Sexual behaviour and knowledge of prevention of sexually transmitted infections among students in coeducational and non-coeducational secondary schools in Ibadan, Nigeria

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Abstract

Introduction: Sexual interaction between students may be different in coeducational (CE) and non-coeducational (NC) schools. The objective was to compare sexual behaviour and knowledge of prevention of sexually transmitted infections (STIs) among senior secondary school students in CE and NC institutions in Ibadan, Nigeria. Method: A comparative cross-sectional study was carried out using a multistage sampling technique. A total of 510 respondents (250 from CE schools and 260 from NC schools) completed semi-structured self-administered questionnaires which included a 30-point STI knowledge scale with scores classified as good and poor. Chi-square statistics were significant at P ≤ 0.05. Results: The mean age of respondents was 15.9 ± 1.5 years, 47.5% were girls. There were no significant differences in sexual behaviour and knowledge of STIs between the students in the two types of schools. However, there were gender differences, as a significantly higher proportion of girls in CE than NC schools had ever had sexual intercourse with the opposite sex (25.6%-CE, 12.4%-NC) and had multiple sexual partners (29.0%-CE, 0%-NC). Girls in NC schools had better knowledge of causes and prevention of STIs than those in CE schools (28.8%-CE, 45.5%-NC). There were no significant differences in the sexual practices and knowledge of STIs among boys in the two types of schools. Conclusion: More girls in CE schools have had sexual intercourse compared to NC schools whereas girls in NC schools had better knowledge of the prevention of STIs. There is a need for strategies to increase reproductive health education in schools, particularly in CE schools.

Keywords: Coeducational and non-coeducational schools, knowledge of STIs, secondary school students, sexual behaviour, sexually transmitted infections

Introduction

Adolescence is a time of opportunity but also a time of vulnerability to risk behaviors which can have lifelong consequences, especially on health. Girls and boys experience these processes in different ways and at different ages. Adolescents are at risk of unprotected sexual relations which may lead to sexually transmitted infections (STIs). Adolescents constitute about one-fifth of the world’s population and their population will continue to grow. About 85% of them live in developing countries. Adolescent sexual activity in sub-Saharan African countries is characterized by a high level of premarital, often multiple, short-term, and casual sexual relationships combined with inconsistent, incorrect, or nonuse of condoms. Inadequate knowledge about sexual intercourse

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and its consequences, lack of sex education and life skills as well as poor access to health services and commodities can increase their vulnerability during these years of rapid physical and psychosocial development.\cite{10,11} They are also less likely to seek information or treatment due to fear, ignorance, stigma, shyness, or inexperience.\cite{12}

The World Health Organization (WHO) estimates that 1 in 20 adolescents globally will contract STI each year (without taking into consideration viral infections).\cite{13} Adolescents are increasingly spending more time in school, experiencing puberty at younger ages, and are also at risk of contracting STIs. Evidence has shown that the school is a good place for providing health services to adolescents but provided little or no proof that educational curriculum-based programmes alone are effective in improving the sexual and reproductive health outcomes for adolescents.\cite{14} Healthcare providers, especially family and primary care physicians as well as public health physicians, play an important role in the development of school health programmes to provide school health services including sexual and reproductive health services to adolescents.\cite{15,16} Comprehensive sexual health services can be provided in school community using a four-pronged approach which includes promotive sexual health services (including rights-based sexuality education and gender-focused as well as family life and life-skills education), preventive sexual health services (including screening for high-risk behaviours, STIs, and sexual abuse as well as provision for vaccinations), treatment services (including treatment of STIs), and counseling services (including counseling regarding STIs and sexuality-related issues).\cite{17} These services can be provided by a family and primary care physician or any trained doctor or nurse in high-resource settings. In low-resource settings, a visiting family and primary care physician or a trained doctor or nurse can provide these services while the appropriately trained teacher, school counselor, or health worker provides promotive as well as some preventive and counseling services.\cite{18,19} In the school, health service providers need to know the gender differences in the sexual behaviour and knowledge of prevention of STIs to provide adequate and effective sexual health services to students in schools. Research findings showed that knowledge about STI transmission might influence sexual behaviour and that knowledge is an important factor for the prevention of STIs.\cite{20}

The school environment provides a setting for sexual interaction between students which may be different in coeducational (CE) and non-coeducational (NC) schools. CE, also known as mixed-sex or mixed-gender education, means educating male and female students jointly in the same institution or classes\cite{21} while NC schools are attended by only one gender, boys school or girls school. Education is a vital tool for socioeconomic development and it also has a positive impact on health.\cite{22} Health problems arising from the risky sexual behaviour of secondary school adolescents affect their physical health as well as long-term emotional, social, and developmental well-being.\cite{23,24} The school environment promotes interaction between the sexes and the interaction is more frequent in CE schools which may lead to an increased level of sexual interaction and more exposure to the risk of STIs. The school environment can shape how young people act or interact and this can be a source of risk or protection to them.\cite{25,26} The WHO initiative on the social determinants of health suggests that it is important to engage in research that identifies the social determinants of adolescents’ sexual and reproductive health as well as the characteristics of the institution and social environment that predispose them to health-compromising behaviour in different settings.\cite{27}

There are gender differences in the sexual behaviour of adolescents. Girls are more likely than boys to report pressures from parents and peers to abstain from sex and to mention moral concerns and/or fear of pregnancy or STIs as motivations for postponing sexual initiation while boys are often encouraged by peers or male relatives (including fathers) to have sex to prove their “manhood.”\cite{28,29} Research suggests that males and females express their sexuality differently as they behave differently when engaging in high-risk sexual practices. Males tend to receive more permissiveness from society for premarital sexual activity than females.\cite{30} Men report an earlier age of first sexual intercourse and a higher number of casual sexual partners than women.\cite{31} Men are more inclined to engage in sexual practices outside of committed relationships and exhibit less caution concerning the quantity and quality of their sexual partners.\cite{32} A school environment that promotes interactions between different sexes may influence in-school adolescents’ sexual behaviour or their knowledge of the prevention of STIs.

Some studies have examined the sexual behaviour of in-school adolescents in Nigeria but evidence on the influence of sexual interaction among students in different school environments and the gender differences in sexual behaviour and knowledge of prevention of STIs in different types of schools is limited. This study was conducted to assess and compare sexual behaviour and knowledge of causes and prevention of STIs among CE and NC senior secondary school students in Ibadan, Nigeria. The information is important for health educators and school health service providers, including family and primary care physicians as well as public health physicians, to develop effective and feasible strategies for promoting the reproductive and sexual health needs of students and also for preventing STIs among students in these types of schools.

**Materials and Methods**

**Study location**

This study area was Ibadan, the capital city of Oyo State in southwest Nigeria. The secondary school net enrolment ratio in the region is 76.6% and shows no sex disparity.\cite{33} Public secondary schools in Ibadan which are government-funded are either CE or NC.

**Study population**

The study population comprised of senior secondary day school students in CE and NC public schools in Ibadan, Oyo State,
Nigeria. Senior secondary school students who had been enrolled in the school from junior secondary school were eligible for inclusion in the study to exclude those who had attended other types of school before joining the present school.

Study design
Comparative cross-sectional study design was used.

Sample size determination
The minimum sample size estimated to compare independent proportions was based on an estimate of 63.3% of secondary school adolescents who were sexually active among CE school students in Ilesa, Nigeria. An expected difference of 15% was used at a 95% confidence interval and the power of 90%. With an allowance of 10% non-response, a minimum sample size of 250 students per group was estimated.

Sampling technique
A multistage sampling technique was used for this study. Ibadan metropolis has eleven Local Government Areas (LGA) of which five LGAs are in the municipality. In the first stage, one LGA (Ibadan North LGA) was selected from the sample frame of five LGAs in Ibadan municipality by simple random sampling (ballot method). In the second stage, secondary schools in Ibadan North LGA were stratified into CE and NC schools. Two schools were selected from each stratum by simple random sampling (ballot method). In the third stage, senior secondary school (SSS) classes were pre-grouped according to their class year as SSS1 (year one), SSS2 (year two), and SSS3 (year three). In the selected schools, one arm of class (class cluster) was selected from each class year (SSS1, SSS2, and SSS3) by balloting. All consenting students in the selected classes were interviewed. About 125 students were interviewed in each school.

Ethical considerations
The proposal of this study was approved by the Department of Community Medicine, University of Ibadan, Nigeria. Ethical approval with reference number AD 13/479/78 was obtained from the Oyo State Ministry of Health Ethical Review Committee. Oyo State Ministry of Education directed the Principals of the selected schools to give permission to conduct this study. Parents gave their consent at the parents-teachers association meeting. The purpose, content, and implication of the research were explained to the participants and they were assured of privacy and confidentiality. Each student in the selected classes provided written informed consent from his/her parent and assent was given by each participant before administering the questionnaires. In addition, students above the age of 18 years gave written informed consent. Respondents were informed that participation was voluntary and that they could decline or withdraw from the study at any time during the study without any adverse consequences. These policies were printed on the front page of the questionnaire.

Data collection
Data were collected using semi-structured self-administered questionnaires. The questionnaire was adapted from a behavioral sentinel survey and there were additional questions to address the objectives of this study. The questionnaire which was written in the English language elicited information on the sociodemographic characteristic, sexual behaviour, and knowledge of causes and prevention of STIs. It was pretested in a CE secondary school in Ibadan South East LGA. Data collection was done over 3 months by the principal investigator and four trained research administrators who were graduates of Medicine and Medical Sociology. The school teachers were not involved in the data collection process. The questionnaires were self-completed by the respondents in the selected classrooms during regular school hours as assigned by the school authority for the study. Respondents were instructed not to write their names on the questionnaire to ensure anonymity, confidentiality, and honest responses. The students sat apart and were asked not to communicate with each other during the completion of the questionnaire. To ensure proper completion of the questionnaires, trained research assistants explained the questions to students who needed assistance. Although the survey lasted for about 30 min in each class, an extra hour was allocated for discussion, and provision of information on STIs after the survey to respond to students’ concerns and to correct misconceptions.

Assessment of study variables
Sexual intercourse with the opposite sex
Respondents were asked if they had ever had sexual intercourse with the opposite sex by indicating yes or no. The number of respondents who had ever had sexual intercourse with the opposite sex was reported as a percentages. Sexual histories of those who reported previous sexual intercourse were reported by school type.

Knowledge of prevention of STIs
There were 30 questions with 30 obtainable points on knowledge of the respondents on causes, modes of transmission, signs and symptoms, and preventive measures for STI. A point was awarded for each correct answer and zero for the wrong answer giving a minimum and maximum obtainable score of 0 and 30, respectively. Each respondent’s aggregate score was classified as poor knowledge if the score was equal to or less than 50% ($p<0.05$) of the maximum score (0–15) and good if it was more than 50% of the maximum obtainable score (16–30).

Data analysis
Data were analyzed using Statistical Package for Social Sciences (SPSS) version 18 computer software. Descriptive statistics such as mean and standard deviation were calculated for the quantitative data while the other results were presented as simple frequencies and percentages. The analysis was stratified by school type and gender to show how the variables differ. Chi-square test ($\chi^2$) was used to test associations between variables at the level of significance of 5%.
Results

Sociodemographic characteristics of the respondents

A total of 510 respondents were interviewed, 250 (49.02%) in CE schools and 260 (50.98%) in NC schools. The sociodemographic characteristics are shown in Table 1. Respondents who were between the age group of 15 to 17 years, constituted a significant proportion of this study participants. Those in the CE schools were slightly older compared to those in the NC schools. The majority of the respondents in both types of schools were Christians and of the Yoruba tribe. A higher proportion of the respondents in the NC schools were from monogamous families compared to those in the CE schools. A higher proportion of parents of the respondents in NC schools had tertiary education compared to those in CE schools.

Sources of sex education of the respondents

Figure 1 shows the sources of sex education among the respondents. The most important sources of information for both types of schools were parents, teachers, and friends. More students in the CE schools had their sex education from teachers while parents and friends were the major sources of sex education for those in NC schools ($P < 0.0001$).

| Table 1: Sociodemographic characteristics of the respondents by school type |
|-----------------------------|-------------------------------|-------------------------------|-----------------|-----------------|-----------------|---------------|-----------------|---------------|
| Sociodemographic characteristics | Coeducational $n=250$ | Non-coeducational $n=260$ | Total $n=510$ | Test statistics | $P$  |
| Age (years) | | | | | |
| 12-14 | 34 (13.6) | 55 (21.2) | 89 (17.5) | | |
| 15-17 | 181 (72.4) | 176 (67.7) | 357 (70.0) | | |
| 18-20 | 35 (14.0) | 29 (11.1) | 63 (12.5) | 5.394 | 0.067 |
| Mean age (years)$\pm$SD | 16.03±1.50 | 15.77±1.49 | 15.89±1.50 | 1.985 | 0.048 |
| Sex | | | | | |
| Male | 129 (51.6) | 139 (53.5) | 268 (52.5) | | |
| Female | 121 (48.4) | 121 (46.5) | 242 (47.5) | 1.777 | 0.674 |
| Class | | | | t-test |
| SSS 1 | 74 (29.6) | 89 (34.2) | 163 (32.0) | | |
| SSS 2 | 90 (36.0) | 83 (31.9) | 173 (33.9) | | |
| SSS 3 | 86 (34.4) | 88 (33.8) | 174 (34.1) | 1.491 | 0.474 |
| Religion | | | | | |
| Christianity | 167 (66.8) | 194 (74.6) | 361 (70.8) | | |
| Islam | 83 (34.4) | 66 (25.4) | 149 (29.2) | 3.764 | 0.052 |
| Tribe | | | | | | | | |
| Yoruba | 216 (86.4) | 224 (86.2) | 440 (86.3) | | | | |
| Igbo | 32 (12.8) | 34 (13.1) | 66 (12.9) | | | | |
| Hausa | 2 (0.8) | 2 (0.8) | 4 (0.8) | 0.010 | 0.995 |
| Family type | | | | | | | | |
| Monogamous | 184 (73.6) | 220 (84.6) | 404 (79.2) | | | | |
| Polygamous | 66 (26.4) | 40 (15.4) | 106 (20.8) | 9.393 | 0.002 |
| Parents’ marital status | | | | | | | | |
| Married | 237 (94.8) | 252 (96.9) | 480 (95.9) | | | | |
| Not married | 13 (5.2) | 8 (3.1) | 21 (4.1) | 2.538 | 0.281 |
| Father’s level of education | | | | | | | | |
| None | 5 (2.0) | 8 (3.1) | 13 (2.5) | | | | |
| Primary | 15 (6.0) | 17 (6.5) | 32 (6.3) | | | | |
| Secondary | 83 (33.2) | 65 (25.0) | 148 (29.0) | | | | |
| Tertiary | 147 (58.8) | 170 (65.4) | 317 (62.2) | 4.481 | 0.214 |
| Mother’s level of education | | | | | | | | |
| None | 11 (4.4) | 10 (3.8) | 21 (4.1) | | | | |
| Primary | 28 (11.2) | 24 (9.2) | 52 (10.2) | | | | |
| Secondary | 106 (42.4) | 91 (35.0) | 197 (38.6) | | | | |
| Tertiary | 105 (42.0) | 135 (51.9) | 240 (47.1) | 5.053 | 0.168 |
Sexual behaviour of the respondents

Table 2 shows the sexual behaviour of the respondents by school type. A higher proportion of the students in CE schools 82 (32.8%) had ever had sexual intercourse compared with the students in NC schools 75 (28.8%) with no statistically significant difference ($P = 0.334$). Overall, about a third among all the respondents in this study 157 (30.8%) had ever had sexual intercourse with the opposite sex.

Sexual histories of the respondents who had ever had sexual intercourse with the opposite sex

Table 3 compares the characteristics of the 157 (30.8%) respondents who reported having had sexual intercourse with the opposite sex. A higher proportion of males in NC schools had ever had sexual intercourse with the opposite sex 60 (80.0%) compared to 51 (62.2) in CE schools. For females, a higher proportion of those in CE schools 31 (37.8%) had ever had sexual intercourse with the opposite sex compared to 15 (20.0%) in NC schools. The mean age at sexual initiation was 14.40 ± 1.68 years for respondents in CE schools and 13.97 ± 1.18 years for the respondents in NC schools. The first sexual partner of more than half of the respondents in CE school was a boyfriend/girlfriend in school and a boyfriend/girlfriend at home for those in NC school.

Knowledge of prevention of STIs

All the respondents 510 (100%) reported that they have heard of STIs. Table 4 shows the 30 point scale of knowledge of prevention of STIs. Regarding the knowledge of causes of STIs, the majority (90%) were aware of Human Immunodeficiency Virus (HIV) infection in the two types of schools. Gonorrhea was well known by a higher proportion of students in NC schools (73.5%) compared to 57.3% of those in CE schools ($P < 0.0001$). About a third of the respondents in both types of schools were aware of syphilis and hepatitis B and C while about a fourth of the respondents in both types of schools were aware of genital herpes, human papillomavirus infections, and trichomoniasis. Candidiasis and chlamydia infections were the least known STIs in both types of schools.

Concerning the knowledge of the mode of transmission of STIs, majority of the respondents in CE (78.0%) and NC (84.2%) schools reported that someone can contract STIs by having sexual intercourse with an infected person. While some respondents knew that someone can be infected with STIs by

| Table 2: Sexual behaviour of the respondents by school type |
|-------------|------------------|--|--|---|---|
| Sexual behaviour | Coeducational | Non-coeducational | Total | Test statistics | $P$ |
| Ever had sexual intercourse with the opposite sex | | | | | |
| Yes | 82 (32.8) | 75 (28.8) | 157 (30.8) | | 0.334 |
| No | 168 (67.2) | 185 (71.2) | 353 (69.2) | 0.935 | |

| Table 3: Sexual histories of students who reported previous sexual intercourse |
|-------------|------------------|--|--|---|---|
| Sexual histories | Coeducational | Non-coeducational | Total | Test statistics | $P$ |
| Ever had sexual intercourse by gender | | | | | |
| Male | 51 (62.2) | 60 (80.0) | 111 (70.7) | | 0.014 |
| Female | 31 (37.8) | 15 (20.0) | 46 (29.3) | 5.995 | |
| Age at 1st sexual intercourse (years) | | | | | |
| 5-9 | 0 (0) | 2 (2.7) | 2 (1.3) | | 0.176 |
| 10-14 | 46 (56.1) | 45 (60.0) | 91 (58.0) | 3.474 | |
| 15-19 | 36 (43.9) | 28 (37.3) | 64 (40.8) | | |
| Mean age at 1st sexual intercourse (years)±SD | | | | | |
| First sexual partner | 14.40±1.68 | 13.97±2.18 | 14.20±1.94 | t-test | |
| A boy/girlfriend in the school | 43 (52.4) | 0 (0) | 43 (27.4) | 1.389 | 0.167 |
| A boy/girlfriend at home | 33 (40.2) | 66 (88.0) | 99 (63.1) | 54.396 | |
| An older person | 6 (7.3) | 9 (12.0) | 15 (9.6) | <0.0001 |
| Circumstances leading to the first sexual intercourse | | | | | |
| Mutual agreement | 34 (41.5) | 42 (56.0) | 76 (48.4) | | |
| Curiosity | 20 (24.4) | 9 (12.0) | 29 (18.5) | | |
| Peer pressure | 23 (28.0) | 15 (20.0) | 38 (24.2) | | |
| Needed to get money or gift | 5 (6.1) | 9 (12.0) | 14 (8.9) | 7.544 | 0.056 |
| Number of sexual partners ever had | | | | | |
| 1 | 54 (65.9) | 55 (73.3) | 109 (69.4) | | |
| 2 | 16 (19.5) | 8 (10.7) | 24 (15.3) | | |
| ≥3 | 12 (14.6) | 12 (16.0) | 24 (15.3) | 2.368 | 0.306 |
| Used condom at the last sexual intercourse | Yes | 24 (29.3) | 31 (41.3) | 55 (35.0) | 2.505 | 1.113 |
| No | 58 (70.7) | 44 (58.7) | 102 (65.0) | | |
having multiple sexual partners and by sharing of needles with an infected person, some respondents believed that STIs can be transmitted by kissing, hugging, touching, eating, or sitting with an infected person.

Regarding their knowledge of the symptoms and signs of STIs, only about half of the students in CE schools identified burning pain on urination and about one-third identified pussy discharge from the penis as symptoms of STI. Abstinence was identified by a majority of the respondents in both types of schools as an important preventive measure for STIs. A higher proportion of the students in the NC school (60.8%) identified having one faithful sexual partner as another preventive measure than the students in the CE school (51.2%). While almost equal proportions of students in both school types identified regular and correct use of condoms as a preventive measure against STIs, some students in both school types reported that taking of antibiotics or herbal concoction after having sexual intercourse and avoiding touching, sitting, and eating with an infected person were preventive measures against STIs.

### Overall knowledge score for STIs

Table 5 shows the mean knowledge score and overall knowledge for STIs by school type. There were no statistically significant differences in the mean knowledge score and the overall knowledge of causes and prevention of STIs among students in both types of schools.

### Sexual behaviour and knowledge of prevention of STIs by gender in CE and NC schools

Table 6 shows the comparison of sexual behaviour and knowledge of prevention of STIs among boys and girls in CE and NC schools. A slightly higher proportion of boys in NC schools had ever had sexual intercourse with the opposite sex compared with boys in CE schools; and of those who had ever had sexual intercourse in both types of school, a higher proportion of boys in CE schools had multiple sexual partners compared with the

| Knowledge                                                                 | Coeducational n=250 | Non coeducational n=260 | Total n=510 | Test statistics | P     |
|----------------------------------------------------------------------------|---------------------|-------------------------|-------------|----------------|-------|
| Knowledge of causes of STI                                                |                     |                         |             |                |       |
| HIV infection                                                             | 225 (90.0)          | 234 (90.0)              | 459 (90.0)  | <0.0001        | 1.000 |
| Gonorrhea                                                                 | 144 (57.6)          | 191 (73.5)              | 335 (65.7)  | 14.226         | 0.001 |
| Syphilis                                                                  | 78 (31.2)           | 100 (38.5)              | 178 (34.9)  | 3.632          | 0.057 |
| Hepatitis                                                                 | 85 (34.0)           | 76 (29.2)               | 161 (31.6)  | 1.342          | 0.247 |
| Genital Herpes                                                            | 64 (25.6)           | 73 (28.1)               | 137 (26.9)  | 0.398          | 0.528 |
| Human papillomavirus                                                      | 70 (28.0)           | 56 (21.5)               | 126 (24.7)  | 2.861          | 0.091 |
| Trichomoniasis                                                           | 65 (26.0)           | 51 (19.6)               | 116 (22.7)  | 2.957          | 0.086 |
| Candidiasis                                                               | 42 (16.8)           | 37 (14.2)               | 79 (15.5)   | 0.643          | 0.423 |
| Chlamydia                                                                 | 44 (17.6)           | 27 (10.4)               | 71 (13.9)   | 5.537          | 0.019 |
| Mode of transmission of STI                                               |                     |                         |             |                |       |
| Sexual intercourse with an infected person                                | 195 (78.0)          | 219 (84.2)              | 414 (81.2)  | 6.704          | 0.035 |
| Sexual intercourse (SI) with multiple partners                            | 149 (59.6)          | 168 (64.6)              | 317 (62.2)  | 1.383          | 0.501 |
| SI with a partner who has another partner                                 | 106 (42.4)          | 135 (51.9)              | 241 (47.3)  | 4.856          | 0.088 |
| Sharing of needles with an infected person                               | 39 (15.6)           | 40 (15.4)               | 79 (15.5)   | 0.216          | 0.898 |
| Kissing and hugging an infected person (IP)                              | 141 (56.4)          | 160 (61.8)              | 301 (59.1)  | 1.918          | 0.383 |
| Touching, eating, and sitting with an IP                                 | 168 (67.2)          | 189 (73.0)              | 357 (70.1)  | 2.075          | 0.354 |
| Symptoms and signs of STI                                                |                     |                         |             |                |       |
| Burning pain on urination                                                | 97 (38.8)           | 130 (50.0)              | 227 (44.5)  | 6.473          | 0.011 |
| Vaginal itching                                                          | 91 (36.4)           | 109 (41.9)              | 200 (39.2)  | 1.631          | 0.202 |
| Low abdominal pain                                                       | 97 (38.8)           | 99 (38.1)               | 196 (38.4)  | 0.028          | 0.867 |
| Foil-smelling vagina discharge                                           | 86 (34.4)           | 108 (41.5)              | 194 (38.0)  | 2.756          | 0.097 |
| Pussy discharge from the penis                                           | 76 (30.4)           | 103 (39.6)              | 179 (35.1)  | 2.751          | 0.029 |
| Painful ulcer around the genital area                                     | 79 (31.6)           | 98 (37.8)               | 177 (34.8)  | 2.182          | 0.140 |
| Swelling in the groin area                                               | 64 (25.6)           | 88 (33.8)               | 152 (29.8)  | 4.412          | 0.042 |
| Non-painful ulcer in the genital area                                     | 33 (13.2)           | 34 (13.1)               | 67 (13.1)   | 0.002          | 0.967 |
| Measures of prevention of STI                                            |                     |                         |             |                |       |
| Abstain from sexual intercourse (SI)                                     | 168 (67.2)          | 180 (69.2)              | 348 (68.2)  | 0.993          | 0.609 |
| Having one faithful sexual partner                                       | 128 (51.2)          | 158 (60.8)              | 286 (56.1)  | 7.908          | 0.019 |
| Regular and correct use of a condom                                      | 144 (57.6)          | 155 (59.6)              | 299 (58.6)  | 0.610          | 0.737 |
| Avoid sex with prostitute                                                | 146 (58.4)          | 156 (60.0)              | 302 (59.2)  | 0.828          | 0.361 |
| Taking of antibiotics after SI                                           | 101 (40.4)          | 120 (46.1)              | 221 (43.3)  | 1.719          | 0.423 |
| Taking of herbal concoction after SI                                     | 127 (50.8)          | 136 (52.3)              | 263 (51.6)  | 0.897          | 0.369 |
| Avoid touching, eating, and sitting with IP                             | 162 (64.8)          | 163 (62.1)              | 325 (63.7)  | 1.860          | 0.395 |
More than half of the parents of adolescents and 52% of adolescents had sexual intercourse (among those who had ever had sexual intercourse). Total 50% had sexual intercourse (among those who had ever had sexual intercourse) and non-coeducational schools.

### Table 5: Respondent’s knowledge of sexually transmitted infections by school type

| Knowledge of STI | Coeducational n=250 (n (%)) | Non-coeducational n=260 (n (%)) | Total n=510 (n (%)) | Test statistics $\chi^2$ |
|------------------|----------------------------|-------------------------------|---------------------|--------------------------|
| Mean knowledge score for STIs | 12.47±5.23 | 13.40±5.66 | 12.95±5.47 | t-test 1.946 0.052 |
| Overall knowledge of causes and prevention of STIs | | | | |
| Good Knowledge | 74 (29.6) | 95 (36.5) | 169 (33.1) | |
| Poor Knowledge | 176 (70.4) | 165 (63.5) | 341 (66.9) | 2.769 0.096 |

### Table 6: Sexual behaviour and knowledge of prevention of sexually transmitted infections by gender in coeducational and non-coeducational schools

| Characteristics | Boys | Girls |
|-----------------|------|-------|
|                  | Coeducational $n=129$ n (%) | Non-coeducational $n=139$ n (%) | Test | Coeducational $n=121$ n (%) | Non-coeducational $n=121$ n (%) | Test |
| Ever had sexual intercourse | | | | | | |
| Yes | 51 (39.5) | 60 (43.2) | | 31 (25.6) | 15 (12.4) | |
| No | 78 (60.5) | 79 (56.8) | 0.363 0.547 | 90 (74.4) | 106 (87.6) | 6.871 0.009 |
| Multiple sexual partners (among those who had ever had sexual intercourse) | | | | | | |
| Yes | 19 (37.3) | 20 (33.3) | 9 (29.0) | 0 (0) | Fisher Exact 5.414 0.021 |
| No | 52 (62.7) | 40 (66.7) | 0.186 0.666 | 22 (71.0) | 15 (100) | 5.414 0.021 |
| Knowledge of prevention of STI | | | | | | |
| Good knowledge | 40 (31.0) | 40 (28.8) | 34 (28.1) | 55 (45.5) | | |
| Poor knowledge | 89 (69.0) | 99 (71.2) | 0.159 0.690 | 87 (71.9) | 66 (54.6) | 7.837 0.005 |

Boys in NC schools. However, a higher proportion of boys in CE schools had good knowledge of STIs compared with the boys in NC schools. In all these, there were no statistically significant differences among the boys in CE and NC schools.

A statistically significantly higher proportion of girls in CE schools (25.6%) had ever had sexual intercourse with the opposite sex compared with 12.4% of the girls in NC schools ($P = 0.009$). Of the girls who had ever had sexual intercourse, a statistically significant proportion of those in CE schools (29%) had multiple sexual partners than girls in NC schools where there was no history of multiple sexual partners ($P = 0.021$). However, a statistically significantly higher proportion of girls in NC school (45.5%) had good knowledge of STIs compared with 28.1% of the girls in CE schools ($P = 0.005$).

### Discussion

The sociodemographic characteristics of the respondents were comparable to previous findings in Nigeria. However, unlike other previous studies, most respondents in this study were from monogamous families. More than half of the parents of the respondents in this study had tertiary education, unlike other previous studies where less than half of the parents of the respondents had tertiary education. Sources of sex education of these respondents were similar to findings in studies from the Eastern part of Nigeria, however, a higher proportion of students in NC schools had their sex education from their friends in addition to other sources. A study indicated that adolescents were not well-informed about sexual and reproductive matters because their major sources of information were friends and other informal sources rather than schools, healthcare providers and parents. It is necessary to encourage peer education, most especially among the same gender, on adolescent sex education. Inclusion of reproductive health education in schools curricula in addition to other sources of sex education is the best strategy for achieving quality reproductive health education among in-school adolescents.

In this study, about a third of the respondents had initiated sexual intercourse in both school types. This finding is similar to those from studies among in-school adolescents from Jos, Ilorin, and Ibadan, Nigeria. It is, however, lower than most first intercourse survey reports for in-school adolescents in other parts of the country and Africa. For instance, some studies reported, 55% and 79% in Eastern Nigeria, 50% and 63.3% in Ilesa, Western Nigeria and 52% of adolescents in Ghana. It was suggested that the increased sexual activity (79%) among in-school adolescents in Port-Harcourt might be due to the rapid urbanization of the city as Nigeria’s crude oil operations expand.

More males than females in both types of schools had initiated sexual activity in this study and this was statistically significant. This finding is consistent with reports from adolescents in rural and urban cities in Nigeria. Boys by their nature are
more adventurous than girls and are more likely to try out new experiences. In Nigeria, the society encourages girls to be chaste while boys and men are not encouraged to limit their sexual activities but only to exercise discretion so that sexual pressures do not push them into visiting commercial sex workers.

Similar proportions of boys in CE and NC schools had initiated sexual intercourse in this study. On the contrary, more girls (25.6%) in CE schools compared to 12.4% in NC schools had initiated sexual intercourse. The influence of boys among the girls in CE schools may explain why more girls in CE schools had initiated sexual intercourse than girls in NC schools.

The mean age at first sexual intercourse for students in both schools was below the national average of 16 years and the findings of other researchers in Nigeria. The early onset of sexual activity could be connected with the fact that adolescents reach puberty earlier now than the previous generation and are more influenced by the technologically advanced societies. This also confirms the findings of surveys that young persons in southwestern Nigeria prefer sexual experience to chastity. About half of the respondents in this study had their first sexual intercourse as a result of mutual agreement with their partners. Curiosity, peer pressure, and economic factors were other reasons the respondents gave for having their first sexual intercourse. Other studies from Nigeria confirmed these findings. The early involvement in sexual activities increases adolescents’ vulnerability to STIs especially when their knowledge in these areas is inadequate. Early initiation of sexual intercourse has been associated with increased risk of STIs including HIV and cervical cancer later in life as a result of infection with human papillomavirus. Studies have also shown that early sexual initiation in adolescents increases their risk of having multiple sexual partners.

Having sex with non-marital partners and multiple sexual partners are considered high-risk sexual behaviours that put adolescents at risk of STIs. Most (69.4%) of the respondents in this study, unlike other studies, had only one sexual partner. However, more respondents in CE schools had multiple sexual partners compared to those in NC schools. Similar proportions of boys in CE (37.3%) and NC (33.3%) schools had multiple sexual partners. Twenty-nine percent of the girls in CE schools had multiple sexual partners but there was no report of multiple sexual partners among the girls in NC school. The increased access girls in CE schools have in terms of interaction with the opposite sex could account for this difference.

The rate of condom use at most recent sexual encounters for the sexually active respondents also depicts the high-risk sexual behaviour in adolescents. Although a higher proportion of the respondents in NC schools (41.3%) used condom at the last sexual intercourse compared to those in CE schools (29.3%) with no significant difference, condom use by the adolescents in this study was lower than the use among respondents in a survey among adolescents in Jos, Nigeria. Overall, 35% of those who had ever had sexual intercourse in this study used condoms at the last intercourse. This is similar to the findings of a national survey in Nigeria which reported that 39.4% of adolescents between the ages of 15 to 19 years used male condom in the last sexual intercourse with their boyfriends or girlfriends but lower than the prevalence of condom use among adults. This finding may be attributed to the low-risk perception of adolescents and their tendency for risk-taking. A previous study had also reported a higher prevalence of nonuse of condoms among sexually active adolescents.

The awareness of HIV infection is very high among these respondents regardless of the school type which is similar to the findings of a survey among girls in Western Nigeria and a survey among selected adolescents in Nigeria. The high awareness of HIV may be a result of the wide publicity of this disease in the mass media and information obtained at schools. The second most recognizable STI was gonorrhea and the least known STI was chlamydia. Knowledge and awareness of chlamydia could be low as a result of inadequate dissemination of information about this STI. The awareness of these respondents about human papillomavirus (HPV) infection is also low in both types of schools. Adolescents need to understand the risk of developing cervical cancer later in life as a result of infection with HPV.

More than half of the respondents reported that STI could be transmitted by sharing needles, kissing, and hugging of an infected person or touching and sitting with an infected person. These misconceptions about other STIs, apart from HIV infection, could be attributed to the increased awareness of HIV infection that can be transmitted through other means apart from sexual intercourse while neglecting other STIs. Knowledge of signs and symptoms of STIs was generally low in this study. However, the proportion of the respondents who identified signs and symptoms of STIs correctly was more than the proportion of persons aged 15 to 19 years who identified the symptoms of STIs in women and men in a national survey in Nigeria. In-school adolescents have more opportunities for information and education than other adolescents in the general population.

Abstinence was identified by the majority of the students in both types of schools as an important preventive measure against STIs. The knowledge of the effective use of condoms for the prevention of STIs is low when compared with other studies. Some respondents reported their misconceptions that taking antibiotics or herbal concoction after having sexual intercourse is a preventive measure against STIs. This is similar to the findings of focus group discussions among secondary-school students aged 15–20 years in Benin City, Nigeria. Use of herbs and native medicines has been on the increase in Nigeria because some of these drugs are licensed while most of the healers and herbalists are permitted to advertise their claimed remedies in mass media.

Overall, knowledge of prevention of STIs is low among the respondents as only a third of them had good knowledge of
STIs. Even though a higher proportion of students in NC schools (36.5%) had good knowledge compared to 29.6% of the students in CE schools, a significantly higher proportion of girls in NC school (45.5%) had good knowledge of prevention of STIs compared with 28.1% of the girls in CE schools. This could be as a result of increased personal communication among peers of the same gender in the same school because a higher proportion of students in NC schools reported friends as one of their sources of sex education in this study. This should be encouraged but it must be in addition to formal reproductive and sex education programmes in the school curriculum and by the school health service providers.

**Strengths and limitations of this study**

This study provides unique insights into sexual behaviour and knowledge of the prevention of STIs among students in CE and NC schools. The result of this study is useful in planning reproductive health services and interventions in these types of schools. However, certain limitations of this study should be recognized. The cross-sectional design of the survey did not allow for a causal relationship to be established. The temporal sequence of the events could not also be established. The self-reported nature of this study could have made the respondents under-report their sexual behaviours. Social desirability bias in the participants’ responses was minimized by ensuring confidentiality and encouraging the respondents to be as sincere as possible. Despite these limitations, the study provides useful information for adolescents’ sexual and reproductive health educators and healthcare providers.

**Conclusion**

This study addressed the gap in the literature regarding the differences in sexual behaviour and knowledge of prevention of STIs among students in CE and NC schools. About a third of the respondents had initiated sexual intercourse and the knowledge of prevention of STIs was generally poor in the two types of schools. However, there was no statistically significant difference in the sexual behaviour and knowledge of prevention of STIs among the students in CE and NC schools but there were gender differences. Even though there was no significant difference in the sexual behaviour and knowledge of prevention of STIs among the boys in the two types of schools, there were significant differences among the girls. More girls in CE schools had ever had sexual intercourse with the opposite sex and multiple sexual partners than the girls in NC schools, however, more girls in NC schools had good knowledge of STIs compared with the girls in CE schools.

**Recommendations**

School healthcare providers including family and primary care physicians as well as public health physicians should be vigilant about the reproductive health needs and services of students and address the gender differences in different types of schools. They should provide a gender-sensitive guide to the parents, school administrators, school counsellors and the teachers on educating adolescents in different schools. Peer education in schools should be encouraged and accurate information to address myths and misconceptions about STIs should be provided. Family life education in school curricula should be introduced early to teach sexuality including issues of identity, human relationship, and skills in handling social and peer pressures. Parents should recognize gender differences and teach their children about sex education at home. School healthcare providers, teachers, parents, and mass media should provide information about all STIs, not only on HIV infection, to adolescents.

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**Conflicts of interest**

There are no conflicts of interest.

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