

Educational Approach on Knowledge and Intention to Uptake Human Papillomavirus Vaccination as a WHO's Best Buy Intervention among Female In-School Adolescents in Ibadan, Nigeria

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ABSTRACT

Background: Cervical cancer ranks as the fourth leading cause of cancer among women worldwide, with high prevalence in low and middle-income countries due to insufficient public health information for prevention. Cervical cancer is a growing public health challenge in Nigeria due to the increasing age of sexual debut, unprotected sex, and frequency of sexual activity among young women. This study investigated the effect of an educational intervention on the knowledge, perception, and intention to uptake HPV vaccination among female adolescents in an urban school setting in Nigeria.

Method: The study was a quasi experimental design (baseline and six-week post-intervention assessment). Baseline data, using a structured questionnaire, were collected in eight randomly selected secondary schools, with four designated as the intervention group and four as the control group. The intervention group participated in a one-day face-to-face educational session. After six weeks, a post-intervention assessment was conducted for both groups. McNemar and paired t-test inferential analysis was performed at $p < 0.05$.

Results: There was a statistically significant increase in the proportion of respondents' knowledge, perception, and intention to uptake human papillomavirus (HPV) vaccination at six-week post-intervention assessment for the intervention group compared to baseline. A statistically significant difference in the mean knowledge score, mean perception score and mean intention score was also observed six-week post-intervention between the control and intervention groups ($p < 0.0001$).

Conclusion: The study demonstrated that face-to-face educational interventions are effective in enhancing knowledge perception and promoting the uptake of HPV vaccination for cervical cancer prevention among female adolescents in Nigeria.

Keywords: Cervical cancer, human papillomavirus vaccine, intention, knowledge.

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1. INTRODUCTION

Cervical cancer is the fourth major cause of cancer in women and the second most prevalent malignancy in women worldwide [1]. Cervical cancer affects more than 600,000 women worldwide each year, with over 300,000 of them dying in 2022 [1]. Cervical cancer is the most common genital tract malignancy among women, caused mainly by HPV subtypes 16 or 18, with a high burden in low-or middle-income countries (LMIC). The developing world accounts for over 80% of all instances and 88% of deaths [2]. According to the World Health Organization, Sub-Saharan Africa (SSA) has the highest prevalence of HPV; Nigeria, with a projected population of over 200 million people and a growth rate of 2.6%, is a key country in this sub-region [3]. The majority of cervical and vaginal cancers in women, as well as oropharyngeal and anal cancers in men and women, are caused by HPV infection [4].

Despite the existence of effective and low-cost prevention strategies, cervical cancer remains a global concern affecting women in developing countries [5]. The high prevalence of cervical cancer in low and middle-income countries has been linked to a lack of public health information to prevent the disease, poor health-seeking behaviours, insufficient infrastructure for prevention strategies, a shortage of manpower to provide screening and early definitive treatment, and inadequate government funding [6].

Cervical cancer is a growing public health challenge in Nigeria, especially because of the increasing age of sexual debut, unprotected sex, and frequency of sexual activity among young women [7], [8], which are determinants of cervical cancer. Human papillomavirus (HPV) vaccine and cervical cancer screening, which are two WHO 'Best Buy' recommended interventions for the prevention of cervical cancer and early detection of cervical lesions, are available in Nigeria, but uptake is very low, which is due to low awareness and knowledge about cervical cancer and HPV vaccine [9]. Most research has focused on interventions for women of reproductive age in health organisation settings. This study investigated the effect of an educational intervention on the knowledge, perception, and intention to uptake the HPV vaccine among female adolescents in an urban school setting. This study is significant in the face of the current roll-out of the HPV vaccine nationally, especially in Oyo State, Nigeria, and within the global elimination of cervical cancer.

The face-to-face approach was employed as a research tool to promote uptake and has been employed by health workers. However, less research has been done using the face-to-face approach for HPV uptake among adolescents, with little evidence about its effectiveness in increasing the uptake of intervention in Nigeria. A face-to-face approach among Nigerian adolescents could be an effective population-level means to support theory-based educational interventions in increasing HPV vaccine uptake. The study aimed to understand if messages delivered via face-to-face contact among in-school adolescent girls between age 13 and 15 years would improve the

intention to uptake the HPV vaccine, which could, in turn, translate to increased uptake of the HPV vaccine among adolescents. These findings helped to contribute to the understanding that face-to-face learning would be a suitable and practical approach to increase awareness and uptake of the HPV vaccine for the prevention of cervical cancer among female in-school adolescents in Nigeria.

2. METHOD

2.1. Study Sites and Participants

The study employed a quasi experimental design, and was conducted in the Ibadan Metropolis using a multistage sampling technique to determine the study sites and participants. In the first stage, two local government areas (LGAs) with similar characteristics were randomly selected from the five LGAs in the Ibadan metropolis. One LGA (Ibadan North) was designated for the intervention study, while the other (Ibadan Southwest) was the control study group. The second stage involved stratifying the secondary schools within each LGA into public and private categories. Two public schools and two private schools each were randomly selected from each LGA, making a total of four schools per LGA; four schools were recruited for the intervention and control groups respectively, making a total of eight schools overall. In the third stage, female adolescent population across each school were selected based on a proportional ratio. The fourth and last stage involved selecting female adolescents aged 9–18 in each school and class based on availability and consent to participate. Overall, 277 and 271 female adolescents completed the questionnaires in the intervention and control groups, respectively. Five hundred and forty eight (548) adolescent girls were recruited from the eight schools and participated in the baseline assessment. However, 504 respondents (239 for the intervention and 265 for the control groups, respectively) participated in the six-week post-intervention assessment.

2.2. Procedure

Before project implementation, the selected schools were visited and informed of the intention to recruit them for the study. The schools were confirmed for participation upon receipt of consent, and appointments were made for further engagement. Research assistants were recruited and trained on effectively delivering the study and using the instrument. All measures were written in English due to the respondents' literacy. At the baseline assessment, respondents in both the control and intervention groups completed the baseline questionnaire on socio-demographic characteristics, awareness, knowledge, perception and intention to uptake the HPV vaccine. Ethical approval was obtained from the Oyo State Ministry of Health Ethics Committee (AD 13/479/610^A), and consent was sought and obtained from schools, parents and students.

Following the baseline assessment, the intervention group were taken through a one-day intervention using

TABLE I: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

		Study group			P	Df	X ²
		Total	Intervention	Control			
		N = 548 (%)	N = 277 (%)	N = 271 (%)			
Age (years)		537	273	264			
	9–13	195(36.3)	80 (41.0)	115 (59.0)	0.001*	2	12.411
	14–17	337 (62.8)	191 (56.7)	146 (43.3)			
	18–19	5 (0.9)	2 (40.0)	3 (60.0)			
Type of school attending		548	277	271			
	Private	241 (44.0)	120 (49.8)	121 (50.2)	0.754	1	0.098
	Public	307 (56.0)	157 (28.6)	150 (48.9)			
Religion		547	276	271			
	Christianity	378 (69.0)	172 (45.5)	206 (54.5)	0.001*	2	13.305**
	Islam	167 (30.5)	103 (61.7)	64 (38.3)			
	Traditional	2 (0.4)	1 (50.0)	1 (50.0)			
Highest level of education of mother/guardian		533	268	265			
	Primary	20 (3.7)	14 (70.0)	6 (30.0)	0.245	4	6.403**
	Secondary	238 (43.5)	115 (48.3)	123 (51.7)			
	Tertiary	266 (48.6)	136 (51.1)	130 (48.9)			
	No formal education	7 (1.3)	3 (42.9)	4 (57.1)			
	Others	2 (0.4)	0	2 (100.0)			
Ethnicity		544	275	269			
	Yoruba	451 (82.9)	237 (52.5)	214 (47.5)	0.01*	3	9.601**
	Igbo	61 (11.2)	20 (32.8)	41 (67.2)			
	Hausa	1 (0.2)	1 (100.0)	0 (0)			
	Others***	31 (5.7)	17 (54.8)	14 (45.2)			

Note. *p < 0.05. **Fischer Exact Test.

a face-to-face approach, which included an educational interaction and teaching on cervical cancer–concept, causes, risk factors and prevention. The control group were not given any intervention. After a six-week duration, the respondents in both the control and intervention groups were assessed using a post-study assessment (same questionnaire as in baseline) to evaluate their knowledge, attitude and intention to uptake the HPV vaccine.

2.3. Measures

The measures collected at both baseline and six-week post-intervention assessment included:

- socio-demographic characteristics,
- knowledge of cervical cancer and HPV vaccine,
- perception of in-school adolescents on cervical cancer,
- the intention of in-school adolescents on uptake of HPV Vaccine.

Socio-demographic characteristics: Variables like age, gender/sex, type of school attending, religion, class, ethnicity, highest level of education of mother/guardian, occupation of mother of guardian and the occupation of father/guardian were assessed to characterise the study sample.

Knowledge: Knowledge of cervical cancer was divided into four sections with 11 questions on general knowledge of cervical cancer and its causes, risk factors and prevention. Response options for each item were “Yes”, “No”, and “Do not know”.

Perception: 8 perception statements (e.g., HPV infection can cause cervical cancer, protected sex can prevent cervical cancer, HPV vaccine can protect me from HPV)

were employed to assess the perception of female in-school adolescents on cervical cancer. The response scales to each item were “agree”, “undecided”, and “disagree”.

Intention to uptake HPV vaccination: 8 questions on intention (e.g., Do you intend to take the HPV vaccine? Will you take the vaccine if your peers in your religious organisation take it?) were the items adopted to assess the intention of female in-school adolescents on intention to uptake of HPV vaccination. “Yes”, “No”, and “Not sure” were the response options.

2.4. Data Analysis

The data was analysed using the IBM SPSS (statistical package for social sciences) v22.0. The McNemar test was used to determine the difference in proportion. The paired t-test was conducted to examine the difference in mean score between the baseline and six-week post-intervention for the intervention and control groups. Knowledge, perception and intention to uptake HPV vaccination were scored 1 for correct/favourable responses and 0 for incorrect/unfavourable responses. P was set at < 0.05.

3. RESULTS

3.1. Socio-Demographic Characteristics of Respondents

There were significant differences between the intervention and control groups in age ($p = 0.001$), religion ($p = 0.001$) and ethnicity ($p = 0.01$). However, there were no significant differences in the type of school attended and the highest level of education of mothers/guardians (Table I).

TABLE II: KNOWLEDGE OF CERVICAL CANCER AND HPV VACCINATION AMONG THE RESPONDENTS

		Study group					
		Intervention		P	Control		p
		Baseline	Post Interv.		Baseline	Post Interv.	
		N (%)	N (%)		N (%)	N (%)	
Cervical cancer is an abnormal growth in the cervix of a woman	Yes	143 (51.6)	196 (82.0)	<0.001*	142 (52.4)	121 (45.7)	0.119
Can cervical cancer be terminal?	Yes	153 (55.2)	140 (58.6)	0.445	114 (42.1)	68 (25.7)	<0.001*
Cervical cancer can be detected in its earliest stages	Yes	103 (37.2)	187 (78.2)	<0.001*	104 (38.4)	106 (40.0)	0.74
Cervical cancer is curable if detected early	Yes	126 (45.5)	179 (74.9)	<0.001*	101 (38.1)	106 (40.0)	0.516
Cervical cancer is a genetic disease	No	64 (23.1)	95 (39.7)	<0.001*	46 (17.1)	31 (11.7)	0.082
Is HPV the causal agent for cervical cancer?	Yes	74 (26.7)	166 (69.5)	<0.001*	90 (33.3)	65 (24.6)	0.027*
What are the risk factors of cervical cancer?							
Multiple sexual partners	Yes	144 (52.0)	175 (73.2)	<0.001*	120 (44.3)	91 (34.5)	0.019*
Early sexual exposure (sexual exposure at an early age)	Yes	118 (42.6)	164 (68.6)	<0.001*	108 (39.9)	79 (29.8)	0.015*
Excessive smoking	Yes	80 (28.9)	58 (24.3)	0.238	92 (34.1)	74 (27.9)	0.132
Family history of cervical cancer	No	78 (28.2)	98 (41.0)	0.002*	61 (22.5)	46 (17.4)	0.136
Breastfeeding	No	70 (25.3)	108 (45.2)	<0.001*	59 (21.8)	38 (14.3)	0.025*
Uncircumcised male	No	72 (26.0)	93 (38.9)	0.002*	71 (26.2)	47 (17.7)	0.018*
Low social economy factors (status)	Yes	36 (13.0)	36 (15.1)	0.499	48 (17.7)	32 (12.1)	0.067
Unhealthy diet	No	81 (29.2)	104 (43.5)	0.001*	60 (22.1)	35 (13.2)	0.007*
Spiritual attack	No	89 (32.1)	106 (44.4)	0.004*	81 (29.9)	45 (17.0)	<0.001*
Poor hygiene	No	42 (15.2)	79 (33.1)	<0.001*	56 (20.7)	23 (8.7)	<0.001*
Long-term oral contraceptive	Yes	67 (24.2)	82 (34.3)	0.011*	75 (27.8)	44 (16.6)	0.002*

Note. *p < 0.05.

3.2. Knowledge of Cervical Cancer and HPV Vaccination among the Respondents

There was a statistically significant increase in the general knowledge of cervical cancer (e.g. HPV is the causal agent for cervical cancer), cervical cancer risk factors (e.g. multiple sexual partners) and knowledge of prevention of cervical cancer (e.g. HPV vaccination before initiating sex) among the intervention group at six-week post-intervention compared to the baseline. There was no difference in proportion in socio-economic status, excessive smoking, and cervical cancer as a terminal disease in 6th week post-intervention. Notably, some knowledge items decreased significantly at six-week post-intervention in the control groups (Tables II and III).

3.3. Perception of Cervical Cancer and HPV Vaccination among the Respondents

There was a statistically significant increase in the proportion of participants with favourable perception six-week post-intervention compared to baseline except for the variable “I think I can be affected with cervical cancer in the future”, which increased slightly but was not statistically significant (10.5%). In contrast, a significant decrease in the proportion of respondents with favourable perception was observed at six-week post-intervention among the control group in most of the perception items (Table IV).

3.4. Intention to Take HPV Vaccination among the Respondents

At six-week post-intervention, there was a statistically significant increase in the proportion of respondents who had an intention to uptake the HPV vaccine among the intervention group compared to the baseline group (Table V).

3.5. Change in Knowledge, Perception and Intention Over Time within Groups

There was a statistically significant increase in the mean knowledge score, mean perception score, and mean intention score in the intervention group six weeks post-intervention. However, the control group experienced a decrease in the mean knowledge score, mean perception score and intention score in six-week post-intervention (Table VI).

3.6. Change in Knowledge, Perception and Intention between Control and Intervention Groups Over Time

At baseline, a statistically significant difference in mean was observed only in the perception score between the control group and the intervention group ($p = 0.038$). A statistically significant difference in the mean knowledge score, mean perception score and mean intention score was observed at six-week post-intervention between the control and intervention group ($p < 0.0001$) (Table VII).

4. DISCUSSION

The results showed that across the intervention and control groups, there was generally a poor knowledge of cervical cancer, risk factors and prevention. This low knowledge remained constant among the control group but increased significantly among the intervention group at the six-week post-intervention assessment [10], [11]. These results corroborate low knowledge of cervical cancer and HPV vaccine among adolescents in Nigeria [12]–[16] and highlight that educational intervention and strategies to increase knowledge of cervical cancer and HPV vaccine can be adopted in school settings using a face-to-face approach. It also showed that in light of the

TABLE III: KNOWLEDGE OF CERVICAL CANCER AND HPV VACCINATION AMONG THE RESPONDENTS

		Study group					
		Intervention			Control		
		Baseline	Follow up	p	Baseline	Follow up	p
		N (%)	N (%)		N (%)	N (%)	
What are the ways to prevent cervical cancer?							
Pap smear test	Yes	88 (31.9)	115 (48.1)	<0.001*	83 (30.6)	45 (17.0)	<0.001*
Use of condom	Yes	88 (31.8)	131 (54.8)	<0.001*	95 (35.1)	69 (26.1)	0.024*
Abstinence	Yes	118 (42.6)	146 (61.1)	<0.001*	90 (33.2)	60 (22.6)	0.006*
Avoiding risk factors like multiple sexual activity	Yes	139 (50.2)	157 (65.7)	<0.001*	146 (53.9)	106 (40.0)	0.001*
Eating healthy	No	36 (13.0)	68 (28.5)	<0.001*	41 (15.1)	21 (8.0)	0.009*
HPV vaccination before beginning sexual activity	Yes	112 (40.4)	127 (53.1)	0.004*	109 (40.4)	71 (26.8)	0.001*
Does the HPV vaccine guarantee protection?	Yes	101 (36.5)	161 (67.4)	<0.001*	126 (46.5)	112 (42.3)	0.324
Maintaining menstrual hygiene can prevent cervical cancer	Yes	127 (45.8)	131 (54.8)	0.042*	148 (54.6)	99 (37.4)	<0.001*
Screening for early detection and treatment	Yes	137 (49.5)	184 (77.0)	<0.001*	152 (56.1)	126 (47.5)	0.048*

Note. *p < 0.05.

TABLE IV: PERCEPTION OF CERVICAL CANCER AND HPV VACCINATION AMONG THE RESPONDENTS

		Study group					
		Intervention		p	Control		p
		Baseline	Follow up		Baseline	Follow up	
Statement	Response	Count	Count		Count	Count	
HPV infection can cause cervical cancer	Agree	144 (52.0)	190 (79.5)	<0.001*	155 (57.2)	119 (44.9)	0.011*
	Undecided	83 (30.0)	29 (12.1)		88 (32.5)	103 (38.9)	
	Disagree	50 (18.1)	20 (8.4)		28 (10.3)	43 (16.2)	
I think I can be affected by cervical cancer in future	Agree	16 (5.8)	25 (10.5)	0.062	22 (8.1)	19 (7.2)	0.904
	Undecided	51 (18.4)	32 (13.4)		52 (19.2)	53 (20.0)	
	Disagree	210 (75.8)	182 (76.2)		197 (72.7)	193 (72.8)	
Cervical cancer cannot be prevented by the HPV vaccine	Agree	62 (22.4)	48 (20.1)	<0.001*	81 (30.0)	53 (20.0)	<0.001*
	Undecided	127 (45.8)	65 (27.2)		86 (31.9)	130 (49.1)	
	Disagree	88 (31.8)	126 (52.7)		103 (38.1)	82 (30.9)	
I think early initiation of sex cannot expose me to cervical cancer	Agree	57 (20.6)	66 (27.6)	0.014*	89 (32.8)	63 (23.8)	0.022*
	Undecided	89 (32.1)	51 (21.3)		78 (28.8)	102 (38.5)	
	Disagree	131 (47.3)	122 (51.0)		104 (38.4)	100 (37.7)	
My parents will allow me to take the HPV vaccine	Agree	120 (43.3)	128 (53.6)	0.039*	104 (38.4)	85 (32.1)	0.292
	Undecided	102 (36.8)	65 (27.2)		96 (35.4)	100 (37.7)	
	Disagree	55 (19.9)	46 (19.2)		71 (26.2)	80 (30.2)	
Protected sex can prevent cervical cancer	Agree	79 (28.5)	152 (63.6)	<0.001*	164 (60.5)	111 (41.9)	<0.001*
	Undecided	113 (40.8)	61 (25.5)		66 (24.4)	92 (34.7)	
	Disagree	85 (30.7)	26 (10.9)		41 (15.1)	62 (23.4)	
HPV vaccine can protect me from HPV	Agree	181 (65.3)	190 (79.5)	0.001*	188 (69.6)	148 (55.8)	0.004*
	Undecided	70 (25.3)	33 (13.8)		57 (21.1)	79 (29.8)	
	Disagree	26 (9.4)	16 (6.7)		25 (9.3)	38 (14.3)	
Both boys and girls should take the HPV vaccine	Agree	140 (50.5)	159 (66.5)	0.001*	144 (53.1)	118 (44.5)	0.031*
	Undecided	71 (25.6)	46 (19.2)		70 (25.8)	96 (36.2)	
	Disagree	66 (23.8)	34 (14.2)		57 (21.0)	51 (19.2)	

Note. *p < 0.05.

national roll-out of the HPV vaccination in Nigeria, it is crucial to make every effort to adopt educational strategies (e.g., [17]) that are useful in increasing adolescents' knowledge about cervical cancer and HPV vaccine, and dispel the misconceptions among this group of young people.

Findings also showed a statistically significant increase in the adolescents' perception towards cervical cancer and HPV vaccination at six-week post intervention compared to the control group who were not exposed to any intervention. The increase in perception may be linked to the

increase in knowledge among the intervention group; this could translate to how educational interventions among adolescents could be important in changing the perception about cervical cancer and HPV vaccine, which also has the potential to influence adolescents' behaviour or intention to adopt a behaviour, as shown in the results. The results, however, showed a decrease in the proportion of in-school adolescents in the control group who had a favourable perception towards cervical cancer and HPV vaccination at six-week post-intervention. This could be attributed to the low knowledge among this group in the control group and

TABLE V: INTENTION TO TAKE HPV VACCINATION AMONG THE RESPONDENTS

Statement	Response	Study group					
		Intervention		p	Control		p
		Baseline	Follow up		Baseline	Follow up	
Do you intend to take the HPV vaccine?	Yes	277 (34.7)	239 (46.9)	0.019*	270 (33.7)	265 (26.4)	0.068
	No	70 (25.3)	49 (20.5)		79 (29.3)	72 (27.2)	
	Not sure	111 (40.1)	78 (32.6)		100 (37.0)	123 (46.4)	
Will your parents allow you to take the vaccine if the cost is subsidised?	Yes	92 (33.2)	108 (45.2)	0.017*	61 (22.5)	71 (26.8)	0.481
	No	73 (26.4)	47 (19.7)		73 (26.9)	64 (24.2)	
	Not sure	112 (40.4)	84 (35.1)		137 (50.6)	130 (49.1)	
Do you intend to take the vaccine if your parents give you approval?	Yes	160 (57.8)	162 (67.8)	0.064	162 (59.8)	131 (49.4)	0.029*
	No	68 (24.5)	45 (18.8)		60 (22.1)	64 (24.2)	
	Not sure	49 (17.7)	32 (13.4)		49 (18.1)	70 (26.4)	
Do you intend to take the HPV vaccine if your friends also take it?	Yes	41 (14.8)	65 (27.2)	<0.001*	53 (19.6)	45 (17.0)	0.013*
	No	186 (67.1)	121 (50.6)		165 (60.9)	139 (52.5)	
	Not sure	50 (18.1)	53 (22.2)		53 (19.6)	81 (30.6)	
Do you intend to take the HPV vaccine if you advise you to?	Yes	67 (24.2)	86 (36.0)	0.007*	115 (42.4)	86 (32.5)	0.054
	No	134 (48.4)	88 (36.8)		92 (33.9)	102 (38.5)	
	Not sure	76 (27.4)	65 (27.2)		64 (23.6)	77 (29.1)	
Will your parents allow you to take the HPV vaccine if they know its benefits?	Yes	197 (71.1)	173 (72.4)	0.202	187 (69.0)	157 (59.2)	0.035*
	No	25 (9.0)	30 (12.6)		36 (13.3)	38 (14.3)	
	Not sure	55 (19.9)	36 (15.1)		48 (17.7)	70 (26.4)	
Will you take the HPV vaccine if it is available in health facilities around your home?	Yes	130 (46.9)	129 (54.0)	0.275	149 (55.2)	113 (42.6)	0.014*
	No	70 (25.3)	51 (21.3)		55 (20.4)	67 (25.3)	
	Not sure	77 (27.8)	59 (24.7)		66 (24.4)	85 (32.1)	
Will you take the HPV vaccine if your family doctor prescribes it?	Yes	183 (66.1)	159 (66.5)	0.950	191 (70.5)	149 (56.2)	<0.001*
	No	39 (14.1)	35 (14.6)		40 (14.8)	38 (14.3)	
	Not sure	55 (19.9)	45 (18.8)		40 (14.8)	78 (29.4)	
Will you take the vaccine if your peers in your religious organisations take it?	Yes	52 (18.8)	83 (34.7)	<0.001*	98 (36.2)	71 (26.8)	0.063
	No	146 (52.7)	90 (37.7)		89 (32.8)	97 (36.6)	
	Not sure	79 (28.5)	66 (27.6)		84 (31.0)	97 (36.6)	

Note. *p < 0.05.

TABLE VI: CHANGE IN KNOWLEDGE, PERCEPTION AND INTENTION OVER TIME WITHIN GROUPS

	Intervention group (Mean ± SD)			Control (Mean ± SD)		
	Baseline	Follow-up	p	Baseline	Follow-up	p
Knowledge	8.44 ± 5.27	13.75 ± 5.22	<0.0001*	9.04 ± 5.08	6.67 ± 5.36	<0.0001*
Perception	8.94 ± 2.18	10.74 ± 2.34	<0.0001*	9.45 ± 2.42	8.76 ± 2.55	0.002*
Intention	10.39 ± 4.41	11.34 ± 4.99	0.021*	10.71 ± 4.29	9.27 ± 5.19	0.001*

Note. *p < 0.05.

non-exposure to information about the subject matter. The increase in knowledge, perception and intention to uptake HPV vaccination [13], [18] was consistent within groups for the intervention group, and there was a statistically significant difference between the control and intervention groups, as shown in the results.

These findings highlight that many of the respondents lacked good knowledge regarding cervical cancer and the HPV vaccine and had low perception and intention to uptake the HPV vaccine at baseline, but through face-to-face educational intervention, there was a significant increase among the intervention group across the three main measures. Educational strategies and health education have been identified in promoting cervical cancer awareness among adolescents. The school is a good ground to create awareness of cervical cancer, especially among

female adolescents [18], because the school has the ability to capture a large number of adolescents at the same time.

Advocacy is a strategy in health promotion that aims to create policies and overcome public health problems. Health and Education ministries should collaborate in intervention programs and formulate policies and strategies to improve the roles of teachers so as to create more awareness of cervical cancer in schools. The government and non-governmental organisations could prioritise the creation of awareness and increased knowledge on cervical cancer and HPV vaccine among adolescents by supporting and promoting health education interventions regarding cervical cancer. This is essentially important with regard to the current and present roll-out of HPV vaccination in Oyo State and Nigeria as a whole.

TABLE VII: CHANGE IN KNOWLEDGE, PERCEPTION AND INTENTION BETWEEN CONTROL AND INTERVENTION GROUPS

	Baseline (Mean ± SD)			Post Interv. (Mean ± SD)		
	Intervention (n = 277)	Control (n = 271)	p	Intervention (n = 239)	Control (n = 265)	p
Knowledge	8.97 ± 5.25	8.92 ± 5.09	0.906	13.75 ± 5.22	6.64 ± 5.34	<0.0001*
Perception	9.04 ± 2.26	9.46 ± 2.45	0.038*	10.74 ± 2.34	8.75 ± 2.55	<0.0001*
Intention	10.28 ± 4.45	10.72 ± 4.27	0.236	11.34 ± 4.99	9.31 ± 5.20	<0.0001*

Note. *p < 0.05.

5. CONCLUSION

The educational intervention was effective for an increase in female in-school adolescents’ knowledge and perception of cervical cancer and intention to uptake the HPV vaccine. Adequate knowledge of cervical cancer and the HPV vaccine has the potential to promote the uptake of HPV vaccination among adolescents. Adoption of identified face-to-face intervention as an implementation strategy could aid the promotion of cervical cancer knowledge and perception and increase HPV vaccination uptake. This would consequently reduces the incidence of cervical cancer.

LIMITATIONS OF THE STUDY

The study was carried out among in-school female adolescents in selected secondary schools in an urban city in Nigeria, so generalisation to other settings should be done with caution.

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CONFLICT OF INTEREST

The authors declare that they do not have any conflict of interest.

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