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EFFECT OF NURSE-LED EDUCATIONAL INTERVENTION ON UPTAKE OF HUMAN PAPILLOMAVIRUS VACCINE AMONG PARENTS OF ADOLESCENTS IN COMMUNITIES IN KADUNA NORTH SENATORIAL DISTRICT

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ABSTRACT: *Background: Human Papillomavirus infection is a major global public health concern, with cervical cancer being the fourth most common cancer among women. Despite the availability of the HPV vaccine, uptake remains low in many communities in Nigeria. Nurse-led educational interventions have the potential to improve parental awareness and vaccine uptake. Objective: To determine the effect of a nurse-led educational intervention on parental uptake of the HPV vaccine among parents of adolescents in Kaduna North Senatorial District, Nigeria. Methods: A quasi-experimental pretest–posttest study was conducted among 208 parents of adolescents aged 9–14 years, equally allocated across four Local Government Areas (LGAs): Zaria and Sabon Gari (intervention) and Makarfi and Soba (control). A multistage sampling technique was used to select wards, communities, and households, with one parent recruited per household. Baseline data on HPV vaccine uptake were collected, followed by a structured nurse-led educational intervention. Post-intervention uptake was assessed three months later using the same questionnaire. Data were collected using a structured questionnaire, and the results were analyzed using descriptive and inferential statistics to address the research question to test the null hypotheses at a 0.05 level of significance. Results: The mean HPV vaccine uptake score in the intervention group increased significantly from 2.49 ± 2.37 at pretest to 4.12 ± 1.71 at post-test ($t = –6.91$, $p < 0.001$), while the control group showed no significant change (1.45 ± 2.14 vs 1.77 ± 2.18, $t = –1.85$, $p = 0.067$). The proportion of parents with high uptake in the intervention group increased from 52.9% to 86.3%, compared with a modest rise from 31.4% to 40.2% in the control group. Between-group comparisons confirmed that the intervention group achieved significantly higher uptake than the control group post-intervention ($p < 0.001$). Conclusion: Nurse-led educational interventions effectively improved parental uptake of the HPV vaccine in Kaduna North Senatorial District. These findings support the incorporation of structured nurse-led education into community-based immunization programs to enhance HPV vaccine coverage among adolescents. Recommendation: Integrating nurse-led educational programs into routine immunization outreach is recommended to improve HPV vaccine coverage in Nigeria.*

KEYWORDS: HPV vaccine, uptake, nurse-led intervention, adolescents, effect, communities.

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INTRODUCTION

Human Papillomavirus (HPV) infection remains a significant global public health concern due to its well-established role in cervical cancer, the fourth most common cancer among women worldwide (Onwuamah et al., 2023). High-risk HPV types, particularly types 16 and 18, are responsible for approximately 70% of invasive cervical cancer cases globally (WHO, 2023). Despite the availability of effective vaccines, HPV continues to be one of the most prevalent sexually transmitted infections in both men and women, with persistent infection predisposing affected individuals to cervical cancer over time (Musa et al., 2021; Cameron et al., 2024). Globally, more than 600,000 new cases of cervical cancer are diagnosed annually, resulting in over 300,000 deaths, with the majority occurring in low- and middle-income countries (WHO, 2022). The disease imposes a profound economic and social burden, particularly among women of reproductive age, due to associated morbidity, loss of productivity, and family disruption.

Africa bears a disproportionate share of HPV-related disease burden, reporting approximately 569,847 new cervical cancer cases and 311,365 deaths annually, accounting for over 90% of global cervical cancer mortality (Alene et al., 2020; Rabiu & Yahuza, 2023). Sub-Saharan Africa is especially affected due to weak health infrastructure, limited screening programs, and cultural barriers to preventive health practices (Guptha et al., 2022). Among the 20 countries with the highest cervical cancer burden worldwide, 18 are located in Africa, highlighting regional disparities in early detection, vaccination access, and public health education (WHO, 2022). Despite ongoing global vaccination campaigns, HPV vaccine uptake remains unacceptably low in sub-Saharan Africa, ranging from 62.5% in Kenya to as low as 3.77% in Nigeria (Asgedom et al., 2024).

In Nigeria, cervical cancer is the second most common cancer among women, with approximately 14,089 new cases and 8,240 deaths reported annually (Umeh et al., 2016; Musa et al., 2021). The prevalence of high-risk HPV types among Nigerian women has been reported at 34%, with types 16 and 18 accounting for 3% and 4% of cases, respectively (Ohihoin et al., 2022). Despite the availability and proven efficacy of HPV vaccines, uptake remains critically low, largely due to limited awareness, cultural beliefs, and misinformation (Otorkpa et al., 2024). National efforts to prevent HPV-related disease include the introduction of the single-dose HPV vaccine into Nigeria's routine immunization program in October 2023, targeting girls aged 9–14 years (Nigeria to vaccinate 7.7 million girls against leading cause of cervical cancer, 2023; One Dose at a Time: Mobilizing to Eliminate Cervical Cancer in Nigeria, 2024). However, vaccine coverage remains suboptimal in many contexts, with continued barriers to acceptance and uptake, especially in rural communities and among groups with limited awareness (Guardian Health Report, 2024). Studies in Nigeria have documented low levels of actual HPV vaccine uptake among adults and families, despite high acceptability (Enebe et al., 2021).

Parents play an important role in adolescent vaccination decisions, yet their knowledge and attitudes significantly influence vaccine uptake. Informal community assessments conducted in Kaduna North Senatorial District revealed parental concerns about vaccine safety, effectiveness, and accessibility, compounded by cultural myths and circulating misinformation. Practical challenges, including limited access to vaccination centers and financial constraints, were also observed, emphasizing the need for targeted interventions to address these barriers.

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Nurse-led educational interventions have demonstrated effectiveness in enhancing parental knowledge, correcting misconceptions, and promoting positive health behaviors. Evidence indicates that brief, parent-focused interventions delivered by nurses can significantly increase HPV vaccination initiation among adolescents (Santa-Maria et al., 2021). Such interventions, particularly when culturally sensitive and community-based, hold promise for improving HPV vaccine uptake in low-resource settings.

Given the persistently low awareness, cultural resistance, and misinformation surrounding HPV vaccination in Kaduna North, this study seeks to evaluate the effect of nurse-led educational interventions on HPV vaccine uptake among parents of adolescents. The findings are expected to inform strategies for improving adolescent vaccination coverage and reducing the burden of HPV-related diseases in the region.

MATERIALS AND METHODS

Study design

This study adopted quasi-experimental research using a pre-test and post-test control group design. The aim of using the pre-test and post-test control group design is to compare parents of adolescents exposed to a nurse-led educational intervention in the study group with those not exposed to the intervention (control group), to examine the effect of the intervention on the uptake of the Human Papillomavirus (HPV) vaccine among adolescents in communities within Kaduna North Senatorial District.

Target population

The target population comprised parents of adolescents aged 9–14 years, in line with WHO recommendations for HPV vaccination, residing in communities within Zaria and Sabon Gari Local Government Areas (intervention LGAs) and Makarfi and Soba Local Government Areas (control LGAs) for at least one year. Based on national demographic patterns, the study population represents households with adolescents eligible for HPV vaccination within these four LGAs.

Sample size

The sample size was calculated using the formula for comparing two proportions (Robert, 1997) to detect a difference in HPV vaccine uptake between the intervention and control groups. Assumptions included a baseline uptake (P_0) of 11% (Iwu et al., 2023), an expected post-intervention uptake (P_1) of 26.6%, 95% confidence interval ($Z\alpha = 1.96$), 80% power ($Z\beta = 0.84$), and a design effect of 2. Considering an anticipated attrition rate of 10% to account for potential dropouts, the total sample size was adjusted to 208 participants.

Sampling Technique

A multistage sampling technique was employed to select study participants. Four Local Government Areas (LGAs); Zaria and Sabon Gari (intervention) and Makarfi and Soba (control) were randomly selected from the eight LGAs in Kaduna North Senatorial District. Within each selected LGA, approximately 30% of political wards and 30% of communities were randomly chosen. Systematic random sampling was then used to select households within

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these communities, with one parent of an adolescent aged 9–14 years recruited per household. The total sample of 208 participants was equally distributed across the four LGAs (52 per LGA), with sampling intervals calculated based on the estimated number of eligible households.

Reliability of Instrument

The questionnaire was pre-tested on 10% of the sample in Song Local Government Area, Adamawa State, among participants with characteristics similar to the study population but not included in the main study. Based on the pre-test findings, minor modifications were made to improve clarity and consistency. The internal consistency of the instrument was assessed using Cronbach's Alpha, which yielded a reliability coefficient of 0.908, indicating excellent reliability. A Cronbach's Alpha of 0.70 or higher is considered acceptable for research instruments (Stevens, 2006).

Method of data collection

Data collection was conducted in three phases: pre-intervention, intervention, and post-intervention.

Pre-Intervention Phase: Ethical approval was obtained from the Ahmadu Bello University Teaching Hospital Health Research Ethics Committee (ABUTH-HREC, approval number ABUTHZ/HREC/C47/2025). Permission was also sought from the relevant Local Government Authorities and community leaders in the selected LGAs. Eight research assistants from primary healthcare centres were trained for two days to ensure understanding of the study objectives, methodology, and data collection procedures. Written informed consent was obtained from all participants, and confidentiality and anonymity were assured.

Intervention Phase: The intervention consisted of a structured, nurse-led health education programme delivered to parents of adolescents aged 9–14 years in their homes. The programme used lectures, visual aids, and interactive discussions to provide accurate information on HPV infection, HPV-related diseases, HPV vaccination (benefits, safety, eligibility), barriers to vaccination, and strategies to improve vaccine uptake. Sessions lasted approximately 40 minutes and included a question-and-answer segment to clarify misconceptions and address participant concerns. Educational materials and flyers were distributed to reinforce learning.

Post-Intervention Phase: Three months after the intervention, the same questionnaire used in the pre-test was administered to participants in both the intervention and control groups to assess changes in HPV vaccine uptake. Reminder flyers were also distributed to encourage vaccination. Data from pre- and post-intervention assessments were collated and analyzed to evaluate the effect of the nurse-led educational intervention.

Ethical Consideration

Ethical approval for the study was obtained from the Department of Nursing Sciences, Ahmadu Bello University, Zaria, and the Ahmadu Bello University Teaching Hospital Health Research Ethics Committee (ABUTH-HREC, approval number ABUTHZ/HREC/C47/2025). Permission was also obtained from the authorities of Zaria, Sabon Gari, Makarfi, and Soba Local Government Area Councils. Informed consent was obtained from all participants after explaining the study objectives, procedures, potential benefits, and possible risks. Participation

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was voluntary, and participants were assured of their right to withdraw at any stage without penalty. Privacy, anonymity, and confidentiality of all information were strictly maintained, and collected data were used solely for research purposes.

RESULTS

Table 1: Distribution of Study and Control Groups According to their Socio-Demographic Data.

Variables	Categories	Study Group n (%)	Control Group n (%)	χ^2	p-value	Mean ± SD (Age)
Age (years)	20-24	1(1.0%)	3(2.9%)	4.885	0.180	Study:34.78±4.784 Control:33.34±4.769
	25–29	10(9.8%)	13(12.7%)			
	30-34	48(47.1%)	57(55.9%)			
	35 and above	43(42.2%)	29(28.4%)			
Sex of Parent	Male	12(11.8%)	11(10.8%)	0.049	0.825	
	Female	90(88.2%)	91(89.2%)			
Religion	Islam	90(88.2%)	98(96.1%)	4.340	**0.037**	
	Christianity	12(11.8%)	4(3.9%)			
Level of Education	No formal	12(11.8%)	26(25.5%)	12.222	**0.016**	
	Primary	15(14.7%)	18(17.6%)			
	Quaranic	36(35.3%)	38(37.3%)			
	Secondary	17(16.7%)	11(10.8%)			
	Tertiary	22(21.6%	9(8.8%)			
Occupation	Housewife	53(52.0%)	51(62.2%)	10.273	**0.036**	
	Petty trader	23(22.5%)	13(15.9%)			
	Civil servant	15(14.7%)	7(8.5%)			
	Farmer	3(2.9%)	9(11.0%)			
	Student	8(7.8%)	2(2.4%)			
Marital Status	Married	99(97.1%)	98(96.1%)	0.205	0.903	
	Single					
	Divorced	1(1.0%)	1(1.0%)			
	Widowed	2(2.0%)	3(2.9%)			
Type of Family	Monogamous	35(34.3%)	39(38.2%)	0.339	0.560	
	Polygamous	67(51.5%)	63(48.5%)			
No of Female Adolescents (9–14 yrs)	1	77(75.5%)	66(64.7%)	3.864	0.425	
	2	15(14.7%)	23(22.5%)			
	3	6(5.9%)	10(9.8%)			
	4	2(2.0%)	2(2.0%)			
	≥5	2(2.0%)	1(1.0%)			
Ethnicity	Hausa/Fulani	68(66.7%)	95(93.1%)	23.272	**0.000**	

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Variables	Categories	Study Group n (%)	Control Group n (%)	χ^2	p-value	Mean ± SD (Age)
	Yoruba	18(17.6%)	2(2.0%)			
	Igbo	1(1.0%)	0(0%)			
	Others	15(14.7%)	5(4.9%)			
Length of Stay in Community	1–2 years	10(9.8%)	5(4.9%)	2.324	0.313	
	3–4 years	21(20.6%)	18(17.6%)			
	≥5 years	71(69.6%)	79(77.5%)			

Table 1 shows the sociodemographic characteristics of respondents in the study and control groups. The mean age of respondents in the study group was 34.78 ± 4.784 years, while that of the control group was 33.78 ± 4.769 years. Most respondents were in the 30–34 years age group (47.1% study and 55.9% control). The difference in age distribution between the two groups was not statistically significant ($\chi^2 = 0.180$, $p > 0.05$).

In terms of sex, the majority of respondents in both groups were females (88.2% study and 89.2% control), while males constituted 11.8% and 10.8% in the study and control groups, respectively. This difference was not statistically significant ($\chi^2 = 0.825$, $p > 0.05$).

With respect to religion, Islam was the predominant religion in both groups (88.2% study and 96.1% control), while Christianity accounted for 11.8% and 3.9% of respondents in the study and control groups, respectively. The difference was statistically significant ($\chi^2 = 0.037$, $p < 0.05$).

Concerning education, Qur'anic education was the most common form of schooling reported (35.3% study and 37.3% control). However, a higher proportion of respondents in the control group had no formal education (25.5% and 11.8%), while the study group had more respondents with tertiary education (21.6% and 8.8%). This difference was statistically significant ($\chi^2 = 0.016$, $p < 0.05$). Regarding occupation, the majority of respondents were housewives (52.0% study and 62.2% control). Petty trading was more common in the study group (22.5% and 15.9%), while farming was higher in the control group (11.0% and 2.9%). The difference in occupation between the groups was statistically significant ($\chi^2 = 0.036$, $p < 0.05$).

Almost all respondents were married (97.1% study and 96.1% control), with very few reporting being divorced or widowed. There was no statistically significant difference between groups ($\chi^2 = 0.903$, $p > 0.05$). Type of family structure was comparable between the two groups, with a predominance of polygamous families (51.5% study and 48.5% control). This difference was not statistically significant ($\chi^2 = 0.560$, $p > 0.05$).

The number of female adolescents aged 9–14 years per household was largely one in both study (75.5%) and control groups (64.7%). A smaller proportion of households reported having two or more adolescent girls. The difference was not statistically significant ($\chi^2 = 0.425$, $p > 0.05$).

With respect to ethnicity, Hausa/Fulani was the dominant ethnic group in both study and control groups, though significantly higher in the control group (93.1% and 66.7%). The study

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group was more ethnically diverse, with higher proportions of Yoruba (17.6%) and other minority groups (14.7%). This difference was statistically significant ($\chi^2 = 0.000$, $p < 0.05$). Finally, the majority of respondents had resided in their community for at least five years (69.6% study and 77.5% control), with no statistically significant difference between groups ($\chi^2 = 0.313$, $p > 0.05$).

Table 2: Distribution of Study and Control groups according to levels of HPV vaccine uptake before and after intervention

Group	Time	Low Uptake (0–2)	High Uptake (3–5)	McNemar χ^2 (p-value)
Study	Before	48 (47.1%)	54 (52.9%)	
	After	14 (13.7%)	88 (86.3%)	**30.250 (p = 0.000)**
Control	Before	70 (68.6%)	32 (31.4%)	**p= 0.035)**
	After	61 (59.8%)	41 (40.2%)	

Table 2 presents the distribution of respondents according to levels of HPV vaccine uptake (low and high) among the study and control groups before and after the educational intervention. Before the intervention, 47.1% of parents in the study group had low uptake scores, while 52.9% demonstrated high uptake. Following the nurse-led educational intervention, the proportion of parents with high uptake in the study group markedly increased to 86.3%, while those with low uptake decreased to 13.7%. In contrast, the control group showed only a slight change. At pre-test, 68.6% of parents had low uptake and 31.4% had high uptake, while at post-test, 59.8% remained in the low uptake category and 40.2% achieved high uptake. This finding indicates a substantial improvement in HPV vaccine uptake among parents in the study group after the health education intervention compared to the control group. The results suggest that the nurse-led educational intervention was effective in enhancing parental uptake of the HPV vaccine in the study population.

Table 3: Comparison of HPV Vaccine Mean Uptake Score Before and After Intervention

Comparison	Mean Uptake Score ± SD	Mean Difference	*t*-value	df	*p*-value	Cohen's *d*
Within-Group Comparison (Paired *t*-test)						
Study Group	Before: 2.4902 ± 2.37456 After: 4.1176 ± 1.71363	−1.62745	−6.908	101	0.000	0.75
Control Group	Before: 1.4510 ± 2.13703 After: 1.7745 ± 2.18413	−0.32353	−1.852	101	0.067	0.15
Between-Group Comparison (Independent *t*-test)						
Study vs Control (Before)	Study: 2.4902 ± 2.37456 Control: 1.4510 ± 2.13703	1.03922	3.285	202	0.001	0.46
Study vs Control (After)	Study: 4.1176 ± 1.71363 Control: 1.7745 ± 2.18413	2.34314	8.524	202	0.000	1.24

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Comparison	Mean Uptake Score ± SD	Mean Difference	*t*-value	df	*p*-value	Cohen's *d*
Overall Study vs Control	Before: 1.9706 ± 2.31277 After: 2.9461 ± 2.28338	−0.97549	−6.364	203	0.000	0.43

Table 3 presents the comparison of HPV mean vaccine uptake rates between the study and control groups, before and after the nurse-led educational intervention. Within the study group, the mean uptake score increased significantly from 2.49 ± 2.37 at baseline to 4.12 ± 1.71 after the intervention, with a mean difference of –1.63. The paired t-test showed a statistically significant improvement (t = –6.91, p < 0.001), Cohen's d = 0.75, indicating a large effect size of the intervention on vaccine uptake. This demonstrates that the intervention substantially improved vaccine uptake among parents. In contrast, the control group showed only a slight, non-significant increase in uptake from 1.45 ± 2.14 at baseline to 1.77 ± 2.18 post-test, with a mean difference of –0.32 (t = –1.85, p = 0.067), Cohen's d = 0.15, indicating a very small effect, suggesting that, in the absence of the intervention, there was no meaningful improvement in vaccine uptake.

When comparing both groups, the independent t-test revealed that at baseline, the study group already had a higher mean uptake score (2.49 ± 2.37) compared to the control group (1.45 ± 2.14), and this difference was statistically significant (t = 3.29, p = 0.001), Cohen's d = 0.46, indicating a moderate effect size. After the intervention, the uptake rate increased much more in the study group (4.12 ± 1.71) compared to the control group (1.77 ± 2.18), with the difference highly significant (t = 8.52, p < 0.001), Cohen's d = 1.24, indicating a very large effect of the intervention. The overall comparison between pre- and post-test mean scores across the two groups also showed a statistically significant improvement from 1.97 ± 2.31 at baseline to 2.95 ± 2.28 after the intervention, with a mean difference of –0.98 (t = –6.36, p < 0.001), Cohen's d = 0.43, representing a moderate effect.

Test for hypothesis

H_0: There is no significant difference in the uptake of the HPV vaccine as reported by parents in Kaduna North Senatorial District before and after the health education intervention.

Table 4: Paired sample t-test on uptake of HPV vaccine before and after intervention

Group	Pre-Intervention Mean ± SD	Post-Intervention Mean ± SD	Mean Difference	t-value	df	p-value	Decision
Study group	2.4902 ± 2.37456	4.1176 ± 1.71363	−1.62745	−6.908	101	0.000	Rejected
Control group	1.4510 ± 2.13703	1.7745 ± 2.18413	−0.32353	−1.852	101	0.067	Not Rejected
Overall	1.9706 ± 2.31277	2.9461 ± 2.28338	−0.97549	−6.364	203	0.000	Rejected

Table 4 above shows the results of the paired sample t-test on the uptake of the HPV vaccine before and after the health education intervention. In the study group, the mean uptake score

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increased from 2.49 ± 2.37 pre-intervention to 4.12 ± 1.71 post-intervention ($t = -6.908$, $df = 101$, $p < 0.001$), indicating a statistically significant improvement in HPV vaccine uptake. In the control group, a slight increase from 1.45 ± 2.14 to 1.77 ± 2.18 was observed ($t = -1.852$, $df = 101$, $p = 0.067$), but this change was not statistically significant. Overall, the combined mean uptake score increased from 1.97 ± 2.31 to 2.95 ± 2.28 ($t = -6.364$, $df = 203$, $p < 0.001$). Therefore, the null hypothesis for the study group and overall population was rejected, while for the control group it was not rejected, indicating that the health education intervention significantly improved HPV vaccine uptake among parents in the study group, with no meaningful change in the control group.

DISCUSSION

The majority of parents in both the study and control groups were aged 30–34 years (mean ± SD: 34.78 ± 4.78 study; 33.34 ± 4.77 control), reflecting early to mid-adulthood, a period associated with active child-rearing and health decision-making. This finding is consistent with evidence from previous Nigerian studies. Ohaeri, Adefolaju, and Onyeneho (2020) reported a mean parental age of 30.2 years among parents surveyed on HPV vaccine knowledge and acceptance in Ibadan, Nigeria, indicating that parents in their early thirties commonly constitute the target population for HPV vaccination decision-making. Anyaka et al. (2024) reported a mean age of 43.7 years among parents in Jos, Nigeria, highlighting that although parental age may vary across settings, adult caregivers remain central to decisions regarding HPV vaccination. The majority of participants practiced Islam, reflecting the religious composition of northern Kaduna State.

Significant differences were observed between the study and control groups in educational attainment ($p = 0.016$) and occupation ($p = 0.036$). The study group had a higher proportion of respondents with tertiary education (21.6%), while the control group had more participants without formal education. Housewives constituted the largest occupational group in both groups (52% study; 62.2% control), consistent with prior findings in southwestern Nigeria (Balogun et al., 2022). Almost all respondents were married (97.1% study; 96.1% control), and slightly more than half belonged to polygamous families, reflecting cultural norms in northern Nigeria. Hausa/Fulani ethnicity predominated (66.7% study; 93.1% control, $p < 0.001$), which is consistent with the demographic distribution of Kaduna North Senatorial District. Most participants had lived in their communities for over five years (69.6% study; 77.5% control), indicating stable residency, which may enhance trust in local health services and engagement with preventive health programs (John-Akinola et al., 2022).

This study demonstrated that the nurse-led educational intervention significantly improved parental uptake of the HPV vaccine. In the intervention group, the proportion of parents with high uptake increased from 52.9% pre-intervention to 86.3% post-intervention, while low uptake decreased from 47.1% to 13.7%. The control group, in contrast, showed only a modest, non-significant increase. Between-group comparisons confirmed that the intervention group outperformed the control group both at baseline and post-intervention, indicating the effectiveness of structured, community-based health education delivered by nurses.

These findings align with evidence from Africa, Europe, and the United States showing that targeted educational interventions can substantially improve vaccine uptake. A systematic

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review by Olaoye and Macdonald (2024) reported that educational and multicomponent strategies in African settings increased HPV vaccine uptake from 34% to 93.3%, supporting the potential for structured health education to achieve meaningful improvements. Similarly, Escoffery et al. (2023) highlighted that multi-component interventions combining education, provider recommendations, and improved access yielded the largest gains in actual vaccination, with increases ranging from 15% to 35%, consistent with the improvement observed in the present study.

Quasi-experimental studies in diverse contexts further reinforce these findings. Kim et al. (2025) reported higher HPV vaccine completion rates among young women exposed to an mHealth intervention compared to usual care, while Simonetti et al. (2024) demonstrated significant improvements in initiation and completion when community nurses delivered digital education in Europe. In Hong Kong, Chu et al. (2021) observed that school-based health education for adolescents and parents increased vaccination rates from 13% to 42%, emphasizing the importance of parental engagement in vaccination decisions. Similarly, Lo et al. (2025) found that school-based educational programs increased uptake modestly, while the current community-based, parent-focused intervention achieved a much larger proportional increase.

The present study also resonates with findings from sub-Saharan Africa. Asgedom et al. (2024) reported wide variation in HPV vaccine uptake across countries, with Nigeria demonstrating low baseline coverage. The post-intervention uptake of 86.3% in this study exceeds average rates in the region, suggesting that structured, nurse-led education at the community level may outperform school-based or passive approaches in increasing vaccine acceptance.

CONCLUSION

The nurse-led educational intervention significantly increased the uptake of the HPV vaccine among parents of adolescents in Kaduna North Senatorial District. The proportion of parents with high vaccine uptake rose from 52.9% at pre-test to 86.3% at post-test in the study group, while the control group showed only a minimal change. These findings demonstrate that structured, community-based health education delivered by nurses is an effective strategy for improving HPV vaccine uptake in settings with low baseline coverage.

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Conflict of interest

No conflict of interest.

Authors contribution

This study provides evidence that nurse-led educational interventions significantly improved parental uptake of the HPV vaccine. It highlights the key factors influencing vaccine uptake and demonstrates that structured community education can overcome knowledge and socio-cultural barriers. The findings support the integration of nurse-led education into routine immunization programs to enhance HPV vaccine coverage among adolescents.

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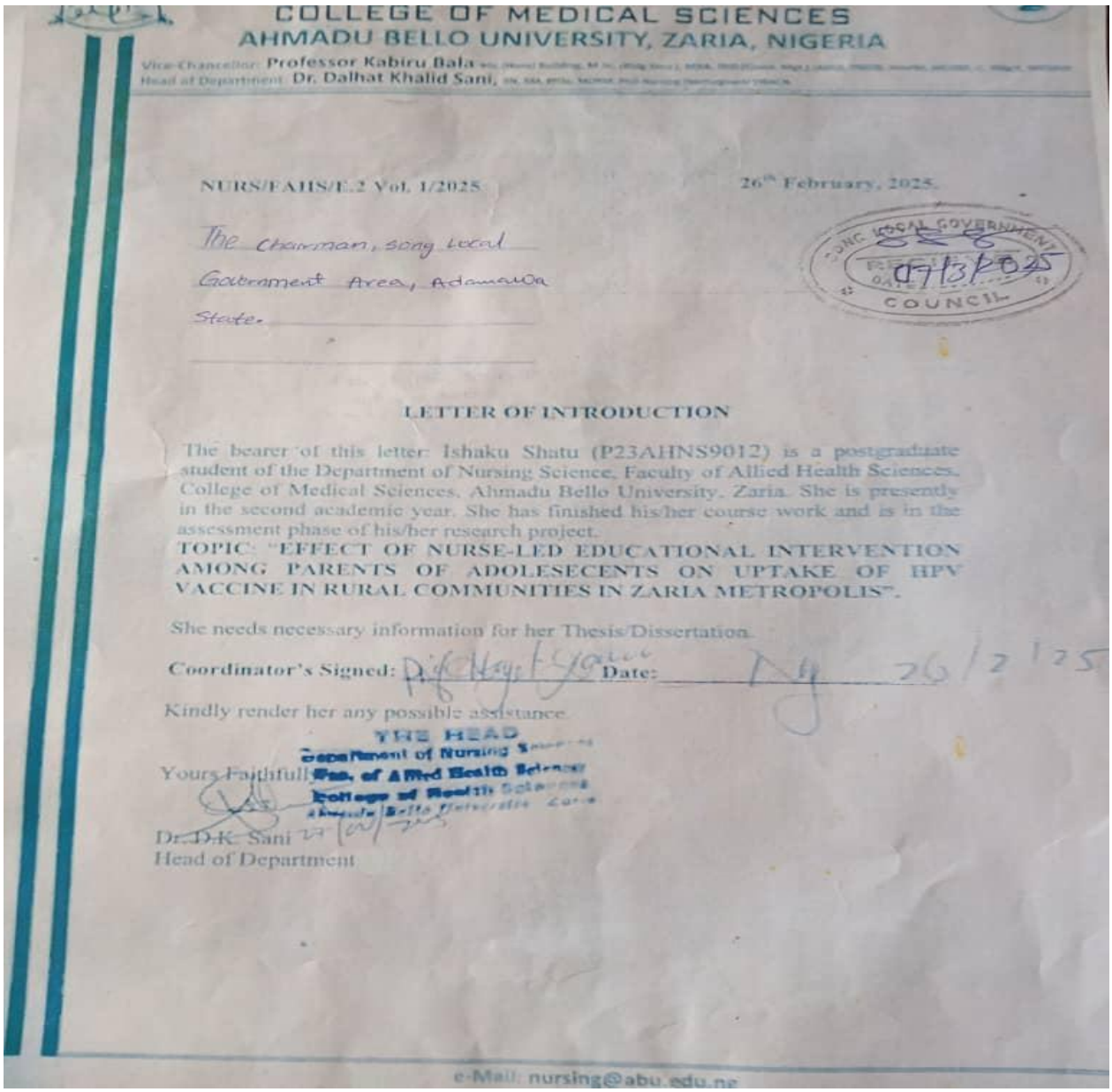
APPENDIX I (INTRODUCTORY LETTER FOR PILOT TESTING)



COLLEGE OF MEDICAL SCIENCES
AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA
Vice-Chancellor: Professor Kabiru Bala
Head of Department: Dr. Dalhat Khalid Sani,

NURS/FAHS/E.2 Vol. 1/2025

26th February, 2025.

The Chairman, Song Local Government Area, Adamawa State.

07/3/2025

LETTER OF INTRODUCTION

The bearer of this letter: Ishaku Shatu (P23AHNS9012) is a postgraduate student of the Department of Nursing Science, Faculty of Allied Health Sciences, College of Medical Sciences, Ahmadu Bello University, Zaria. She is presently in the second academic year. She has finished his/her course work and is in the assessment phase of his/her research project.

TOPIC: "EFFECT OF NURSE-LED EDUCATIONAL INTERVENTION AMONG PARENTS OF ADOLESECENTS ON UPTAKE OF HPV VACCINE IN RURAL COMMUNITIES IN ZARIA METROPOLIS".

She needs necessary information for her Thesis/Dissertation.

Coordinator's Signed: Date: 26/2/25

Kindly render her any possible assistance.

THE HEAD
Department of Nursing Science
Fac. of Allied Health Sciences
College of Health Sciences
Ahmadu Bello University Zaria

Yours Faithfully,

Dr. D.K. Sani
Head of Department

e-Mail: nursing@abu.edu.ng

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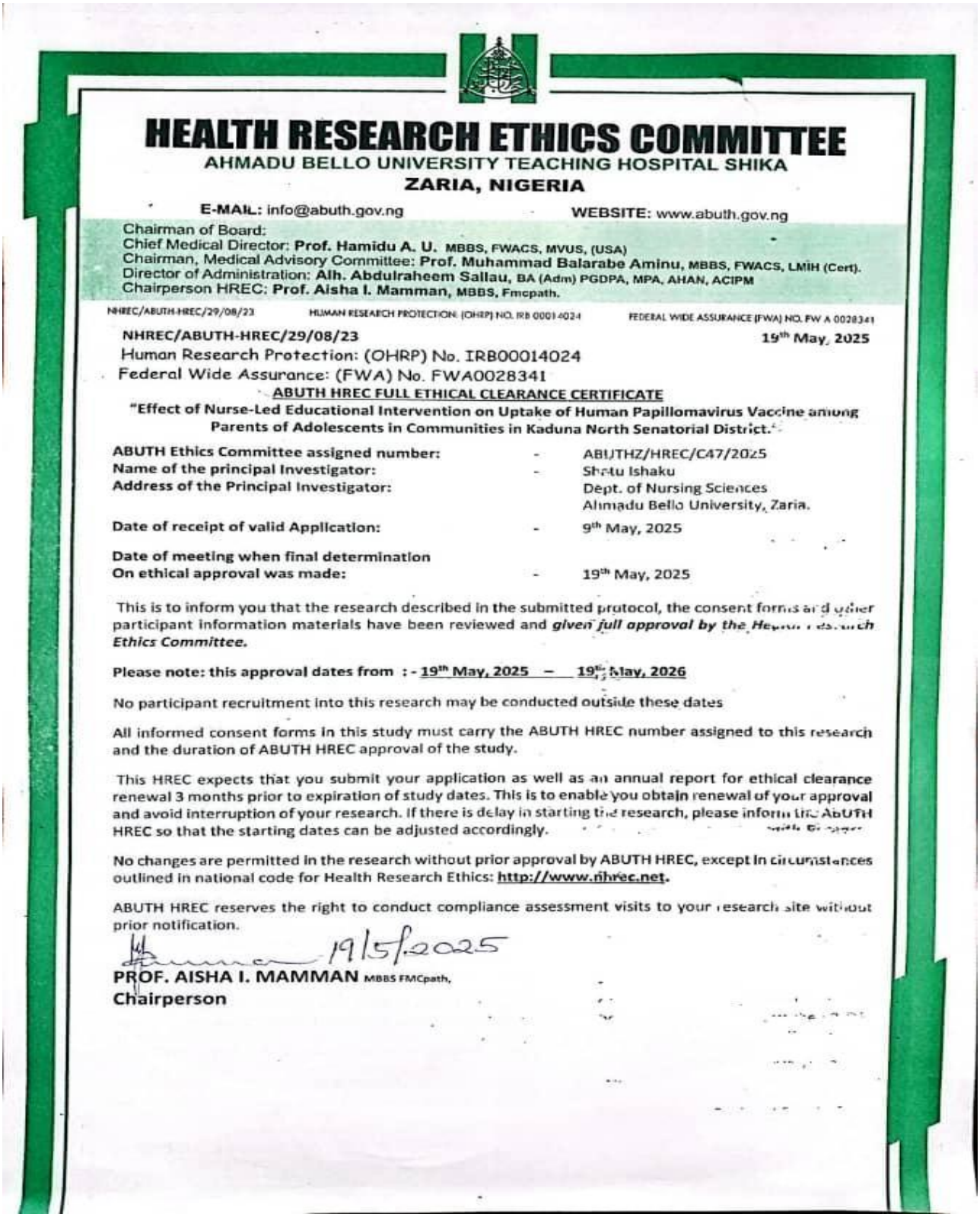
APPENDIX II (ETHICAL CLEARANCE)



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NHREC/ABUTH-HREC/29/08/23 **19th May, 2025**
Human Research Protection: (OHRP) No. IRB00014024
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ABUTH HREC FULL ETHICAL CLEARANCE CERTIFICATE

"Effect of Nurse-Led Educational Intervention on Uptake of Human Papillomavirus Vaccine among Parents of Adolescents in Communities in Kaduna North Senatorial District."

ABUTH Ethics Committee assigned number:	-	ABUTHZ/HREC/C47/2025
Name of the principal Investigator:	-	Shatu Ishaku
Address of the Principal Investigator:		Dept. of Nursing Sciences Ahmadu Bello University, Zaria.
Date of receipt of valid Application:	-	9th May, 2025
Date of meeting when final determination On ethical approval was made:	-	19th May, 2025

This is to inform you that the research described in the submitted protocol, the consent forms and other participant information materials have been reviewed and ***given full approval by the Health Research Ethics Committee.***

Please note: this approval dates from : - 19th May, 2025 – 19th May, 2026

No participant recruitment into this research may be conducted outside these dates

All informed consent forms in this study must carry the ABUTH HREC number assigned to this research and the duration of ABUTH HREC approval of the study.

This HREC expects that you submit your application as well as an annual report for ethical clearance renewal 3 months prior to expiration of study dates. This is to enable you obtain renewal of your approval and avoid interruption of your research. If there is delay in starting the research, please inform the ABUTH HREC so that the starting dates can be adjusted accordingly.

No changes are permitted in the research without prior approval by ABUTH HREC, except in circumstances outlined in national code for Health Research Ethics: **http://www.nhrec.net.**

ABUTH HREC reserves the right to conduct compliance assessment visits to your research site without prior notification.

19/5/2025

PROF. AISHA I. MAMMAN MBBS FMCpath,
Chairperson

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