension	53 (54.6)	44 (45.4)	99 (100)	0 (0.0)	63 (64.3)	35 (35.7)	35 (35.7)	63 (64.3)
	% Average	65.5	34.5	63.4	36.6	55.4	44.6	46.8	53.2

Table 5. Summary of Chi-square analysis of no significant difference in the knowledge of risk factors for lifestyle induced chronic diseases among students based on age (n = 392).

S/N	Items	Age (years)														
		10-14 (n=182)				15-19 (n=176)				20-24 (n=34)						
		Yes		No		Yes		No		Yes		No				
		O	E	O	E	O	E	O	E	O	E	O	E	$\chi^{2\text{-Cal}}$	P-Val.	*Dec.
4	Item 4	143	145.3	39	36.7	153	140.5	23	35.5	17	27.1	17	6.9	24.497	0.000	*
5	Item 5	64	127.2	118	54.8	176	123.0	0	53.0	34	23.8	0	10.2	194.789	0.001	*
6	Item 6	111	88.2	71	93.8	62	85.3	114	90.7	17	16.5	17	17.5	23.810	0.000	*
7	Item 7	150	87.8	32	94.3	22	84.9	154	91.1	17	16.4	17	17.6	175.229	0.001	*
8	Item 8	64	109.1	118	72.9	154	105.5	22	70.5	17	20.4	17	13.6	103.604	0.000	*
9	Item 9	72	112.8	110	69.2	154	109.1	22	66.9	17	21.1	17	12.9	89.542	0.000	*
10	Item 10	103	67.3	79	114.7	22	65.1	154	110.9	20	12.6	14	21.4	82.252	0.001	*
11	Item 11	32	95.2	150	86.8	154	92.0	22	84.0	19	17.8	15	16.2	175.520	0.000	*
12	Item 12	79	116.1	103	65.9	137	112.2	39	63.8	34	21.7	0	12.3	67.069	0.000	*
-	-	-	-	-	-	-	-	-	-	-	-	-	-	104.03	0.000	-

*Significant at $p < 0.05$; *****Dec. = Decision; *Not significant; **Significant. Item 4 = Physical inactivity can lead to obesity and overweight; Item 5 = Tobacco use is a risk factor for cancer; Item 6 = Eating food with large calorie content can lead to obesity and overweight; Item 7 = Alcohol consumption can lead to cancer; Item 8 = Cigarette smoking can cause lung cancer and other respiratory diseases; Item 9 = Excessive alcohol consumption is a risk factor for liver disease; Item 10 = Consumption of diets with high cholesterol is a risk factor for cardiovascular diseases e.g. hypertension and stroke; Item 11 = Abnormal basal metabolic rate is a risk factor for obesity; Item 12 = Ageing is a risk factor for stroke and hypertension.

Table 6. Summary of Chi-square analysis of no significant difference in the knowledge of risk factors for lifestyle induced chronic diseases among students based on gender (n=392).

Items	Gender										
	Male (n=97)				Female (n=295)						
	Yes		No		Yes		No				
	O	E	O	E	O	E	O	E	χ^{2}-cal	P-Val	*Dec
Physical inactivity can lead to obesity and overweight	68	77.5	29	19.5	245	235.5	50	59.5	7.605	0.006	*
Tobacco use is a risk factor for cancer	54	67.8	43	29.2	220	206.2	75	88.5	12.401	0.000	*
Eating food with large calorie content can lead to obesity and overweight	57	47.0	40	50.0	133	143.0	162	152.8	5.468	0.019	*
Alcohol consumption can lead to cancer	56	46.8	41	50.2	133	142.2	162	152.8	4.676	0.031	**
Cigarette smoking can cause lung cancer and other respiratory diseases	54	58.2	43	38.8	181	176.8	114	118.2	0.983	0.321	**
Excessive alcohol consumption is a risk factor for liver disease	59	60.1	38	36.9	184	182.9	111	112.1	0.074	0.785	**
Consumption of diets with high cholesterol is a risk factor for cardiovascular diseases e.g. hypertension and stroke	37	35.9	60	61.1	108	109.1	187	185.9	0.074	0.786	**
Abnormal basal metabolic rate is a risk factor for obesity	41	50.7	56	46.3	164	154.3	131	140.7	5.196	0.023	*
Ageing is a risk factor for stroke and hypertension	60	61.9	37	35.1	190	188.1	105	106.9	0.206	0.650	**
	-	-	-	-	-	-	-	-	**4.076**	**0.291**	*

*Significant at p < 0.05. *****Dec.: Decision. *Not significant; **Significant.

findings of both studies may be attributed to subjects' composition, data collection procedures and study settings.

Table 5 indicates that no significant difference (χ^{2} = 104.03, p = 0.00 < 0.05) was found in the knowledge of risk factors for lifestyle induced chronic diseases among students based on age. This implied that knowledge of risk factors for lifestyle induced chronic diseases among secondary school students was not dependent on age.

Table 6 shows that a significant difference (χ^{2} = 4.08, p = 0.291, p = 0.29 > 0.05) was found in the knowledge of risk factors for lifestyle induced chronic diseases among students based on gender. This implied that knowledge of risk factors for lifestyle induced CDs differed by gender among students.

Table 7 indicates that no significant difference (x^{2} = 63.69, p = 0.00 <0.05) was observed in the knowledge of risk factors for lifestyle induced chronic diseases among students based on class of study. This implied knowledge of risk factors for lifestyle induced chronic diseases among secondary school students was not dependent on class of study.

In conclusion, our finding shows that students had average knowledge of risk factors for lifestyle induced chronic diseases. It is important to understand the impact of information dissemination on risk factors for lifestyle induced chronic diseases in the public domain including school settings especially among adolescents who constitute the most vulnerable group. Prospective studies are now needed to determine whether introducing valid health information via health education to students who were previously unaware of it is equally benevolent, and to find ways to communicate health information on risk factors for lifestyle induced chronic diseases that maximize positive outcomes and minimize negative outcomes.

RECOMMENDATIONS

(1) Implementation of vigorous awareness campaign through public health education and school health education on health risks of unhealthy lifestyles.
(2) Integration of nutrition education into the syllabuses of subjects such as Health Education, Home Economics, Biology and Health Science that will help educate students on risk factors for lifestyle induced chronic diseases.
(3) Interventions directed at reducing smoking, obesity and alcohol use as well as increasing physical activity, fruit and vegetable intake, which are necessary to prevent onset of chronic disease of lifestyle become expedient should be implemented.
(4) Efforts should be geared towards eliminating

Table 7. Summary of Chi-square analysis of no significant difference in the knowledge of risk factors for lifestyle induced chronic diseases among secondary school students based on class of study (n=392).

Items	Class of Study																		
	JSS 1 (n=97)				JSS 2 (n=99)				SS 1 (n=98)				SS 2 (n=98)						
	Yes		No		Yes		No		Yes		No		Yes		No				
	O	E	O	E	O	E	O	E	O	E	O	E	O	E	O	E	χ^2–cal.	P-val.	*Dec.
Item 4	97	77.5	0	19.5	69	79.0	30	20.0	89	78.3	9	19.8	58	78.3	40	19.8	64.152	0.000	*
Item 5	72	67.8	25	29.2	99	69.2	0	29.8	46	68.5	52	29.5	57	68.5	41	29.5	74.464	0.000	*
Item 6	69	47.0	28	50.0	30	48.0	69	51.0	71	47.5	27	50.5	20	47.5	78	50.5	86.489	0.000	*
Item 7	44	46.8	53	50.2	32	47.7	67	51.3	63	47.3	35	50.8	50	47.3	48	50.8	20.776	0.001	*
Item 8	72	58.2	25	38.8	67	59.3	32	39.7	46	58.8	52	39.3	50	58.8	48	39.3	20.861	0.000	*
Item 9	97	60.1	0	36.9	67	61.4	32	37.6	54	60.8	44	37.3	25	60.8	73	37.3	118.158	0.000	*
Item 10	19	35.9	78	61.1	34	36.6	65	62.4	22	36.3	76	61.8	70	36.3	28	61.8	71.660	0.000	*
Item 11	53	50.7	44	46.3	69	51.8	31	47.2	35	51.3	63	46.8	48	51.3	50	46.8	23.462	0.001	*
Item 12	53	61.9	44	35.1	99	63.1	0	35.9	63	62.5	35	35.5	35	62.5	63	35.5	93.151	0.000	*
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	63.690	0.000	-

*Significant at $p < 0.05$.

currently known risk factors for lifestyle induced chronic diseases among students.

Conflict of Interests

The authors have not declared any conflict of interests.

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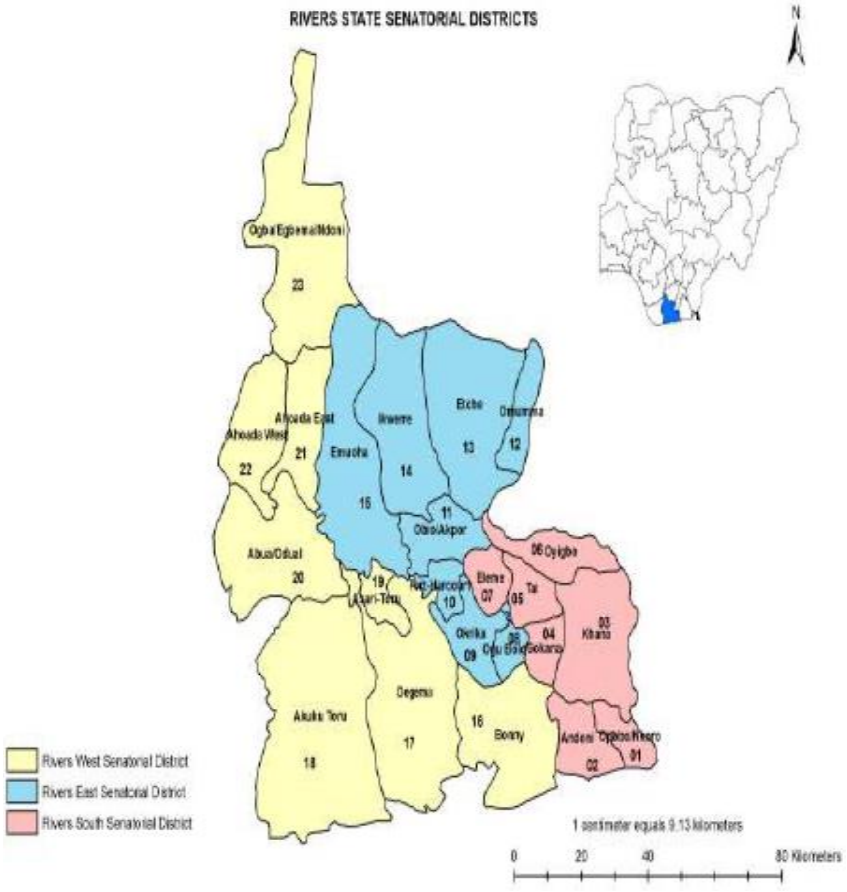
Appendix A. List of secondary schools in Obio/Akpor LGA, Rivers State.

S/N	Name and location of school
1	Army Day Secondary School
2	Community Boys Secondary School, Elelenwo
3	Government Secondary School, Eneka
4	Community Secondary School, Mgbuoshimini Rumueme
5	Oginigba Community Secondary School, Oginigba
6	Community Secondary School, Okosonuodu
7	Community Secondary School, Okporo
8	Community Secondary School, Olanada
9	Government Technology College, Portharcourt
10	Community Secondary School, Rumuokwurusi
11	Model Girls Secondary School, Rumueme
12	Government Girls Secondary School, Rumuokwuta
13	Community Secondary School, Rumuekini
14	Community Secondary School, Rumuolumeni
15	Community Secondary School, Rukpoku
16	Community Secondary School, Rumuapara
17	Community Secondary School, Rumuomasi
18	Community Secondary School, Rumuodumaya
19	Community Secondary School, Rumuepirikom
20	Community Secondary School, Ogbogoru



Appendix B. Map of River State Senetorial District.