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In-School Adolescents' Perspectives on Strategies for Implementation of Cervical Cancer Awareness and Human Papillomavirus Vaccination Uptake in Ibadan, Oyo State, Nigeria

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Article history: Received 11 July 2024, Reviewed 21 November 2024, Accepted for publication 23rd November 2024

Abstract

Background: This study investigated health promotion strategies to increase cervical cancer awareness and human papillomavirus (HPV) vaccination uptake among in-school adolescents in Ibadan, Nigeria. The objectives were to assess adolescents' knowledge of cervical cancer and HPV, identify their preferred health promotion strategies for implementation interventions, and examine the factors influencing the adoption of these strategies.

Methodology: A cross-sectional study was conducted among 369 in-school adolescents aged 10-19 years, using a mixed-method approach. Quantitative data were collected via structured questionnaires, while qualitative data were gathered through focus group discussions (FGDs) with 8 homogenous groups. Descriptive and inferential statistics were used to analyse the quantitative data, while thematic analysis was applied to the qualitative data.

Results: The mean age of the respondents was 14.69±1.12. The mean knowledge score was 5.48±4.4, with a little above half (51.80%) having poor knowledge. There was a statistically significant difference between knowledge, school category (p=0.000) and age (p=0.002). Strategies for implementation of interventions to promote cervical cancer awareness and HPV vaccination uptake included social media (46.0%), and educational methods, school education (66.4%). Findings from FGD corroborated these results. Availability of HPV vaccines in health facilities (81.2%) and provision of incentives to promote HPV vaccination (82.9%) were factors reported to influence the adoption of suggested strategies.

Conclusion: The results from both qualitative and quantitative studies showed that health promotion strategies like health education in schools, and the use of social media to disseminate information could help to promote awareness of cervical cancer and HPV vaccination among adolescents.

Keywords: Cervical cancer, human papillomavirus, HPV vaccination, adolescents, implementation strategies.

How to cite this article:

Adeyemo PI, John-Akinola YO. In-School Adolescents' Perspectives on Strategies for Implementation of Cervical Cancer Awareness and Human Papillomavirus Vaccination Uptake in Ibadan, Oyo State, Nigeria. The Nigerian Health Journal 2025; 25(1): 77 – 87.
https://doi.org/10.71637/tnhj.v25i1.865

Introduction

Cervical cancer is of global public health concern among women, with increasing incidence and mortality in sub-Saharan Africa[1]. Many barriers impede cervical cancer prevention including low awareness and cost/financial resource[2]. Socio-cultural factors could also be associated with low knowledge and uptake of cervical cancer prevention services, including human papillomavirus vaccination (HPV) uptake.

Adolescents represents part of the major population in Nigeria and prevention interventions and programmes have been carried out among them. Most of the studies carried out among adolescents in Nigeria have identified public health education as the main strategy to promote cervical cancer awareness among adolescents[3]. The growing population of adolescents in Nigeria has necessitated the need to identify effective health promotion strategies to increase awareness and knowledge of cervical cancer[4]. In order to prevent HPV-related illnesses in girls between the ages of 9 and 14, the World Health Organization approved the use of an effective HPV vaccine in 2006[5]. Although the HPV vaccine has been available for more than 15 years, countries in sub-Saharan Africa that are implementing the vaccination program have only achieved 53% of the recommended doses[6]. There are numerous implementation barriers that have limited adequate coverage, implementation methods for cervical cancer prevention, including HPV vaccination[7].

It has been that reported health education in schools and incorporation of cervical cancer education into the school curriculum are effective ways of promoting cervical cancer awareness[8]. However, there is a dearth of study in Nigeria on adolescents' perspectives on preferred health promotion strategies for implementation of interventions to promote cervical cancer awareness and HPV vaccination uptake. Understanding the perspectives of adolescents on preferred strategies may be useful in developing effective intervention programs to further increase their awareness on cervical cancer and improve uptake of HPV vaccination. Therefore, this study investigated health promotion strategies for implementation of cervical cancer awareness and human papillomavirus vaccination uptake among selected in-school adolescents in Ibadan, Nigeria. Both male and female adolescents were included to embrace inclusivity.
This study answered the following questions: What is the level of knowledge of in-school adolescents on cervical cancer and HPV vaccination? What are the preferred health promotion strategies for implementation interventions to promote cervical cancer awareness and HPV vaccination uptake among in-school adolescents? and What are the factors influencing the adoption of these strategies?

Method

Study design and area

This study employed an exploratory sequential mixed-methods design, combining both qualitative and quantitative data collection methods. The study was conducted among public and private senior secondary school students in Ibadan North Local Government Area (LGA), Oyo State, Nigeria. The local government region is divided into 12 wards, with a total of 95 secondary schools, 42 public/government schools and 53 registered private schools in Ibadan North local government.

Sample size and sampling technique

The sample size for this study was estimated using Leslie Kish formula for single proportion as 369. A multistage random sampling technique was used to select 369 students from a proportionate number of public and private schools. The sample size was determined using the Leslie Kish formula for single proportion, and respondents were selected from Senior Secondary S.S. 1 to S.S. 3 classes based on consent. A multistage random sampling was used for this study. The 5-stages included:
Stage 1: The list of all secondary schools in Ibadan North Local Government was obtained from the Oyo State website, Simple stratified sampling was used to divide the 95 registered secondary schools in Ibadan North Local government into strata; private and public schools. All 95 registered secondary schools in the LGA were stratified into public and private schools
Stage 2: Proportionate ratio was used to determine the number of schools selected from each stratum: 5 (five) out of the 53 private schools and 4 (four) out of the 42 registered public schools. Total secondary school in Ibadan North LGA = 95; Number of Public secondary school = 42; Number of private secondary school = 53. Ratio of public to private secondary schools is 42:53 = 1:1.3. To ensure fair and equal representation, 5 private and 4 public schools were selected through simple random sampling.
Stage 3: From the randomly selected schools, proportional ratio was used to determine the number of respondents per school.

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Stage 4: Students who were given consent and who gave assent were selected randomly from senior secondary classes 1-3 across all selected schools.

Instruments for data collection, procedure and analysis

Qualitative and quantitative instruments were used for data collection. The quantitative instrument was modified with the findings from the qualitative reports. Data collection involved two instruments: Focus Group Discussions (FGDs) and self-administered semi-structured questionnaires. For quantitative data, a pretested questionnaire was administered, which covered socio-demographic information, awareness of cervical cancer, knowledge of HPV vaccination, and preferred health promotion strategies.

Qualitative data: Focused Group Discussion (FGD) guide was used to obtain qualitative data from adolescents. Six FGDs were conducted with 48 students to gather qualitative data on cervical cancer and HPV vaccination knowledge, and strategies to promote awareness. Permission was sought from the school Principal, while consent and assent were obtained from the guardians and students before commencement of the FGDs. Focus group discussions were held in one of the school classrooms that was quiet and conducive for the participants. Participants were provided with adequate information about the study and what is expected of them as well as ground rules, permission was obtained for audio recording of the discussion. The FGD was facilitated by three persons; the moderator, the timekeeper who kept record of time, the notetaker who documented the discussion. Eight participants participated in each of the six FGD sessions, making a total of 48 participants. The discussions were recorded, transcribed, and analysed thematically to identify patterns in the participants' perceptions. Similar and different themes were developed within and across the groups. Each opinion was put in italics form, including the speaker's means of identification for easy comprehension and identification.

Quantitative data: The questionnaire contained 4 sections, namely, the socio-demographic information, awareness of cervical cancer and HPV vaccination, knowledge of cervical cancer and HPV vaccination, identification of preferred strategies for implementation interventions to promote cervical cancer awareness and HPV vaccination uptake, and factors influencing the adoption of implementation strategies to promote cervical cancer awareness and uptake of HPV vaccination.

Validity and reliability of data instruments were ensured before data collection proceeded. Both qualitative and quantitative instruments were pretested at another LGA with similar characteristics in two selected secondary schools (private and public). The Cronbach's alpha model was used to determine the reliability coefficient of the questionnaire. In this approach, a reliable coefficient greater than 0.50 was regarded as reliable. The Cronbach alpha technique gave a reliability of 0.757. Permissions, consent and assent were obtained before data was collected with the help of three research assistants who had been trained on the objectives and contents of the questionnaire.

All copies of the questionnaires were checked for the purpose of completeness and accuracy. Serial numbers were assigned to each of the administered questionnaire for easy reference and identification, and a coding guide was developed. Analysis was done with the use of statistical package IBM SPSS version 20. The data entered was subjected to descriptive (mean, median, mode) and inferential (Chi-square) statistical analysis to test associations between variables. Knowledge of cervical cancer and HPV vaccination was measured using a 19-point knowledge score; knowledge score 0 to 5 was categorized poor, 6 to 10 was categorized as fair while 11 to 15 was categorized as good.

Ethical consideration

Ethical approval was sought and obtained from the Oyo State Ethics Review Committee of the Ministry of Health with assigned number (NHREC/OYOSHRIEC/10/11/22) before commencement of data collection. The study also took into consideration, ethical principles such as informed consent, statement of confidentiality, beneficence and non-maleficence, permission was obtained from principals of each of the selected secondary schools. Informed consent was obtained from the guardians and assent from study participants respectively. Confidentiality of the respondents' information supplied was ensured by allocating ascribed codes/identifiers to each FGD group and identification number to each questionnaire (respondents' name was not included in the questionnaire). Data collected was used for the purpose of this research and were kept confidential on a password protected computer to avoid unauthorized

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access; questionnaires were serially numbered to avoid missing data, and stored in a safe place.

Results

Participants' profile for qualitative results

There were 8 homogenous groups comprising of male and female in-school adolescents from four different schools; each group comprised of 8 students. Each participant contributed willingly to the discussions.

Socio-demographic characteristics of respondents

The total number of respondents was 369 with mean age of 14.69±1.12; age range from 10-19 years. More than half of the respondents (54.5%) were 15-19 years and females (55.3%) respectively. More than half of the respondents (53.7%) and (51.2%) were from private school and in second year of senior secondary school (S.S.2) respectively (Table 1).

Table 1. Socio-demographic characteristics of the respondents (N=369)

Socio-demographic characteristics	Frequency	Percentage (%)
Age category (in years)		
10-14	168	45.6
15-19	201	54.5
Gender		
Male	165	44.7
Female	204	55.3
Religion		
Christianity	295	79.9
Islam	70	19.0
Traditional	3	0.8
Others	1	0.3
Tribe		
Yoruba	304	82.4
Hausa	16	4.3
Igbo	23	6.2
*Others	26	7.0
School category		
Public	171	46.3
Private	198	53.7
Class		
S.S 1	128	34.7
S.S 2	189	51.2
S.S 3	52	14.1

*Others (Edo, Binjim, Ijaw, Urobo and Fulani)

Awareness of cervical cancer, human papillomavirus (HPV) and HPV vaccination

Less than half (45.3%) of the respondents had heard of cervical cancer (CC) while 24.2% had heard of human papillomavirus (HPV). Social media was reported as the most common source of information for both CC (24.2%) and HPV (21.1%). Few (18.2%) of the respondents had heard of HPV vaccination. The main source of information of HPV vaccination reported by the respondents was medical/health personnel (23.4%). Qualitative findings highlighted that almost all participants in both public and private schools were unaware of cervical cancer nor human papillomavirus (HPV). Question on 'have you heard of cervical cancer' generated "I don't know" from most participants. Few of the responses are found below:

> "I have heard but I don't know what it is about"-(PrFF)
>
> "I've heard of cancer, but I've never heard of cervical cancer"-PrFM

Most of the participants across all groups had never heard of HPV vaccine except for three participants in two of the groups who had heard of the vaccine;

> "HPV vaccine is used to cure cervical cancer "-PrFM
>
> "Maybe it's used for prevention "-PrFM
>
> "When I ask the doctor about cervical cancer, then I asked what can we use to cure or prevent it, he only said it is only HPV vaccine that can be used to prevent it"-PrFF

Respondents' knowledge of cervical cancer and HPV vaccination

Less than half (41.5%) of the respondents reported that cervical cancer was an abnormal growth in the cervix of a woman while few (23.8%) knew that cervical cancer was caused by human papillomavirus. More than one third (34.7%) of the respondents correctly reported HPV as a sexually transmitted disease, while less than half of the respondents (40.1%) stated that HPV vaccination can prevent cervical cancer (Table 2). The mean knowledge score obtained by the respondents was 5.48± 4.4. More than half (51.80%) of the respondents had poor knowledge of cervical cancer, human papillomavirus (HPV) and HPV vaccination. There was a statistically significant difference between school category (p=0.000) and age (p=0.002), and overall knowledge of cervical cancer, HPV and HPV vaccination (Table 3).

Most participants across all qualitative groups had low knowledge of cervical cancer except for four participants who stated something related to what cervical cancer meant, as shown in the statements below.

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"It affects the vagina"-PrFM
"I asked the man he said it was in the womb part"-PrFF
"I think it is a cancer that affects cervix"-PrEF
"I think it is a cancer that affects cervix"-PrEM

When participants were asked how cervical cancer can be contracted, most responses did not show adequate knowledge; few of the responses are shown below:

"Like the women not breasting feeding"-PrEF
"Through blood transfusion, use of soap around the vagina, poor hygiene"-PrEM
"Smoking, putting money on the woman's breast, writing biro on the skin flesh, taking hard drugs, by bleaching"-GCM
"Maybe through juju, from the toilet, through sharp objects, through contaminated can food, through infected blade" –PrFM

Most of the participants had no idea of the relationship between human papillomavirus and cervical cancer. However, two participants in one group stated that HPV is the virus that causes cervical cancer:

"The virus is the cause of the cancer"
"The virus might be one of the causes of cervical cancer"

Table 2. Respondents' knowledge of cervical cancer and HPV vaccination (N=369)

Statements	Frequency	Percentage (%)
Understanding of cervical cancer		
Cervical cancer is an abnormal growth in the cervix of a woman	153	41.5
Cervical cancer preventable	135	36.6
Ways to prevent cervical cancer		
Pap smear test	68	18.4
Use of condom	99	26.8
Abstinence	127	34.4
Eating healthy	61	16.5
HPV vaccination	148	40.1
Understanding of human papillomavirus		
HPV is the cause of cervical cancer	88	23.8
HPV a sexually transmitted disease	128	34.7
Modes of transmission of HPV		
Multiple sexual partners	134	36.3
Early sexual exposure	117	31.7
Smoking	74	20.1
Family history of cervical cancer	99	26.8
Breastfeeding	79	21.4
Uncircumcised male	68	18.4
Understanding of HPV vaccine		
HPV vaccine prevent cervical cancer	127	34.4
A girl takes the vaccine	160	43.4
A boy takes the vaccine	121	32.8
Approved age for HPV vaccine for adolescents		
9 and above	99	26.8
18 and above	179	48.5
20 and above	35	9.5
50 and above	13	3.5

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Table 3. Association between respondents' socio-demographic characteristics and knowledge

Socio demographic characteristics	Knowledge categorization			X^2	Df	P-value
	Poor (%)	Fair (%)	Good (%)			
Age						
10-14	92(54.8)	60(35.7)	16(9.5)	12.056	2	0.002*
15-19	99(49.3)	56(27.9)	46(22.9)			
Gender						
Male	78(47.3)	60(36.4)	27(16.4)	3.501	2	0.174
Female	113(55.4)	56(27.5)	35(17.2)			
School category						
Public	66(38.6)	66(38.6)	39(22.8)	22.707	2	0.000*
Private	125(63.1)	50(25.3)	23(11.6)			

*Significant (P<0.05)

Adolescents' preferred strategies and methods for implementation interventions to promote cervical cancer awareness and HPV vaccination uptake

Preferred strategies reported that could promote cervical cancer awareness and HPV vaccination uptake among adolescents included: social media (46.0%), television/radio (16.0%), incorporation into the school curriculum (5.2%), school enlightenment programs (3.0%), health personnel (3.1%) and parents/friend/family (1.6%) (Table 4).

In addition, adolescents were asked to identify educational methods to promote cervical cancer awareness and HPV vaccination uptake among in-school adolescents. Many (66.4%) highlighted in-school education as their most preferred method; 63.4% of the respondents indicated health education by health personnel. Further, 68.8% of the respondents highlighted the use of social media platforms, and 65.9% identified mass media (radio and television) as the preferred educational method. Majority (83.5%) of the respondents suggested that the itemized strategies could also be useful to address other health issues relating to adolescents (Table 5).

The focus group discussion findings corroborated the quantitative results. Participants highlighted strategies that could be used to promote awareness on cervical cancer and HPV vaccination uptake as:

- Use of social media and internet
- Print media (such as billboards, handbills, newspapers and magazines)
- Use of influencers
- Incorporation into their school curriculum
- Public enlightenment (enlightenment programs in schools' campaigns and sensitization)
- Through their teachers and assembly
- Advertisements on radio (through jungles)

Most of the participants across all groups agreed that peer group discussion, provision of incentives and incorporation of cervical cancer into the school curriculum will promote awareness of cervical cancer among adolescents.

> "It will prevent people from contracting the virus if it is included into the curriculum for adolescents, subjects like civic education, social studies"-PrFM
> "Yes, because it will prevent the continuity of cervical cancer"-PrFM

Participants across all groups were asked the most effective way information on cervical cancer and HPV can be delivered to adolescents, the following ways were highlighted.

- Through social media
- Mass media
- School curriculum

While most participants mentioned social media as an effective route for creating awareness, because almost everybody had access to a cell phone, one participant disagreed; he stated that the school curriculum is the best and most effective way to pass information on cervical cancer;

> "Actually, not all children have access to cell phone, I think incorporation in school curriculum is better"-PrEF

Another participant also disagreed with the use of social media social media and stated radio because everybody has access to radio;

> "Because everybody listens to radio and have access to radio"-GCM

In addition, adolescents were asked to identify ways that cervical cancer awareness can be promoted among adolescents in the community (out of school adolescents); the identified ways included;

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"By sharing the information to them, campaign for cervical cancer and the vaccine should be made known, when they get to the community, they should inform people about it, they should create a group, to enlighten the community member on cervical cancer and its effect, they should bring like where they can take the vaccine, they should bring it closer to the people"-PrFF

"Peer group discussion, people should go to each house to advise them and educate them, through mass media, they should protest, like writing it on banners, billboard"-PrFm

"Putting in their informal-school curriculum,"-GCF

"Social media and hand bills"-GCM

"By telling them, by chatting them online, by sending message to them "-GSM

All participants across all groups also agreed that community campaign will promote cervical awareness among all adolescents (in-school and out-of-school).

Table 4. Adolescents' preferred strategies for implementation interventions to promote cervical cancer awareness and HPV vaccination uptake (N = 287)

Statement	Frequency	Percentage (%)
Strategies to promote cervical cancer awareness		
Social media	132	46.0
Television/radio	46	16.0
Mass media	22	7.7
Incorporation into school curriculum	15	5.2
School enlightenment	14	4.9
Public enlightenment/social awareness	13	4.5
Seminars/lectures/symposium	11	3.8
Health personnel	9	3.1
IEC materials	7	2.4
Parents/friends/family	6	2.1
Phone	5	1.7
House-house enlightenment	4	1.4
Community campaign/medical outreach	3	1.0

Table 5. Identified educational methods to promote cervical cancer and HPV vaccination awareness (N = 369)

Statement	Frequency	Percentage (%)
Educational methods you think will help promote cervical cancer awareness		
Health education regarding cervical cancer in schools	245	66.4
Health education regarding cervical cancer by health personnel	234	63.4
Use of social media platforms (WhatsApp, Twitter and Facebook)	254	68.8
Mass media (radio and television)	243	65.9
Peer group education (study group discussions)	208	56.4
Lectures and seminar	237	64.2
Community campaign (house to house publicity and public advertisement)	188	50.9
Remind calls and text messages (telephone)	169	45.8
Use of IEC materials (posters, leaflets, signpost/billboard)	199	53.9
Do you think these strategies can be applied to other health issues relating to adolescents		
Yes	308	83.5
No	61	16.5

*Multiple responses included

Factors influencing the adoption of strategies for implementation interventions to promote cervical cancer awareness and HPV vaccination uptake

Majority (81.2%, 82.9% and 75.1%) of the respondents reported that availability of HPV vaccines in health

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facilities, provision of incentives to promote HPV vaccination and government policies to make vaccination mandatory by the government are factors that could influence the adoption of strategies to promote cervical cancer awareness and HPV vaccination uptake. Majority (81.0%) mentioned health workers and parents (70.2%) as persons that could drive the implementation of the strategies to promote awareness among adolescents (Table 6).

Qualitative findings revealed that most participants highlighted measures the government can put in place to promote cervical cancer awareness and increase HPV vaccination uptake, as the use of social media, making the vaccine free, sensitizing in community and school settings, as shown in few statements:

"The government should make medical checkup compulsory and free, they should make the vaccine free, the government should provide voluntary workers to go to each house and enlighten them, they should give us money"-PrEF

"Make it mandatory, do health campaign and make it compulsory to take it before travelling"-GSM

"They should go to all these TV stations so that we can be more educated on it and also know the measures from it. they should inform all hospital so they can reduce the fees, so that people will be able to pay for it, shows in which teenagers watch like watching they can advertise after such shows so that children can be aware about it"-PrFF

Table 6. Factors influencing the adoption of implementation strategies to promote cervical cancer and HPV vaccination awareness (N=369)

Factor statement	Yes (%)	No (%)
Inclusion of cervical cancer into health education curriculum	285(77.2)	84(22.8)
Availability of the HPV vaccine in health facilities	302(81.2)	67(18.2)
Cost of the vaccine	242(65.6)	127(34.4)
Government policies, vaccination made mandatory by the government	277(75.1)	92(24.9)
Provision of incentives to promote HPV vaccination	306(82.9)	63(17.1)
Groups of people that will drive the implementation strategies to promote awareness		
Health workers	299(81.0)	70(19.0)
Parent	259(70.2)	110(29.8)
Teachers	246(66.7)	123(33.3)
Social media influencers	245(66.4)	124(33.6)
Community leaders/ religious leaders	232(62.9)	137(37.1)
Friends	203(55.0)	166(45.0)
Others *	2(0.5)	367(99.5)

*Others (government)

Discussion

This study investigated health promotion strategies that could increase cervical cancer awareness and HPV vaccination uptake among in-school adolescents in Ibadan, Nigeria. Specifically, the objectives assessed the level of knowledge among adolescents about cervical cancer and the HPV vaccination, identified their preferred health promotion strategies, and the factors that could influence the adoption of these strategies. The key findings revealed that less than half of the respondents were aware of cervical cancer, while fewer had heard of HPV and HPV vaccination. Social media emerged as the most common source of information on both cervical cancer and HPV. Qualitative results showed low knowledge among adolescents regarding cervical cancer and HPV vaccination. Preferred health promotion strategies included social media as the most preferred. Mean age was 14.69±1.12 years and majority fell in the 15-19 years age category; this was because the study included only in-school adolescents in senior secondary school.

Awareness of cervical cancer, HPV and HPV vaccination was low among in-school adolescents.

Few of the respondents had heard of HPV vaccination; this report was higher than the findings from a study conducted in Lagos State, which showed that less than 2% of the participants had heard of HPV vaccine[14]. The results showed that more than half of respondents had poor knowledge cervical cancer and HPV vaccination. This highlights the need for more educational program

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strategies among in-school adolescents. Overall proportion of adolescents who had good knowledge was lower than the that reported from south-eastern Nigeria among adolescents[15], but similar to the study among female secondary school in Ibadan where 11% had good knowledge of cervical cancer[10]. One third of the respondents knew that HPV is a sexually transmitted disease; this is similar the study by Ndikom and Oboh[16]. Majority of the adolescents identified the following strategies to promote cervical awareness among adolescents; social media, television and radio, school enlightenment programs and incorporation into school curriculum[17]. The use of social media platforms was suggested as one of the ways to promote cervical cancer awareness among in school adolescents, as corroborated by Lyson, Le, Zhang, Rivadeneira, Lyles and Radcliffe[18] where participants agreed that the use of social media can promote awareness of cervical cancer. The findings of this study were also similar to the report of Abraham, Szela, Feng, Egbujor and Gay[19] where adolescents reported the use of online resources such as websites, videos and social media to promote information on cervical cancer. Implementation of educational programs using already established resources will promote the awareness of cervical cancer among adolescents.

There were several factors that influenced the adoption of suggested strategies, and findings would be useful for development of appropriate strategies to improve and promote cervical cancer awareness and uptake of the HPV vaccination among in-school adolescents. Health workers and parents were identified as part of the drivers to promote these strategies[20]. Advocating to parents and health workers, among others, are potential drivers to increase the implementation of cervical cancer and HPV vaccination awareness among in-school adolescents.

Implication and recommendation for health promotion and education

The findings of this present study provide important information on awareness, knowledge and factors influencing strategies for implementation interventions to promote cervical cancer awareness and HPV vaccination uptake. This study established poor knowledge of cervical cancer and HPV vaccination among in-school adolescents and explored strategies and educational methods to promote awareness of cervical cancer. Health promotion strategies that could be adopted to increase awareness include:

Health education and public awareness: The findings from this study showed many of the respondents lacked good knowledge regarding cervical cancer and HPV vaccination. Educational strategies such public enlightenment and health education are strategies identified to promote cervical cancer awareness among adolescents. The school is a good ground to create awareness on cervical cancer because the school have the ability to capture large number of young people. Schools should integrate comprehensive health education programs into their curriculum, with a particular focus on cervical cancer prevention and sexual health. These programs can be delivered through health clubs, workshops, and digital platforms, ensuring that students receive accurate and age-appropriate information. Mass media, media print, social media influencers and public figures could also be employed to create awareness on cervical cancer among adolescents.

Social approach/advocacy: Advocacy is a strategy in public health promotion for achieving policies and overcoming public health problems. Health and Education ministries should collaborate on intervention programs and formulate policies and strategies to improve the roles of teachers so as to create more awareness on cervical cancer in schools. The government and non-governmental organizations could prioritize awareness creation on cervical cancer through advocacy by funding and promoting health programs regarding cervical cancer.

Training: In this study, health professionals were found to be key players in raising awareness of cervical cancer, hence ongoing training for these professionals is crucial. Good interpersonal relationships are essential for health professionals because that will enable them to effectively communicate cervical cancer information to adolescents. Training healthcare workers on adolescent-friendly services and culturally sensitive communication can further enhance the effectiveness of these interventions.

Policy formulation and implementation: Policies on incorporation of HPV vaccination into the national immunization routine has been implemented in Nigeria and there is a national roll out of HPV vaccination presently. This should improve the number of adolescents who will be vaccinated with HPV vaccine. The school curriculum should be revisited in schools so as to include important health issues like cervical cancer education. Public health issues should be highlighted early enough in schools so has to increase the awareness

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of adolescents. Policymakers should also focus on improving access to affordable HPV vaccines by subsidizing the cost of vaccines and providing them through school-based programs.

Medical/preventive approach: HPV vaccination should continuously be made readily available and free in all health facilities, which may encourage more adolescents to uptake the HPV vaccination.

Strengths and limitations of the study

The strength of this study is its use of a mixed-methods approach combining both qualitative and quantitative data collection methods. This approach provided a more comprehensive understanding of in-school adolescents' perspectives on preferred strategies for cervical cancer awareness creation and HPV vaccination uptake among in-school adolescents. The focus group discussions allowed for in-depth exploration of adolescents' perspectives, while the semi-structured questionnaires offered measurable insights into knowledge levels and preferred strategies, enhancing the validity of the findings. Another strength lies in the sampling method, as the study employed a multistage random sampling technique to select participants from both private and public schools in Ibadan North Local Government. This helped ensure a balanced representation of adolescents from diverse socio-economic backgrounds, which adds to the generalizability of the study findings.

The study has several limitations that may affect the generalizability and scope of its findings. The study was conducted only among in-school adolescents, excluding out-of-school adolescents who may have different perspectives. Thus, the results may not fully represent the broader adolescent population. Furthermore, the study was confined to a single local government area (Ibadan North), limiting its applicability to other regions of Nigeria that may have different cultural or infrastructural dynamics influencing cervical cancer awareness and HPV vaccination uptake.

Conclusion

This study revealed poor knowledge of cervical cancer and HPV vaccination among in-school adolescents in Ibadan North Local Government Area, Oyo State. Adequate knowledge of cervical cancer and HPV vaccination can promote the uptake of the vaccine among adolescents. Adoption of identified implementation strategies from this study may help promote awareness of cervical cancer, increase uptake of the vaccine and reduce the incidence of the disease among adolescents and young people.

Declarations

Authors' Contribution: API and JAYO conceptualized the study and study design. Data collection and analysis was done by API and supervision, and validation was done by JAYO. Both authors contributed to the drafting, review and approval of the final manuscript for publication.

Conflict of interest: The authors declare that there is no conflict of interest.

Funding: The study did not have any external funding.

Acknowledgment: We appreciate all study participants and their schools for their contribution to this study. We also thank the Oyo State Ethics Review Committee who provided ethical approval for the study. All research assistants are appreciated for their support.

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Print ISSN: 0189-9287 Online ISSN: 2992-345X