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EFFECT OF COMPREHENSIVE SEXUALITY EDUCATION ON KNOWLEDGE OF SEXUAL AND REPRODUCTIVE HEALTH AMONG ADOLESCENTS IN SECONDARY SCHOOLS IN RIVER STATE: A QUASI-EXPERIMENTAL STUDY

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Abstract

The study addressed concerns about adolescents' sexual and reproductive health (SRH) by implementing comprehensive sexuality education (CSE) developed by some researchers in the medical women's association of Nigeria, Rivers State branch and implemented aimed at ascertaining the effect of CBE on knowledge of SRH services among adolescents in secondary schools in Rivers State, Nigeria. The study design is a quasi-experimental design employing pre-post phases. The intervention was CSE with a nine-module training manual, with a sample size of 100 adolescents drawn from 10 secondary schools. Data collection utilized interviewer questionnaires, and analysis was performed using SPSS version 26. The outcome variables were awareness and knowledge of SRH, with the effect size measured as the proportional difference in scores on awareness and knowledge assessment administered before and after the intervention. The mean difference between pre- and post-test scores was determined with the use of a paired t-test. Results showed that 80% of the adolescents were female, it indicated significant improvements in both awareness and knowledge of SRH post-intervention. Awareness of SRH rose from 87% to 94.8%, while knowledge increased from 64% to 87.6%. Mean awareness score increased from 8.3±1.8 to 10.1±1.7, with a statistically significant difference ($t = 7.59$, $df = 96$, $P < 0.01$). Similarly, the mean knowledge score increased from 52.2±7.3 to 57.7±9.3, also with a significant difference ($t = 4.59$, $df = 96$, $P < 0.01$). The findings underscore the effectiveness of CSE in enhancing adolescent SRH knowledge, highlighting its potential for addressing SRH challenges among adolescents in Rivers State and elsewhere.

Keywords: Improving Knowledge, Sexual and Reproductive Health, Adolescents, Scondary School, River State.

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Introduction

Adolescents make up about one-quarter of the entire population of sub–Saharan Africa; their sexual and reproductive health needs are under-researched and served (WHO Regional office for Africa, 2019) especially in Nigeria and Rivers State in particular. About 22.3% of Nigeria's population is made up of adolescents (Odo *et al.,* 2018) Despite their large population, their health issues are under-served (WHO Regional office for Africa, 2019).

Awareness has to do with seeing, knowing, feeling, or being conscious of occasions, objects, thoughts, emotions, or sensory patterns. Awareness does not allude to in-depth comprehension; knowledge alludes to inside and out understanding or familiarity (Hasa, 2011). Knowledge is facts, information, and skills gained through experience or schooling, the theoretical or practical comprehension of a subject (Hasa, 2011). Awareness precedes knowledge, it is important to assess awareness before assessing whether there is comprehension /knowledge of the subject of sexual and reproductive health.

According to the World Health Organization, "reproductive health is defined as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and its functions and processes"(United Nations Department of Economic and Social Affairs Population Division, 2016)(Reproductive Health, n.d.) Reproductive health is basic to accomplishing the sustainable development goal three (SDG 3) (United Nations Department of Economic and Social Affairs Population Division, 2016). Target 3.7 seeks to ensure universal access to sexual and reproductive healthcare services, and 3.8 refers to achieving universal health coverage, which includes financial risk protection and access to quality essential healthcare services (Lehtimaki & Schwalbe, 2019). Information and services on prevention, counselling, diagnosis, and treatment are compliments of Reproductive Health Services (RHS) and entail that all individuals can safely reach services without travelling a lengthy distance or wasting time to get to the service delivery points (Tlaye *et al.,* 2018).

Reproductive health concerns of adolescents have grown due to an unprecedented upsurge in teenage pregnancy, human immunodeficiency virus (HIV), and other sexually transmitted infections (STI) (Abajobir & Seme, 2014). worldwide, problems occurring during pregnancy are the leading cause of death among adolescents aged 15-19 years (WHO, n.d.). The teenage pregnancy rate was 19% among women aged 15-19 years and 13.9 % for Rivers State in particular, with a sharp rise from 2% at age 15 to 37% at age 19 years (National Population Commission Federal Republic of Nigeria, ICF International Rockville, Maryland, 2013). This is a major concern, as it is associated with adverse outcomes for the mother and baby (WHO, n.d.).

As reported in a national survey done in 2013, the median age at first intercourse among women aged 25-49 is 17.6 years. While 24 % of women report that they had sexual intercourse by age 15 and 54 % by age 18 years (National Population Commission Federal Republic of Nigeria, ICF International Rockville, Maryland, 2013). The median age at first marriage is 18.1 and 27.2 years for female and men correspondingly (National Population Commission Federal Republic of Nigeria, ICF International Rockville, Maryland, 2013).

The level of knowledge and access to reproductive health services among adolescents is reported as low (Ilori *et al.,* 2020a).

The reproductive and sexual well-being needs of adolescents are under-researched and served despite their large population (WHO Regional office for Africa, 2019), especially in Rivers State. Adolescents need knowledge and abilities to make very educated decisions about their lives, acknowledge how to keep away from and manage issues, and be familiar with where to look for help if vital.

This intervention aims to improve the knowledge and skills of adolescents to make well-informed choices about their lives, learn how to evade and deal with problems and be acquainted with where to seek help when necessary. Investment in reproductive health services for adolescents will bring a triple dividend of benefits now, into future adult life, and for the next generation of children (Patton *et al.,* 2016).

Therefore, we deem it necessary to ascertain the effect of CBE on knowledge of SRH services among adolescents in secondary schools in Rivers State, Nigeria.

Methodology

Study Area: The assessment was conducted in Rivers State, Nigeria. Rivers State has an estimated population of 7,303,924 million as of 2016. About 23% of the population are adolescents. The participants were drawn from ten Secondary Schools in Rivers State.

Study Design: The study design was a quasi-experimental design employing pre- and post-intervention phases to determine the effect of the comprehensive sexuality education intervention on improving the knowledge of reproductive health services among adolescents in secondary schools in Rivers State. The intervention includes teaching adolescents comprehensive sexual and reproductive health education. That entails giving the adolescent participants manuals that have nine modules as follows Hunan Body Development and Changes during Puberty; Sex/Gender Role; Sexual Abstinence; Premarital sexual intercourse and Teenage Pregnancy; Human Sexual Behaviour and Sexually Transmitted Infections; Contraception/Safe Sex; Reliable sources of SRH information and services

for adolescents; Effective Parent-child SRH Communication skills; and Peer Health Education. The facilitators also had a facilitator manual.

Study Population: Male and female adolescents (aged 10-19 years) in secondary schools in Rivers State.

Inclusion Criteria: Adolescents in secondary schools in Rivers State, who we willing to join the adolescent health club, and who provide ascent/consent and their guardian provide written informed consent for those below 18 years would be included.

Exclusion Criteria: Adolescents who due to serious illness were unable to complete the questionnaires were excluded.

Sample Size Determination

Testing the significance of the difference in proportion between the population before and after (13).

- $n= [Z_\alpha (2P(1-P))^{1/2} + Z_\beta (p_1 (1-p_1) + p_2 (1-p_2))^{1/2}]^2/(p_1-p_2)^2$
- An approximate formula is given below.

$n= (Z_\alpha + Z_\beta)^2 \{p_1 (1-p_1) + p_2 (1-p_2)\}/ (p_1- p_2)^2$

p_1 = proportion of knowledgeable adolescent pre-intervention 54.4% (0.544).

p_2 = proportion of knowledgeable adolescents' post-intervention 74.0% (0.74) derived from a similar study by Oyo-Ita et.al on knowledge of reproductive health issues among secondary school adolescents in Calabar, Nigeria(Oyo-Ita *et al.,* 2004).

p = average of p_1 and $p_2 = 0.642$

Z_α is a standard normal deviation corresponding to the level of significance (usually 5%) which is a critical value using 1.96 at a 95% confidence interval.

Z_β is the standard deviation corresponding to the power of 1-β which is a critical value using 0.84 at 80% power.

A minimum sample size of 90 was estimated.

An attrition rate of 10 % is factored in, giving a sample size of 100.

An estimated sample size of 100 adolescents, that is 10 per school and 2 teachers each will be added.

Sampling Technique

A multistage sampling technique was used to select participants.

Stage 1: From the list of 58 public secondary schools in Rivers State (Osaro & Wokekoro, 2019), ten (10) schools were randomly (computer-generated) selected.

Stage 2: In each selected school, ten students were selected, two from each class SSS 1-3 and JSS 3 while one each from JSS 1 and 2. It was by random selection (balloting), and then from the list of students in each class who were willing to join the adolescent health club. Overall, ten (10) adolescents were randomly selected from each of the 10 schools by balloting. Adolescents who met the inclusion criteria were surveyed.

Study Instrument: An interviewer-administered semi-structured questionnaire, from the WHO illustrative questionnaire and reviewed works of literature was adapted for the surveys (16) and inputted into Kobo Collect then used to elicit information from the participants using Android phones. The MS Excel sheet was downloaded, cleaned, exported, and analysed using version 26 of the Statistical Package for Social Science (SPSS).

In measuring the overall awareness of reproductive health services, 12 questions in the domains of puberty, bodily perception, pregnancy, contraceptives, cervical cancer, breast cancer, prenatal care, antenatal, postnatal, adolescent-friendly centres, HIV and other STIs were used to assess this. This section scored one (1) for each response that showed the participant ever heard of RHS and zero (0) for a not heard of response concerning RHS. All answers were summed up. Participants with an overall good awareness of RHS were graded 7-12 and poor awareness ≤ 6. In measuring the overall knowledge of reproductive health services, 67 questions were used to assess this. This section scored one (1) for each response that showed the participant answered correctly and zero (0) for an incorrect response concerning RHS. All answers were summed up. Participants with an overall good knowledge of RHS were graded 50-67 and poor awareness ≤ 49.

Data was checked for completeness; analysis was done for comparison of awareness and knowledge of reproductive health issues before and after the intervention. For pre-and post-comparison of the mean score of awareness and knowledge, a paired t-test was used, the data set was normally distributed. The Cohen's d effect size was used to account for the magnitude of change in awareness and knowledge.

Ethical Considerations: The Research and Ethics Committee of the University of Port Harcourt Teaching Hospital, Port Harcourt Rivers State gave the ethical approval for the study (UPTH/ADM/90/S.11/VIL.XI/1398). Consent was obtained for participants 18 years and above, assent for those less than 18 years as well as consent from their parents/guardian. They signed an appropriate form before the survey to ensure their willingness to participate in the study, and they were told have a right to refuse to participate or to withdraw at any time. The benefits of the study were explained to eligible participants and assurances of confidentiality and privacy were given to them. Permission was sought and obtained from the principals of the selected schools.

Results

Concise statement of results/implications for public health should be included. It should be presented in a logical sequence with reference to tables, figures, and supplemental material as appropriate. This heading can be renamed as Results and Discussion depending on the nature of the study. NB. Tables should be scientifically presented (Table 1) and labelled.

Table 1: Sociodemographic profile of adolescents in a secondary school in Rivers State 2002.

Variables	Frequency (%) n=100
Sex	
Female	80 (80.0)
Male	20 (20.0)
Marital status	
Single	100 (100.0)
Location	
Rural	29 (29.0)
Urban	71 (71.0)
Education Completed	
Junior Secondary	64 (64.0)
Senior Secondary	36 (36.0)
Current class	
JSS 2	1 (1.0)
JSS 3	19 (19.0)
SS 1	32 (32.0)
SS 2	28 (28.0)
SS 3	20 (20.0)
Resides with	
Both Parents	76 (76.0)
Others	1 (1.0)
relative	14 (14.0)
Single Parents	9 (9.0)

As shown in Table 1, eighty (80.0%) of the respondents were female, of them (100.0%) were single, and urban respondents made up 71 (71.0%). Those in SS 1 made up 32 (32.0%) followed by SS2 (28.0%), and SS 3 (20.0%). 76% of the respondents resided with both parents.

Table 2: Pre- and Post Intervention Awareness of Reproductive and sexual health services among Adolescents in secondary schools in Rivers State 2022.

Variables	Pretest Frequency (%) n=100	Post-test Frequency (%) n=97
Ever heard about reproductive health		
No	14 (14.0)	1 (1.03)
Yes	86 (86.0)	96 (98.97)
Ever heard about family planning/contraception		
No	15 (15.0)	7 (7.22)
Yes	85 (85.0)	90 (92.78)
Ever heard about post-abortion care		
No	68 (68.0)	37 (38.14)
Yes	32 (32.0)	60 (61.86)
Ever heard about HIV		
No	0 (0.0)	1 (1.03)
Yes	100 (100.0)	96 (98.97)
Ever heard about pregnancy		
No	0 (0.0)	0 (0.0)
Yes	100 (100.0)	97 (100.0)
Ever heard of other Sexually Transmitted Infection		
No	7 (7.0)	2 (2.06)
Yes	93 (93.0)	95 (97.94)
Ever heard about cervical cancer		
No	77 (77.0)	63 (64.95)
Yes	23 (23.0)	34 (35.05)
Ever heard about breast cancer		
No	5 (5.0)	1 (1.03)
Yes	95 (95.0)	96 (98.97)
Have ever heard about prenatal care		
No	48 (48.0)	14 (14.43)
Yes	52 (52.0)	83 (85.57)
Ever heard about antenatal		
No	19 (19.0)	13 (13.4)
Yes	81 (81.0)	84 (86.6)
Ever heard about postnatal		
No	55 (55.0)	19 (19.59)
Yes	45 (45.0)	78 (80.41)
Are you aware of adolescent-friendly centres (where adolescents can seek health services)?		
No	59 (59.0)	29 (29.9)
Yes	41 (41.0)	68 (70.1)
Overall, Awareness Level		
Good (7-12)	87 (87.0)	92 (94.85)
Poor (≤ 6)	13 (13.0)	5 (5.15)

Overall, good awareness at pre-intervention, 87 (87%) increase to 92 (92 %) post intervention.

Table 3: Overall Pre- and Post-intervention Awareness of sexual and reproductive health services among adolescents in secondary schools in Rivers State 2022.

Variables	Pre-intervention	Post Intervention n=97	Test Statistic	Cohen's defect size [95% CI]	P-value
Mean Awareness Score	8.3±1.8	10.1±1.6	t=7.59	2.14 [0.9-0.5]	0.01

As shown in Table 3, The Mean Awareness Score of 8.3± 1.8 rose to 10.1±1.6 post-intervention. The difference was statistically significant (t=7.59, df 96, P < 0.01).

Table 4: Overall Pre- and Post-intervention knowledge of comprehensive sexual and RHS among adolescents in secondary schools in Rivers State 2022.

Variables	Pre-intervention	Post Intervention n=97	Test Statistic	Cohen's defect size [95% CI]	P-value

Mean Awareness Score	51.6±8.3	57.4±9.3	t=4.59	11.7 [0.7-0.3]	0.01

The overall pre intervention good knowledge of RHS was 64 (64%), it rose to 85 (87.6%) post intervention. The mean knowledge score increased from 51.6 ± 8.3 to 57.7 ± 9.3, this difference was statistically significant (t =4.59, df 96, P < 0.01).

Discussion

The study aimed to assess the effect of CSE on the knowledge of sexual and reproductive health care services among adolescents in rural/urban secondary schools of Rivers State. The findings showed that the intervention improved the knowledge of SRH care services among adolescents.

A relatively high level of awareness was observed among the adolescents and their teachers before and after the intervention with the mean awareness score increasing only slightly from 8.3± 1.8 to 10.1±1.6. 87% of participants had good awareness at baseline, which is in tandem with a study carried out in Ethiopia (Melaku *et al.,* 2014) Although the Ethiopian study population was adolescent girls, most respondents of this index study were females (80%) and females have been documented to have better health-seeking behaviour than their male counterparts, seeking out information and health solutions more readily from adults and professionals. (Agampodi *et al.,* 2008)On the contrary, some studies which had more adolescent male respondents than females showed lower levels of awareness (Ilori *et al.,* 2020b; Olugbenga-Bello *et al.,* 2009) Also, a systematic review by Ivanova et al revealed a generally low awareness of RHS among adolescents (Ivanova *et al.,* 2018) This deviation could be because their populations of interest were migrant, refugee or displaced girls and women whose access to health information and services would be impaired by the prevailing socio-economic situations.

Participants' knowledge level was assessed on the domains of puberty, bodily perception, pregnancy, contraceptives, reproductive health rights, Youth Friendly Centres (YFC), HIV and other STIs(Akinwale *et al.,* 2022; Ilori *et al.,* 2020b) At baseline, only about two-thirds of the participants (64%) demonstrated a good knowledge of RHS before the intervention. The fairly average baseline outcome can be attributed to the mixed study location as some studies have deduced a better knowledge of RHS among urban respondents compared to rural settings. In addition, this level of knowledge is in keeping with two systematic reviews in which most included studies were African and their results showed a poor-moderate and limited knowledge of RHS among adolescents. (Akinwale *et al.,* 2022; MN *et al.,* 2018) These results are not surprising as studies have shown that over the years, access to information which constitutes knowledge of RHS has been hindered by factors like stigma, distance, costs, cultural influences and provider attitudes(Gausman *et al.,* 2021; Ivanova *et al.,* 2018; Patel *et al.,* 2012) It is worthy of note, however, that many recent studies show an increasing level of knowledge of RHS among adolescents with more access to the internet, regardless of their setting (Inthavong *et al.,* 2020; Utaka *et al*., 2023).

Implication of the findings: The findings suggest that the Comprehensive Sexuality Education (CSE) intervention was effective in improving awareness and knowledge of sexual and reproductive health (SRH) among adolescents in Rivers State, Nigeria. The implication of this is that the intervention successfully enhanced understanding of SRH topics among the adolescents. The statistically significant differences in mean awareness and knowledge scores provide strong evidence supporting the effectiveness of the CSE intervention.

Strengths and limitations of the study: The study utilized a quasi-experimental design, which is high among the epidemiological study designs. The study also provides clear, quantifiable evidence of the effectiveness of the CSE intervention by showing statistically significant increases in both awareness and knowledge scores. The findings can potentially be generalized to other settings with similar populations, suggesting the broader applicability of CSE programmes in improving SRH outcomes among adolescents. the study limitation is that it may have inherent biases due to the sampling method or characteristics of the participants, limiting the generalizability of the findings to the broader adolescent population. Participants might have provided responses they perceived as socially desirable rather than reflecting their true knowledge or awareness levels. Also, the evaluation of the intervention's effects may be limited to short-term (four mouths) outcomes, and long-term sustainability and impact remain unclear.

Conclusion

A significantly measurable increase in awareness and knowledge of SRH has been achieved by teaching adolescents about comprehensive sexual and reproductive health. Improving the knowledge of sexual and reproductive health among adolescents in secondary schools in Rivers State is not only a vital step towards their overall well-being but also a responsibility that society must actively undertake. Through a comprehensive and evidence-based approach, we can foster a healthier, safer, and more informed generation of adolescents.

This intervention improved the knowledge and skills of adolescents to make well-informed decisions about their reproductive health, realize how to avoid and deal with reproductive health problems and be acquainted with where to seek help when necessary.

We recommend that this intervention be scaled up, and it should include adolescents in rural communities who may lack access to formal education. However, a comprehensive review of whether to use a 2-phased approach should be made to avoid "attrition". That is the pre- and post-intervention may be done at once. However, the scope of the education provided may be limited.

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Competing Interest

This manuscript has not been submitted to, nor is it under review at, another Journal or other publishing venue.

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