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Research Article

Knowledge of Non-Communicable Diseases Among Adolescents in Public and Private Secondary Schools in Port Harcourt, Rivers State, Nigeria

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Abstract

Background: Non-communicable diseases (NCDs) are the leading causes of poor health and early death globally. Although NCDs are most common in middle to late adulthood, many lifestyle habits that contribute to these diseases begin during adolescence. This research evaluated the knowledge of non-communicable diseases among adolescents in public and private secondary schools in Port Harcourt, Rivers State. *Methods*: The study used a comparative cross-sectional design to collect research data from 640 adolescents. Participants were selected through a multi-stage sampling technique and data was analysed using IBM Statistical Product for the Service Solution version 29. *Results*: Few respondents from private (6.3%) and public (5.3%) schools had good knowledge, majority from private (75%) and public (66.9) schools had fair knowledge, while 18.8% (private) and 27.8% (public) had poor knowledge on non-communicable diseases. Socioeconomic status and knowledge level were statistically significant ($p<0.05$). The prevalence of NCDs (asthma, diabetes, high blood pressure) was 3.4% and 2.5% among private and public school adolescents. *Conclusion*: There is need for continuous health education on NCDs risk factors among adolescents to ensure they adopt healthy lifestyles through informed choices to foster good and quality health into adulthood.

Keywords

Non-communicable Diseases, Adolescents, Knowledge, Public Schools, Private Schools

1. Introduction

Non-communicable diseases (NCDs) are characterized by a complex etiology, multiple risk factors, and a prolonged latency period. They are non-contagious and non-transmissible, posing a major global health concern, adding to the burden of morbidity and mortality among people [1]. As the leading causes of poor health and premature death globally, NCDs contribute to about 70% of total annual deaths, with 77% occurring in low and middle-income coun-

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tries. This is due to the larger populations of people with NCDs in these regions and these deaths predominantly occur during working age [2]. The priority NCDs to the World Health Organization (WHO) are cardiovascular diseases, diabetes, cancers, and chronic respiratory diseases because of their public health significance. Global health estimates from WHO [3] indicated that 44% of deaths worldwide are caused by cardiovascular disease (CVDs), 9% from cancer, 9% from chronic respiratory disorders, and 4% from diabetes. Nigeria had an estimated 792,600 NCD-related deaths in 2008 [4].

NCDs are on the rise in countries like Ghana, Nigeria, and South Africa. At the same time, these countries continue to face challenges posed by communicable and poverty-related diseases, including infant mortality, malaria, malnutrition, cholera [5]. By 2030, NCDs are expected to surpass communicable and poverty-related diseases in Africa [3]. Deaths from chronic non-communicable diseases are already predominant in several developing countries, like Pakistan and India [3].

Although NCDs are mostly prevalent in middle to late adulthood, most lifestyle habits begin in adolescence, leading to approximately 70% of premature adult deaths [6]. There is an increasing burden of NCDs among children and adolescents with over 2.1 billion predicted to be affected globally [7]. Adolescents comprised 1.2 billion of the world's population in 2012 [8] and 21.5% of Nigeria's population as of 2013 [9].

NCDs result from a combination of non-modifiable and modifiable risk factors. Modifiable risk factors are preventable. Preventable behavioural factors include tobacco use, unhealthy diet, harmful alcohol consumption, physical inactivity, and metabolic factors like overweight/obesity, elevated blood pressure, cholesterol, and glucose levels [1]. Non-modifiable factors include age, gender, race, ethnicity, and genetics [5]. Although an individual may experience these risk factors for NCDs alone or in combination, the co-occurrence of multiple risk factors significantly increases an individual's risk for NCDs. The incidence of the above-mentioned risk behaviours is increasing among young people globally [10].

In developing countries, the prevalence of chronic diseases among adolescents has also been linked to increased calorie intake and decreased physical activity due to rapid urbanization and economic growth [5]. These risk factors are frequently disregarded in adolescents, seldom appear before adulthood, and/or go undetected in part since adolescents are hard to reach and frequently thought of as healthy [11].

Good health and quality of life for adolescents are influenced by knowledge of healthy lifestyles and dietary habits [12]. Investigating adolescents' knowledge of NCDs aligns with global health priorities, with major focus on equipping them with adequate knowledge about NCDs and preventive practices. School-based education is significant in preventing NCDs among adolescents [13]. This study aims to assess and compare the knowledge of non-communicable diseases among adolescents in public and private secondary schools in Port Harcourt, Rivers State.

2. Methods

2.1. Study Design

This study employed a comparative cross-sectional design.

2.2. Study Settings

The study was conducted in Public and Private Secondary Schools in Port Harcourt, Rivers State. Port Harcourts is a major industrial area and the capital of Rivers State in Nigeria. It is located along the Bonny River in the Niger Delta region. English is the official language of the state. The major tribal languages spoken in the state are Ikwerre, Okrika, and Kalabari. Rivers State consists of three Senatorial Districts—Rivers East, Rivers South-East, and Rivers West—comprising a total of 23 Local Government Areas (LGAs) with a projected population of 7.3 million according to National Bureau of Statistics in 2016. Port Harcourt is made up of Port Harcourt, Obio-Akpor and parts of Eleme local government area. Obio-Akpor local government area has an estimated population of 665,000 [14] and consists of 17 wards. In Obio-Akpor LGA, there are 42 public and 742 registered private secondary schools [15].

2.3. Study Participants

The research was conducted among adolescents from 10-19 years of age in selected Public and Private Secondary Schools, and Wards in Obio-Akpor local government area in Port Harcourt, Rivers State.

2.4. Sample Size

The minimum sample size was estimated using the formula for two proportions [16].

$$n = \frac{(\mathrm{Z}\alpha + \mathrm{Z}\beta)^2 \, (P_1 \, (1 - P_1) + P_2 \, (1 - P_2))}{(P_1 - P_2)^2}$$

Zα = the test statistic at a 95% confidence interval given as 1.96; Zβ =The critical value of the standard normal distribution at the desired power is 80% (0.84); P_1 = Prevalence of prehypertension and hypertension among adolescents in private school 2.44%; P_2 = Prevalence of prehypertension and hypertension among adolescents in public school 8.84% from a study in Anambra State, Nigeria [17]. With 20% non-response rate [18], the minimum sample size for this study was 250 for each group. However, the sample size was increased to 320 to ensure robust comparison as prevalence obtained was from a non-comparative study with unequal sample sizes [19, 20].

2.5. Sampling Technique

A multistage sampling procedure was used to select participants from public and private secondary schools for this study.

In the first stage, one Local Government Area (LGA) was randomly selected from the two LGAs (Obio-Akpor and Port Harcourt) within Port Harcourt metropolis using a balloting method, and Obio-Akpor LGA was selected for the study. In the second stage, four wards were randomly selected from the 17 wards in Obio-Akpor LGA, also by balloting, to ensure diverse student participation. The selected wards were 7, 9, 13, and 15. In the third stage, one community was randomly selected from wards 7, 9, and 15, while two communities were selected from ward 13, using a simple random sampling method. The five communities from the four wards were Rumuokoro (ward 7), Rumuepirikom (ward 9), Rumuosi (ward 15), and Rumuokuta/Mgbouba (ward 13). In the fourth stage, one secondary school was randomly selected from each of these five communities. Schools in each community were listed, and the balloting method was used to choose two public and three private secondary schools, totaling five schools. In the final stage, simple random sampling was employed to select 320 adolescents from the selected public and private secondary schools proportionately. The students were selected from junior secondary class three to senior secondary class three, with each student being assigned a number and those selected through balloting included in the study according to the inclusion and exclusion criteria.

2.6. Study Instrument

A structured questionnaire, adapted from the WHO [21] standard STEPS instrument on NCDs and the study by Eviano [22]. The self-administered questionnaire written in English, included both open-ended and multiple-choice questions and was organized into various subsections. These subsections included socio-demographic characteristics, family structure and socio-economic status, personal and family medical history, and respondents' knowledge of non-communicable diseases. To ensure clarity and consistency, the questionnaire was pretested in Port Harcourt Local Government Area (PHALGA), outside the main study area. The pretest results aligned with the study's hypotheses, accurately capturing the variables relevant to the research questions, with respondents providing consistent answers. Minor adjustments were made based on the feedback to enhance clarity. The Cronbach's alpha values for each section of the questionnaire were as follows: Family structure and socioeconomic characteristics (0.80), Personal and family medical history (0.75), and Knowledge of non-communicable diseases (0.85), all at α=0.05. These values indicate that the items in each section effectively measured their intended constructs, ensuring the accuracy and consistency of the responses.

2.7. Data Analysis

Data collected from the participants were coded and entered into a Microsoft Excel spreadsheet and statistical analysis was carried out using IBM Statistical Product and Service Solution (SPSS) software version 29.0. Data analysis was carried out using descriptive and inferential statistics.

Descriptive statistics were expressed as means and standard deviations for continuous variables while proportions and percentages for categorical variables (sex, religion, ethnicity). Inferential statistics using the Chi-squared test of significance was carried out to compare categorical variables, and independent t-tests to analyse continuous variables. P value < 0.05 was considered significant, indicating that there is a meaningful relationship between the variables.

2.8. Study Duration

This study was carried out from September 2023 to September 2024

3. Results

Table 1 shows that majority of students are in senior secondary class 1 (40.94%, private) and senior secondary class 2 (41.25%, public). Gender distribution showed a slight majority of females (50.78%) in private and males (49.21%) public school with majority between 10-14 years in both schools (74.06%, private, 55.63%, public). The predominant ethnic group and religion was Igbo (40.94%, private, 50%, public), and Christianity (94.69%, private, 95.62%, public).

Table 1. *Socio-demographic Characteristics.*

Variable	Private (N=320) n (%)	Public (N=320) n (%)	Total (N=640) n (%)
Class			
JSS 3	97 (30.31)	97 (30.31)	194 (30.31)
SS 1	131 (40.94)	91 (28.44)	222 (34.69)
SS 2	65 (20.31)	132 (41.25)	197 (30.78)

Variable	Private (N=320) n (%)	Public (N=320) n (%)	Total (N=640) n (%)
SS 3	27 (8.44)	0 (0.00)	27 (4.22)
Sex			
Male	133 (41.56)	182 (56.88)	315 (49.21)
Female	187 (58.44)	138 (43.12)	325 (50.78)
Age in group (years)			
10 - 14	237 (74.06)	178 (55.63)	415 (64.84)
15 - 19	83 (25.94)	142 (44.37)	225 (35.16)
Ethnicity			
Igbo	131 (40.94)	160 (50.00)	291 (45.47)
Yoruba	10 (3.12)	17 (5.31)	27 (4.22)
Hausa	6 (1.87)	0 (0.00)	6 (0.94)
Ikwerre	55 (17.19)	28 (8.75)	83 (12.97)
Kalabari	11 (3.44)	8 (2.50)	19 (1.41)
Others	107 (33.44)	107(33.44)	214 (33.44)
Religion			
Christianity	303 (94.69)	306 (95.62)	609 (95.16)
Islam	15 (4.69)	8 (2.50)	23 (3.59)
Traditional	2 (0.62)	6 (1.88)	8 (1.25)

Table 2. *Family Structure and Socio-economic Characteristics of Respondents.*

Variable	Private (N=320) n (%)	Public (N=320) n (%)	Total (N=640) n (%)	X^2	P-value
Family type					
Monogamous	297 (92.8)	306 (85.6)	603 (94.2)	2.324	0.127
Polygamous	23 (7.2	14 (4.4	37 (5.8)		
Family size					
≤ 3	27 (8.4)	12 (3.8)	39 (6.1)		
4 - 6	178 (55.6)	187 (58.4)	365 (57.0)	6.144	0.046
> 6	115 (35.9)	121 (37.8)	236(36.9)		
Father's educational level					
No formal education	2 (0.6)	2 (0.6)	4 (0.6)		
Primary	13 (4.1)	9 (2.8)	22 (3.4)		
Secondary	37 (11.6)	43 (13.4)	80 (12.5)	7.042	0.134
Tertiary	159 (49.7)	133 (41.6)	292 (45.6)		
I don't know	109 (34.1)	133 (41.6)	242 (37.8)		
Mother's educational level					
No formal education	6 (1.9)	0 (0.00)	6 (0.9)	17.170	0.002
Primary	4 (1.3)	8 (2.5)	12 (1.9)		

Variable	Private (N=320) n (%)	Public (N=320) n (%)	Total (N=640) n (%)	X^2	P-value
Secondary	44 (13.8)	55 (17.2)	99 (15.5)		
Tertiary	175 (54.7)	137 (42.8)	312 (48.8)		
I don't know	91 (28.4)	120 (37.5)	211 (33.0)		
Father's occupation					
Petty trader	6 (1.9)	20 (6.3)	26 (4.1)		
Artisan	9 (2.8)	14 (4.4)	23 (3.6)		
Retired civil servant	10 (3.1)	11 (3.4)	21 (3.3)	12.873	0.012
Businessman	154 (48.1)	122 (38.1)	276 (43.1)		
Others (civil servant, lawyer etc)	141 (44.1)	153 (47.8)	294 (45.9)		
Mother's occupation					
Petty trader	22 (6.9)	61 (19.1)	83 (13.0)		
Retired civil servant	17 (5.3)	10 (3.1)	27 (4.2)		
Businesswoman	175 (54.7)	130 (40.6)	305 (47.7)	27.531	0.001
Others (farmer, civil servant, artisan, lawyer)	106 (33.1)	119 (37.2)	225 (35.2)		
Father's estimated monthly income (₦)					
≤ 30,000	18 (5.6)	22 (6.9)	40 (6.3)		
31,000- 60,000	9 (2.8)	24 (7.5)	33 (5.2)		
61,000-90,000	18 (5.6)	22 (6.9)	40 (6.3)	18.549	0.002
91,000- 120,000	65 (20.3)	37 (11.6)	102 (15.9)		
>120,000	91 (28.4)	75 (23.4)	166 (25.9)		
I don't know	119 (37.2)	140 (43.8)	259 (40.5)		
Mother's estimated monthly income (₦)					
≤ 30,000	31 (9.7)	36 (11.3)	67 (10.5)		
31,000- 60,000	52 (16.3)	41 (12.8)	93 (14.5)		
61,000-90,000	26 (8.1)	46 (14.4)	72 (11.3)		
91,000- 120,000	42 (13.3)	38 (11.9)	80 (12.5)	10.352	0.066
>120,000	62 (19.4)	45 (14.1)	107 (16.7)		
I don't know	107 (33.4)	114 (35.6)	221 (34.5)		

Table 2 shows that most students, both in private (92.8%) and public (85.6%) schools, came from monogamous families, with a majority having 4-6 family members. Fathers' tertiary education levels were 49.7% and 41.6% in private and public schools. Business was the leading occupation for fathers (48.1% private, 38.1% public) and mothers (54.7% private, 40.6% public). A larger proportion of parents in private schools earned over ₦120,000 per month compared to public school parents. However, lower income levels were more common among public school families. Significant differences were found between private and public school respondents in family size, parents' education, occupation, and income ($p<0.05$).

Table 3. *Knowledge of the Respondents on Non-communicable Diseases.*

Variable	Private (N=320) n (%)	Public (N=320) n (%)	Total (N=640) n (%)	X^2	P-value
Education on NCDs					
Yes	227 (70.9)	212 (66.3)	439 (68.9)	1.632	0.201
No	93 (29.1)	108 (33.8)	201 (31.4)		
Knowledge on NCD Diabetes					
Yes	157 (49.1)	152 (47.5)	309 (48.3)	0.156	0.692
No	163 (50.9)	168 (52.5)	331 (51.7)		
Chronic respiratory disorders					
Yes	34 (10.6)	37 (11.6)	71 (11.1)	0.143	0.706
No	286 (89.4)	283 (88.4)	569 (88.9)		
Cancer					
Yes	157 (49.1)	98 (30.6)	255 (39.8)	22.693	0.001
No	163 (50.9)	222 (69.4)	385 (60.2)		
Cardiovascular disease					
Yes	79 (24.7)	62 (19.4)	141 (22.0)	2.629	0.105
No	241 (75.3)	258 (80.6)	499 (78.0)		
Lack of physical activity leads to obesity/ overweight					
Yes	263 (82.2)	254 (79.4)	517 (80.8)	0.815	0.367
No	57 (17.8)	66 (20.6)	123 (19.2)		
Tobacco/cigarette use a risk factor for--Diabetes					
Yes	18 (5.6)	35 (10.9)	53 (8.3)	5.945	0.015
No	302 (94.4)	285 (89.1)	587 (91.7)		
Chronic respiratory disorders					
Yes	118 (36.9)	118 (36.9)	236 (36.9)	0.000	1.000
No	202 (63.1)	202 (63.1)	404 (63.1)		
Cancer					
Yes	157 (49.1)	131 (40.9)	288 (45.0)	4.268	0.039
No	163 (50.9)	189 (59.1)	352 (55.0)		
Cardiovascular disease					
Yes	73 (22.8)	57 (17.8)	130 (20.3)	2.471	0.116
No	247 (77.2)	263 (82.2)	510 (79.7)		
High fatty and fast foods can lead to obesity/overweight.					
Yes	266 (83.1)	237 (74.1)	503 (78.6)	7.811	0.005
No	54 (16.9)	83 (25.9)	137 (21.4)		
Alcohol is a risk factor for Diabetes					
Yes	68 (21.3)	67 (20.9)	135 (21.1)	0.009	0.923
No	252 (78.8)	253 (79.1)	505 (78.9)		

Variable	Private (N=320) n (%)	Public (N=320) n (%)	Total (N=640) n (%)	X^2	P-value
Chronic respiratory disorders					
Yes	104 (32.5)	77 (24.1)	181 (28.3)	5.616	0.018
No	216 (67.5)	243 (75.9)	459 (71.7)		
Cancer					
Yes	90 (28.1)	73 (22.8)	163 (25.5)	2.379	0.123
No	230 (71.9)	247 (77.2)	477 (74.5)		
Cardiovascular disease					
Yes	73 (22.8)	72 (22.5)	145 (22.7)		
No	247 (77.2)	248 (77.5)	495 (77.3)	0.009	0.925
Total	320 (100.0)	320 (100.0)	640 (100.0)		
Fatty food a risk factor for CVDs					
Yes	233 (72.8)	194 (60.6)	427 (66.7)	10.703	0.001
No	87 (27.2)	126 (39.4)	213 (33.3)		

Table 3 shows that most respondents (70.9% private, 66.3% public) reported receiving education on NCDs, with diabetes being the most recognized (49.1% private, 47.5% public). Large proportion of respondents identified lack of physical activity as an obesity risk (82.2% private, 79.4% public) and linked fast food consumption to obesity (83.1% private, 74.1% public). Alcohol and fatty foods were also associated with various NCDs, with private school students generally showing higher awareness. Significant differences were observed in knowledge regarding cancer, tobacco use as a risk factor for diabetes and cancer, alcohol's link to chronic respiratory disorders, and fatty foods as a risk factor for obesity and cardiovascular diseases ($p<0.05$).

Table 4. *Knowledge Score of the Respondents on Non-Communicable Diseases.*

Variable	Private N (%)	Public N (%)	Total N (%)	X^2	P-value
Knowledge Score Classification					
Poor (1-3)	60 (18.8)	89 (27.8)	149 (23.3)		
Fair (4 - 8)	240 (75.0)	214 (66.9)	454 (70.9)	7.377	0.025
Good (9-11)	20 (6.3)	17 (5.3)	37 (5.8)		
Total	320 (100.0)	320 (100.0)	640 (100.0)		

Table 4 shows that majority of the respondents from private (75%) and public (66.9) schools had fair knowledge, 18.8% (private) and 27.8% (public) had poor knowledge while a few 6.3% (private) and 5.3% (public) had good knowledge on NCDs. Significant difference was observed in both groups about their knowledge on NCDs ($p<0.05$).

Table 5. *Independent t-test on knowledge of NCDs.*

Variable	N	Min- Max Score	Mean Score ± SD	Total (Mean Score ± SD)	t-test	P-value
Private	320	1-10	4.9 ±1.8	4.7 ±1.8	2.029	0.043

Variable	N	Min- Max Score	Mean Score ± SD	Total (Mean Score ± SD)	t-test	P-value
Public	320	1-10	4.6±1.8			

Table 5 shows significant difference between private and public school respondents with p-value 0.043.

Table 6. *Personal and Family Medical History of the Respondents.*

Variable	Private (N=320) n (%)	Public (N=320) n (%)	Total (N=640) n (%)	Fishers' Exact test	P-value
Respondent long-standing illness: Heart problem					
Yes	7 (2.2)	0 (0.00)	7 (1.1)	7.077	0.008
No	313 (97.8)	320 (100.0)	633 (98.9)		
Diabetes					
Yes	0 (0.00)	2 (0.6)	2 (0.3)	2.006	0.157
No	320 (100.0)	318 (99.4)	638 (99.7)		
Obesity/overweight					
Yes	1 (0.3)	0 (0.00)	1 (0.2)	1.002	0.317
No	319 (99.7)	320 (100.0)	639 (99.8)		
High blood pressure					
Yes	0 (0.00)	1 (0.3)	1 (0.2)	1.002	0.317
No	320 (100.0)	319 (99.7)	639 (99.8)		
Cancer					
No	320 (100.0)	320 (100.0)	640 (100.0)		
Asthma					
Yes	11 (3.4)	5 (1.6)	16 (2.5)	2.308	0.129
No	309 (96.6)	315 (98.4)	624 (97.5)		
Others (myopia, ulcer, migraine, etc)					
Yes	30 (9.4)	9 (2.8)	39 (6.1)	12.041	0.001
No	290 (90.6)	311 (97.2)	601 (93.9)		
Respondent currently on medication					
Yes	36 (11.3)	6 (1.9)	42 (6.6)	22.934	0.001
No	284 (88.8)	314 (98.1)	598 (93.4)		
History of family illness: Heart problem					
Yes	6 (1.9)	1 (0.3)	7 (1.1)	3.611	0.057
No	314 (98.1)	319 (99.7)	633 (98.9)		
Diabetes					
Yes	13 (4.1)	12 (3.8)	25 (3.9)	0.042	0.838
No	307 (95.9)	308 (96.3)	615 (96.1)		
Obesity/overweight					
Yes	4 (1.3)	0 (0.00)	4 (0.6)	4.025	0.045

Variable	Private (N=320) n (%)	Public (N=320) n (%)	Total (N=640) n (%)	Fishers' Exact test	P-value
No	316 (98.8)	320 (100.0)	636 (99.4)		
High blood pressure					
Yes	44 (13.8)	41 (12.8)	85 (13.3)	0.122	0.727
No	276 (86.3)	279 (87.2)	555 (86.7)		
Cancer					
Yes	1 (0.3)	2 (0.6)	3 (0.5)	0.335	0.563
No	319 (99.7)	318 (99.4)	637 (99.5)		
Asthma					
Yes	13 (4.1)	2 (0.6)	15 (2.3)	8.260	0.004
No	307 (95.9)	318 (99.4)	625 (97.7)		
Asthma					
Yes	13 (4.1)	2 (0.6)	15 (2.3)	8.260	0.004
No	307 (95.9)	318 (99.4)	625 (97.7)		
Others (myopia, ulcer, migraine, etc)					
Yes	25 (7.8)	2 (0.6)	27 (4.2)	20.456	0.001
No	295 (92.2)	318 (99.4)	613 (95.8)		
If yes, family member with long-standing illness:					
Mother	39 (39.8)	18 (32.7)	57 (37.3)		
Father	30 (30.6)	19 (34.5)	49 (32.0)		
Both parents	9 (9.2)	9 (16.4)	18 (11.8)	2.490	0.477
Grandparent	20 (20.4)	9 (16.4)	29 (19.0)		
Total	98 (100.0)	55 (100.0)	153 (100.0)		

Table 6 shows that among private school students, 2.2% had heart problems, 3.4% had asthma. Public school students had slightly lower rates of these conditions. Medication use was reported by 35.3% of public-school respondents, compared to 44.4% of private school students. Hypertension was noted as a common family health issue (13.8% private, 12.8% public), with diabetes also present in both groups. Significant differences were observed in asthma, obesity/overweight and heart problems between private and public-school students ($p<0.05$).

4. Discussion

Access to quality health education cannot be overemphasized during adolescence, a period marked by significant changes (social, psychological, and physical aspects). This study found similarly distribution in gender, ethnicity, and religion. Most respondents came from monogamous families with 4-6 members, however, private school students had more smaller family unit whose parents had more tertiary education and higher incomes. Public school students were more likely to come from lower-income families with parents as petty trades. These differences indicate that socioeconomic background significantly influences school choice and educational experiences. Akinsanya et al. [23] in Ogun State found that parental education and income strongly influence school choice and academic performance, with wealthier and better-educated families favoring private schools. Similarly, Oduro-Ofori et al. [24] in Ghana highlighted that private school students generally come from higher socioeconomic backgrounds. In contrast, Heyneman and Stern [25] noted that in some developing countries, school quality and parental perceptions could outweigh socioeconomic factors. Students from both socioeconomic backgrounds may face similar challenges in their academics, other factors such as personal motivation, persistence, and parental support will enhance academic performance [26]. Ibadin & Akpede [27] socioeconomic status (SES) classification was used and showed

that families of private school students were predominantly in the high and middle SES brackets. In contrast, public school students mainly belonged to middle and lower SES groups.

Majority of students from both private and public schools reported receiving education on non-communicable diseases (NCDs), with diabetes being the most recognized. However, knowledge of chronic respiratory disorders and cardiovascular diseases was lower in both school types. Private school students had slightly better knowledge of cancer, while public school students showed marginally better awareness of tobacco use as a risk factor for diabetes. A study by Gamage & Jayawardan showed that knowledge of certain NCDs, especially diabetes, hypertension was poor among students [13]. A contrasting report was observed in a study in Kenya with over 50% of participants having good knowledge about NCDs - diabetes, hypertension, and cancer [28]. Most respondents had only fair knowledge of NCDs, with a small percentage demonstrating good knowledge and a larger proportion showing poor knowledge. In a similar study carried out in Obio/Akpor LGA amongst public secondary school adolescents, 58.7% of students had average knowledge of risk factors for lifestyle induced chronic diseases [29]. Furthermore, there was low overall good NCDs risk-related knowledge of 22.7% and high overall poor NCDs risk-related knowledge of 77.3% observed by Oyibo et al. [30] in Delta, and 43% good overall knowledge on NCDs risk factors by Gamage & Jayawardana [13] in Sri Lanka. Private schools might dedicate more resources or have a more comprehensive curriculum that incorporates NCDs education. Students from private schools might come from families with higher health literacy, leading to better baseline knowledge. Lack of sufficient knowledge on NCDs is dangerous, thus, it is important that adolescents acquire the necessary knowledge and abilities to adopt healthy behaviours and choices prior to adulthood [1].

The reported prevalence of chronic conditions among adolescents was low, with obesity/overweight and asthma slightly more common in private school respondents, while public school respondents reported slightly higher prevalence of hypertension and diabetes. No significant difference was found between the two groups regarding hypertension and obesity/overweight prevalence. The low prevalence of these conditions might be due to factors such as limited awareness, healthcare access, and lack of regular health screenings [31]. Respondents from private schools reported higher prevalence of long-standing family illnesses on heart problem, diabetes, obesity/overweight, high blood pressure, asthma and other conditions compared to public school respondents with cancer as an exception. First degree relatives of respondents from private and public schools were more likely to have a long-standing illness, with higher proportion among parents of private school respondents. Due to an individual genetic composition, a genetic predisposition or susceptibility leads to an increased likelihood of developing a specific disease [32]. Since genetics play a role in disease risk, children from these families are more at risk for the development of NCDs [33].

4.1. Limitations of the Study

The study's cross-sectional design limits its ability to determine cause-and-effect relationships and the use of self-administered questionnaires may introduce recall and response bias. Additionally, the research only included school-enrolled students, potentially overlooking adolescents not in school, who may have different health behaviors and risk profiles.

4.2. Implications of the Findings of the Study

The study reveals a concerning low level of good knowledge about non-communicable diseases (NCDs) among adolescents in both public and private secondary schools in Port Harcourt. Despite most students receiving some form of education on NCDs, their types, and risk factors, most demonstrated only fair knowledge. The proportion of students with poor knowledge of NCD-related risk factors was at least three times higher than those with good knowledge. Though, students from private schools had received more education about NCDs as this was reflected in their knowledge score, and the significant difference between both school types. This finding raises questions about the quality and effectiveness of NCD education in school settings. In private schools accessing funds are directly from the fees paid by students' guardian/parent hence they often have more financial resources allowing for better educational resources and program. These students from higher socio-economic backgrounds may have parents with better health literacy, influencing their children's knowledge and awareness [34, 35].

The knowledge gap between public and private school students could lead to increased health disparities between socio-economic groups in adulthood, contribute to a higher prevalence of NCDs in the future and significant economic costs for individuals and the healthcare system [36]. To address this potential outcomes, standardized NCD education curriculum should be developed and implemented across all schools (regardless of type), engage parents and community members in health education initiatives to reinforce learning outside of school and implementation of e-health literacy programs to provide equal access to health information across all socio-economic groups [37].

The significant difference in NCD knowledge between public and private school students, coupled with the socio-economic disparities, underscores the urgent need for targeted interventions to improve NCD education and awareness across all schools and socio-economic groups.

5. Conclusion

The development of non-communicable diseases (NCDs) is strongly influenced by socioeconomic status, family health history, and risky health behaviors. Although, good knowledge level of NCDs was low with majority having fair knowledge, the study found that private school students had higher knowledge of NCDs. Significant differences between private and public-school respondents underscore the importance of continuous NCDs education both in-school and out of school settings.

Abbreviations

NCDs	Non-Communicable Diseases
WHO	World Health Organization
WHO	World Health Organization STEPwise
STEPS	Approach to NCD Risk Factor Surveillance
CVDs	Cardiovascular Disease
SES	Socioeconomic Status
SPSS	Statistical Product for the Service Solution
LGA	Local Government Area
PHALGA	Port Harcourt Local Government Area
JSS	Junior Secondary School
SS	Senior Secondary School

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Ethical Clearance

The University of Port Harcourt's Ethics Committee granted approval for the study [UPH/CEREMAD/REC/MM92/012]. Written informed consent was obtained from the participants before the study commenced. The researcher was the only one with a passcode to the password-protected computer where the data was kept.

Author Contributions

All authors were involved in conceptualization, planning and implementation of the study. Data collection team was led by Enuagwuna FC, Tobin-West CI, Asiboje ET, Wilcox AS. All authors contributed to the interpretation of the results, read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

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