

A COMPARATIVE STUDY ON AWARENESS AND KNOWLEDGE OF CERVICAL CANCER AND HUMAN PAPILLOMAVIRUS AMONG ADOLESCENT GIRLS IN URBAN AND RURAL AREAS

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ABSTRACT

Cervical cancer is the fourth most prevalent cancer among women worldwide, with approximately 604,000 new cases and 342,000 deaths reported in 2020. Nearly 99% of cases are associated with high-risk human papillomavirus (HPV) infection, a widespread virus primarily transmitted through sexual contact. Early awareness and education regarding cervical cancer and HPV are essential for prevention. This study was carried out to assess and compare awareness and knowledge regarding cervical cancer and HPV among adolescent girls from urban and rural areas, and to implement educational interventions to enhance their understanding and awareness. This interventional, comparative study enrolled eligible participants from selected urban and rural schools in western Bengaluru. Data were collected using a pre-validated structured questionnaire. At baseline, both urban and rural adolescent girls demonstrated very low knowledge scores. However, urban girls had significantly higher Knowledge scores and overall KAP scores than rural girls ($p < 0.001$). Positive attitudes toward HPV vaccination were reported by 55% of urban girls compared with 20% of rural girls ($p < 0.0001$). Willingness to receive the vaccine was low, with 40% of urban and 20% of rural participants expressing willingness. Among urban girls, the most frequently reported barriers were lack of awareness, concerns regarding side effects, and social stigma, all significantly higher than in the rural group. The study demonstrates substantial gaps in awareness of HPV infection and cervical cancer among adolescent girls in both urban and rural populations. Urban girls showed slightly higher baseline knowledge and awareness than rural girls, suggesting greater access and opportunities for health-related information. Comprehensive educational strategies are needed to improve awareness and support better health outcomes.

Keywords: Cervical cancer, Human Papillomavirus (HPV), Urban and Rural Adolescent girls, Health Awareness

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INTRODUCTION

Cervical cancer is a malignancy that originates from the epithelial cells of the cervix, particularly within the transformation zone, and is strongly associated with persistent infection with high-risk human papillomavirus (HPV). The disease develops gradually through a series of precancerous changes, known as cervical intraepithelial lesions, which may eventually progress to invasive cervical cancer if they are not detected and treated in time (1). Human papillomavirus is a double-

stranded DNA virus comprising more than 200 identified genotypes. Among these, HPV types 16 and 18 are the major high-risk types and are responsible for approximately 70% of cervical cancer cases (2).

In 2022, cervical cancer was estimated to account for 662,044 new cases globally, with an age-standardized incidence rate of 14.12 per 100,000 women, and 348,709 deaths, with an age-standardized mortality rate of 7.08 per 100,000. These figures place cervical cancer as the

fourth most common cancer in terms of both incidence and mortality among women worldwide (3). Among women aged 15–44 years, cervical cancer is one of the three most frequently occurring cancers in 149 countries and one of the three leading causes of cancer-related mortality in 154 countries (4). In India, cervical cancer remains the second most common cancer among women, with an estimated 127,526 new cases and 79,906 deaths. India accounts for a considerable proportion of the cervical cancer burden in the WHO Southeast Asia Region, contributing 29.59% of global cases and 34.12% of global deaths. The estimated mortality rate in India, approximately 11.2 per 100,000 women, is considerably higher than the global average of 7.1 per 100,000 (5).

HPV is primarily transmitted through direct skin-to-skin or skin-to-mucosal contact, most commonly through vaginal, anal, or oral sexual contact. It is recognized as the most common sexually transmitted infection worldwide (6).

HPV vaccination represents one of the most important strategies for the primary prevention of cervical cancer. Available prophylactic HPV vaccines are highly effective in preventing infection with high-risk HPV types, particularly HPV-16 and HPV-18, when administered before exposure to the virus. The World Health Organization (WHO) recommends routine HPV vaccination for girls aged 9–14 years who have not yet been exposed to sexual activity, as vaccination at this age provides a strong immune response and offers protection before potential HPV exposure (7) (8) (9) (10).

Assessing awareness and knowledge of HPV and cervical cancer among adolescent girls is particularly important because HPV vaccination provides the greatest benefit when administered before exposure to the virus (11). Comparing urban and rural populations can help identify differences in health literacy, access to healthcare services, and willingness to receive HPV vaccination, thereby supporting the development of education strategies tailored to the needs of different populations (11) (12). Educational interventions have been shown to improve awareness, knowledge, and willingness to receive the HPV vaccine, highlighting their importance in strengthening cervical cancer prevention programmes (11). Improving awareness among adolescent girls may contribute to greater uptake of HPV vaccination, earlier participation in cervical cancer prevention programmes, and progress towards the WHO goal of cervical cancer elimination (11) (12).

MATERIALS AND METHODS

The study was designed as a prospective interventional study and was conducted over the period of one year. It was carried out as a community-based study among urban and rural adolescent girls from selected high schools and colleges located in the western part of Bengaluru.

Ethics Committee Approval: The study protocol was reviewed and approved by the Institutional Ethics Committee at JSS Medical College, Mysore. (Ref. No. JSSMC/IEC/28082023/44 NCT/2023-24) before commencement of the study.

Inclusion Criteria: The study included urban and rural adolescent girls aged 10–19 years who were studying in the selected high schools and colleges within the study area. Participants who were willing to take part in the study and provided assent, along with the required parental or legal guardian consent, were included.

Exclusion Criteria: Adolescent girls below 10 years or above 19 years of age were excluded from the study. Those who were unwilling to participate or whose parent or legal guardian did not provide consent were also excluded. Participants who were unable to understand or complete the study questionnaire, as well as those who were absent during the educational intervention or post-intervention assessment, were excluded.

All relevant and necessary information for the study was collected directly through interactions with adolescent girls using a pre-validated, structured questionnaire assessing knowledge, awareness, and attitude towards HPV infection, HPV vaccination, and cervical cancer. The study population was recruited into the study through convenient sampling technique across the settings after obtaining prior permission from high schools and colleges in the western part of Bengaluru.

For individual items assessed in the same participants before and after the intervention, McNemar's test with continuity correction was used. For comparing individual items between the independent urban and rural groups, Pearson's chi-square test of independence was used. For domain and total scores measured before and after the intervention, the distribution of the data was assessed using the Shapiro–Wilk test and Q–Q plots. The Wilcoxon signed-rank test was used as the primary test for paired comparisons. For comparisons of domain and total scores between urban and rural groups, the Mann–Whitney U test was used as the primary analysis, with Welch's t-test reported alongside. Statistical significance was set at $\alpha = 0.05$, using two-tailed tests. 95% confidence intervals were reported for mean differences.

RESULTS

Knowledge Domain – Item-Level Interpretation

At baseline, knowledge concerning cervical cancer, HPV infection, HPV transmission, screening, and vaccination was very limited in both Urban and Rural participants. For every one of the 13 Knowledge items, the proportion answering 'Yes' was below 10% in both groups before the intervention. This indicates a substantial baseline knowledge deficit in both urban and rural populations (Table 1).

All 13 Knowledge items showed statistically significant pre–post improvement within both Urban and Rural groups (McNemar $p < 0.001$ for every item). The post-test proportions were approximately 93.5% to 100.0% in Urban participants and 93.5% to 100.0% in Rural participants. Thus, the intervention was followed by a large increase in correct responses across

At baseline, statistically significant Urban–Rural differences were present; however, these baseline differences were generally small in absolute terms because both groups had very low knowledge.

At post-test, only K7 ($p < 0.001$) and K8 ($p < 0.001$) showed statistically significant Urban–Rural differences. For the remaining knowledge items, the Urban–Rural comparisons were not statistically significant. This indicates that the post-intervention knowledge levels were broadly similar across the two settings, although two individual items retained statistically detectable differences (Figure 1).

Knowledge Domain – Overall Score Interpretation

The mean Knowledge score increased by 12.01 points in Urban participants (95% CI 11.91–12.10; Wilcoxon $p < 0.001$; $d_z = 9.90$) and by 12.40 points in Rural participants (95% CI 12.33–12.47; Wilcoxon $p < 0.001$; $d_z = 14.06$). The baseline Urban–Rural difference was statistically significant (mean difference 0.40, 95% CI 0.29–0.50; Mann–Whitney $p < 0.001$; $d = 0.43$), whereas the post-test difference was not statistically significant (mean difference 0.01, 95% CI –0.06 to 0.07; $p = 0.676$; $d = 0.01$). (Table 2)

Therefore, the data support a marked pre–post increase in Knowledge in both groups and show that the initial Urban advantage in the overall Knowledge score was no longer statistically detectable after the intervention.

Attitude Domain – Item-Level Interpretation

The Attitude domain showed greater baseline heterogeneity than Knowledge. Several items indicated substantial concerns about vaccine safety, cost, lack of information, myths, and the influence of parents or doctors. These findings are important because they identify potential barriers or determinants of HPV vaccination decisions rather than simply measuring factual knowledge. (Table 3)

Most Attitude items changed significantly following the intervention. Notable changes included increased recognition of vaccine-related benefits and a marked reduction in reported fear of vaccine side effects and the influence of myths. The proportion reporting that cost would affect the decision to vaccinate decreased from 89.5% to 52.2% in Urban participants and from 87.2% to 46.0% in Rural participants. The proportion reporting that parents' or doctors' decisions affected their choice also decreased substantially in both groups.

The item concerning willingness to vaccinate if the Government provides a discount: the Urban group increased from 90.7% to 94.7% (McNemar $p = 0.010$), and the Rural group from 90.2% to 95.3% ($p = 0.320$).

Attitude Domain – Overall Score Interpretation

The Attitude score increased significantly in Urban participants by 2.58 points (95% CI 2.46–2.69; Wilcoxon $p < 0.001$; $d_z = 1.79$) and in Rural participants by 2.56 points (95% CI 2.45–2.67; $p < 0.001$; $d_z = 1.86$). The baseline Urban–Rural difference was statistically significant but small (mean difference 0.19, 95% CI 0.03–0.34; $p = 0.011$; $d = 0.14$). Importantly, the post-test difference also remained statistically significant (mean difference 0.20, 95% CI 0.10–0.30; $p < 0.001$; $d = 0.22$). (Table 4)

Thus, the interpretation is that attitude improved significantly in both Urban and Rural participants. (Figure 2)

Practice/Willingness Domain – Item-Level Interpretation

The five items primarily measure vaccination willingness and supportive intentions. Therefore, the interpreted results are changes in willingness, intention, and support for HPV vaccination.

All five Practice/Willingness items showed statistically significant pre–post improvement within both Urban and Rural participants (McNemar $p < 0.001$ for every item). The largest absolute changes were observed for willingness to receive HPV vaccination, willingness to recommend the vaccine, support for inclusion in immunization records, and willingness to receive education from healthcare professionals. (Table 5)

Practice/Willingness Domain – Overall Score Interpretation

The Practice/Willingness score increased by 3.26 points in Urban participants (95% CI 3.10–3.42; Wilcoxon $p < 0.001$; $d_z = 1.65$) and by 3.43 points in Rural participants (95% CI 3.29–3.57; $p < 0.001$; $d_z = 1.92$). These findings indicate a substantial increase in vaccination willingness and supportive intentions in both settings. (Table 6) (Figure 3)

Overall KAP Score Interpretation

The overall KAP score increased significantly in both groups. Urban participants showed a mean increase of 17.84 points (95% CI 17.60–18.08; Wilcoxon $p < 0.001$; $d_z = 5.97$), while Rural participants showed a mean increase of 18.39 points (95% CI 18.18–18.60; $p < 0.001$; $d_z = 7.17$).

At baseline, the Urban group had a significantly higher overall KAP score than the Rural group (mean difference 0.73, 95% CI 0.43–1.04; Mann–Whitney $p < 0.001$; $d = 0.27$). At post-test, a statistically significant difference remained (mean difference 0.18, 95% CI 0.06–0.30;

$p=0.003$; $d=0.16$). The absolute difference was small, but because of the large sample size, it remained statistically detectable. (Table 7) (Figure 4)

Interpretation of the Educational Intervention

Taken together, the findings demonstrate substantial pre-post improvements in all three measured domains in both Urban and Rural participants. Knowledge increased from very low baseline levels to near-maximal post-test levels. Attitude scores increased significantly in both settings, although a small statistically significant Urban-Rural difference persisted after intervention. Practice/Willingness scores increased markedly in both groups, with no significant overall Urban-Rural difference at post-test.

The magnitude and consistency of the changes nevertheless provide strong evidence of substantial improvement in the measured outcomes following the intervention.

Urban-Rural Interpretation

At baseline, the Urban group had higher overall Knowledge and overall KAP scores than the Rural group, while the overall Practice/Willingness score did not differ significantly. The overall Attitude score showed a small statistically significant Urban-Rural difference. At post-test, Knowledge and Practice/Willingness scores were not significantly different between the two groups, whereas Attitude and overall KAP remained statistically different.

The current analyses establish that both Urban and Rural groups improved significantly from pre-test to post-test.

At baseline, adolescent girls from both Urban and Rural settings demonstrated limited Knowledge regarding cervical cancer, HPV infection, HPV transmission, screening and HPV vaccination, with fewer than 10% responding affirmatively to each Knowledge item. Following the educational intervention, significant improvements were observed across all 13 Knowledge items in both groups (McNemar $p<0.001$ for all items). The overall Knowledge score increased significantly in Urban participants from 0.69 ± 1.08 to 12.70 ± 0.61 and in Rural participants from 0.30 ± 0.70 to 12.69 ± 0.59 (Wilcoxon $p<0.001$ for both). The baseline Urban-Rural difference in Knowledge was significant ($p<0.001$), whereas the post-test difference was not significant ($p=0.676$).

Attitude scores also increased significantly following the intervention, from 5.37 ± 1.36 to 7.94 ± 0.87 in Urban participants and from 5.18 ± 1.29 to 7.74 ± 0.89 in Rural participants (Wilcoxon $p<0.001$ for both). However, a statistically significant Urban-Rural difference remained at post-test ($p<0.001$), although the corresponding standardized difference was small ($d=0.22$).

Practice/Willingness scores increased significantly from 1.68 ± 1.98 to 4.93 ± 0.28 in Urban participants and from

1.53 ± 1.76 to 4.96 ± 0.22 in Rural participants (Wilcoxon $p<0.001$ for both). There was no significant Urban-Rural difference in the overall Practice/Willingness score at either pre-test ($p=0.651$) or post-test ($p=0.142$).

The overall KAP score increased significantly in both groups, from 7.74 ± 2.95 to 25.57 ± 1.10 in Urban participants and from 7.00 ± 2.46 to 25.39 ± 1.09 in Rural participants (Wilcoxon $p<0.001$ for both). Urban participants had a higher overall KAP score at baseline ($p<0.001$), and a small but statistically significant difference remained at post-test ($p=0.003$).

DISCUSSION

The present study identified a substantial baseline deficit in knowledge concerning HPV infection, cervical cancer, screening, and HPV vaccination among adolescent girls in both Urban and Rural settings. Although Urban participants had modestly higher Knowledge scores at baseline, the absolute levels in both groups were very low. This finding indicates that geographic residence alone did not protect participants from the information gap and highlights the need for accessible, structured education regarding HPV and cervical cancer prevention. A systematic review and meta-analysis of studies by Pal D et al. (13) conducted in India reported a pooled prevalence of knowledge regarding HPV vaccination of approximately 22%, highlighting the continuing information gap surrounding HPV vaccination in the Indian population. The low baseline knowledge observed in the present study is therefore consistent with the broader Indian literature. The present findings are also comparable with recent evidence from a study by Mohanty G et al., (14) in rural Haryana, where more than 80% of female adolescents were reported to have inadequate knowledge regarding cervical cancer and HPV infection. The consistency between these findings suggests that inadequate HPV and cervical cancer knowledge remains an important issue among Indian adolescents, particularly in settings where access to reliable health information may be limited.

Following the educational intervention, Knowledge increased dramatically in both groups, with post-test scores approaching the maximum possible value. The consistency of improvement across all 13 Knowledge items suggests that the intervention addressed multiple components of HPV and cervical-cancer knowledge rather than producing improvement in only a limited topic area. The disappearance of the statistically significant overall Knowledge difference between Urban and Rural participants at post-test further indicates that both groups reached broadly comparable levels of measured knowledge after education. Similarly, an Indian educational intervention among 489 female healthcare students demonstrated improvement in knowledge and attitude regarding cervical cancer and HPV vaccination following health education as per Verma I et al., (15).

Attitude also improved significantly in both settings. The baseline responses indicated concerns related to vaccine side effects, cost, lack of information, myths, and the influence of parents or healthcare professionals. Post-intervention responses showed substantial changes in several of these items. However, the persistence of a statistically significant Urban–Rural difference in the overall Attitude score at post-test indicates that improvement in knowledge does not necessarily result in complete convergence of attitudes between different settings.

The Practice/Willingness findings demonstrated a marked increase in willingness to receive HPV vaccination, recommend vaccination, and support awareness and professional education. Because these measures reflect intention or willingness rather than confirmed vaccination uptake, they should not be interpreted as direct evidence of increased vaccine coverage. Actual uptake would require follow-up documentation of vaccination.

Overall, the findings provide evidence of substantial improvement in measured KAP outcomes following the educational intervention. Nevertheless, the absence of a separate untreated control group means that the results should be interpreted as an association between the intervention period and improvement rather than as definitive proof of causality. Longer-term follow-up would also be necessary to determine whether the observed gains in knowledge, attitude and willingness are retained over time and whether they translate into actual HPV vaccination. More recently, a 2026 intervention study by Anand A et al., (15) among secondary-school girls and their mothers in North India reported significant improvements in girls' knowledge of cervical cancer symptoms and Pap smear testing following the intervention.

A recent Indian scoping review by Josten K et al., (16) identified knowledge gaps, cultural/social hesitancy, fear-driven hesitancy and individual/system-level barriers as important factors influencing HPV vaccination among adolescent girls. A qualitative study by Dhusiya HR et al., (17) from Odisha similarly identified knowledge gaps, fear-driven hesitancy, cultural/social concerns and communication gaps as barriers, while highlighting school-based education and community engagement as potential strategies.

CONCLUSION

The study demonstrated substantial improvement in Knowledge, Attitude and vaccination-related Practice/Willingness among Urban and Rural adolescent girls following the structured educational intervention. Knowledge increased from very low baseline levels to near-maximal post-test scores in both groups, and the baseline Urban–Rural difference in Knowledge was no longer statistically significant after intervention. Practice/Willingness also improved markedly, without a

significant overall Urban–Rural difference at post-test. Attitude scores improved significantly in both groups; however, a small statistically significant Urban–Rural difference persisted after intervention. Similarly, the overall KAP score remained statistically different between the two groups at post-test despite substantial improvement in both. These findings support the value of structured education for improving HPV-related KAP outcomes, while the study design requires cautious interpretation regarding causal effectiveness and equality of intervention effects between Urban and Rural settings.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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TABLES AND FIGURES

Table 1: Comparison of Knowledge Regarding Cervical Cancer, HPV Infection and HPV Vaccination Between Urban and Rural Adolescent Girls Before and After the Educational Intervention

Item	Knowledge item	Urban Pre → Post	Rural Pre → Post	McNemar p (Urban/Rural)	χ ² p (Pre/Post)
K1	Knows what cervical cancer is	7.3% → 100.0%	5.5% → 99.5%	<0.001 / <0.001	0.239 / 0.249
K2	Knows microorganisms can cause cervical cancer	5.5% → 97.8%	1.0% → 98.3%	<0.001 / <0.001	<0.001 / 0.674
K3	Knows signs & symptoms of cervical cancer	7.5% → 100.0%	2.3% → 99.2%	<0.001 / <0.001	<0.001 / 0.062
K4	Knows complications of cervical cancer	3.5% → 94.8%	0.8% → 94.7%	<0.001 / <0.001	0.003 / 1.000

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K5	Knows cervical cancer screening techniques	3.7% → 94.2%	1.2% → 93.5%	<0.001 / <0.001	0.008 / 0.719
K6	Heard of Pap smear test	5.2% → 99.2%	1.0% → 99.7%	<0.001 / <0.001	<0.001 / 0.452
K7	Knows what HPV stands for	4.2% → 95.7%	1.8% → 100.0%	<0.001 / <0.001	0.028 / <0.001
K8	Heard of signs & symptoms of HPV infection	5.2% → 100.0%	2.0% → 96.3%	<0.001 / <0.001	0.005 / <0.001
K9	Knows HPV can be asymptomatic	2.8% → 94.0%	1.3% → 94.0%	<0.001 / <0.001	0.106 / 1.000
K10	Knows HPV causes cancer in both sexes	5.2% → 97.8%	2.7% → 97.7%	<0.001 / <0.001	0.037 / 1.000
K11	Knows HPV is sexually transmitted	6.3% → 98.5%	2.2% → 98.8%	<0.001 / <0.001	<0.001 / 0.801
K12	Knows an approved HPV vaccine exists in India	6.8% → 100.0%	4.8% → 100.0%	<0.001 / <0.001	0.175 / 1.000
K13	Knows HPV vaccine can be given to boys	6.2% → 97.8%	3.0% → 97.7%	<0.001 / <0.001	0.013 / 1.000

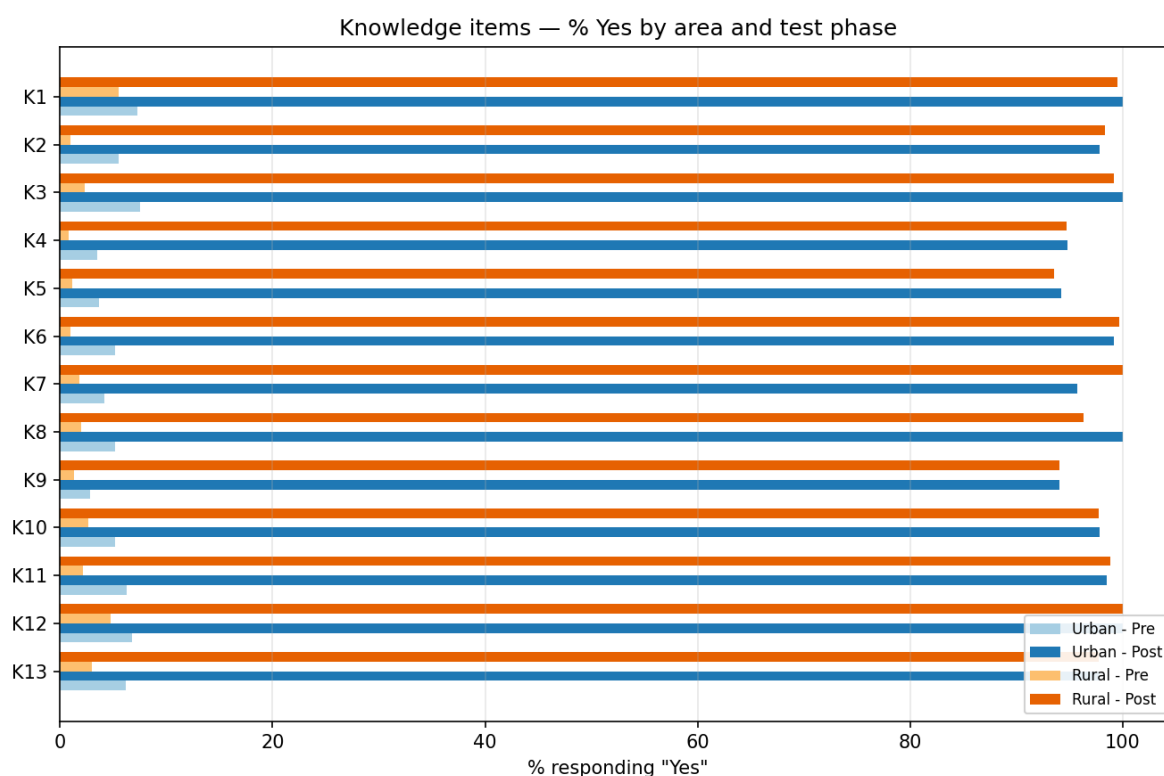


Figure 1: Comparison of Knowledge Regarding Cervical Cancer, HPV Infection and HPV Vaccination Among Urban and Rural Adolescent Girls Before and After the Educational Intervention

Table 2. Comparison of Overall Knowledge Scores Among Urban and Rural Adolescent Girls Before and After the Educational Intervention

Group	Pre-test mean $\pm$ SD	Post-test mean $\pm$ SD	Median (IQR) pre	Median (IQR) post
Urban	0.69 $\pm$ 1.08 /13	12.70 $\pm$ 0.61 /13	0 (0–1)	13 (13–13)
Rural	0.30 $\pm$ 0.70 /13	12.69 $\pm$ 0.59 /13	0 (0–0)	13 (13–13)

Table 3: Comparison of Attitude Regarding Cervical Cancer, HPV Infection and HPV Vaccination Between Urban and Rural Adolescent Girls Before and After the Educational Intervention

Item	Attitude item	Urban Pre $\rightarrow$ Post	Rural Pre $\rightarrow$ Post	McNemar p (Urban/Rural)	χ^2 p (Pre/Post)
A1	Believes HPV infection is deadly	2.5% $\rightarrow$ 99.3%	2.2% $\rightarrow$ 99.5%	<0.001 / <0.001	0.848 / 1.000
A2	Believes HPV infection is curable	3.3% $\rightarrow$ 98.7%	3.8% $\rightarrow$ 98.3%	<0.001 / <0.001	0.756 / 0.812
A3	Believes vaccine will keep them safe & healthy	16.3% $\rightarrow$ 98.7%	10.8% $\rightarrow$ 99.0%	<0.001 / <0.001	0.007 / 0.788
A4	Believes vaccine will be effective in all age groups	6.8% $\rightarrow$ 96.3%	4.5% $\rightarrow$ 96.7%	<0.001 / <0.001	0.105 / 0.875
A5	Believes vaccine can prevent cervical cancer	22.3% $\rightarrow$ 98.0%	14.3% $\rightarrow$ 99.0%	<0.001 / <0.001	<0.001 / 0.235
A6	Afraid of vaccine side effects/complications	88.2% $\rightarrow$ 4.0%	86.8% $\rightarrow$ 2.7%	<0.001 / <0.001	0.541 / 0.260
A7	Cost would affect decision to vaccinate	89.5% $\rightarrow$ 52.2%	87.2% $\rightarrow$ 46.0%	<0.001 / <0.001	0.242 / 0.038
A8	Willing to vaccinate if Government gives discount	90.7% $\rightarrow$ 94.7%	90.2% $\rightarrow$ 95.3%	0.010 / 0.320	0.845 / <0.001
A9	Hesitant due to lack of information	92.3% $\rightarrow$ 100.0%	92.3% $\rightarrow$ 100.0%	<0.001 / <0.001	1.000 / 1.000
A10	Religious reasons/myths affect decision	32.5% $\rightarrow$ 2.0%	35.2% $\rightarrow$ 1.0%	<0.001 / <0.001	0.360 / 0.235
A11	Parent's/doctor's decision affects choice	92.0% $\rightarrow$ 50.2%	90.7% $\rightarrow$ 43.8%	<0.001 / <0.001	0.473 / 0.032

Table 4. Comparison of Overall Attitude Scores Among Urban and Rural Adolescent Girls Before and After the Educational Intervention

Group	Pre-test mean $\pm$ SD	Post-test mean $\pm$ SD	Median (IQR) pre	Median (IQR) post
Urban	5.37 $\pm$ 1.36 /11	7.94 $\pm$ 0.87 /11	5 (5–6)	8 (7–9)
Rural	5.18 $\pm$ 1.29 /11	7.74 $\pm$ 0.89 /11	5 (5–6)	8 (7–8)

A COMPARATIVE STUDY ON AWARENESS AND KNOWLEDGE OF CERVICAL CANCER AND HUMAN PAPILLOMAVIRUS AMONG ADOLESCENT GIRLS IN URBAN AND RURAL AREAS

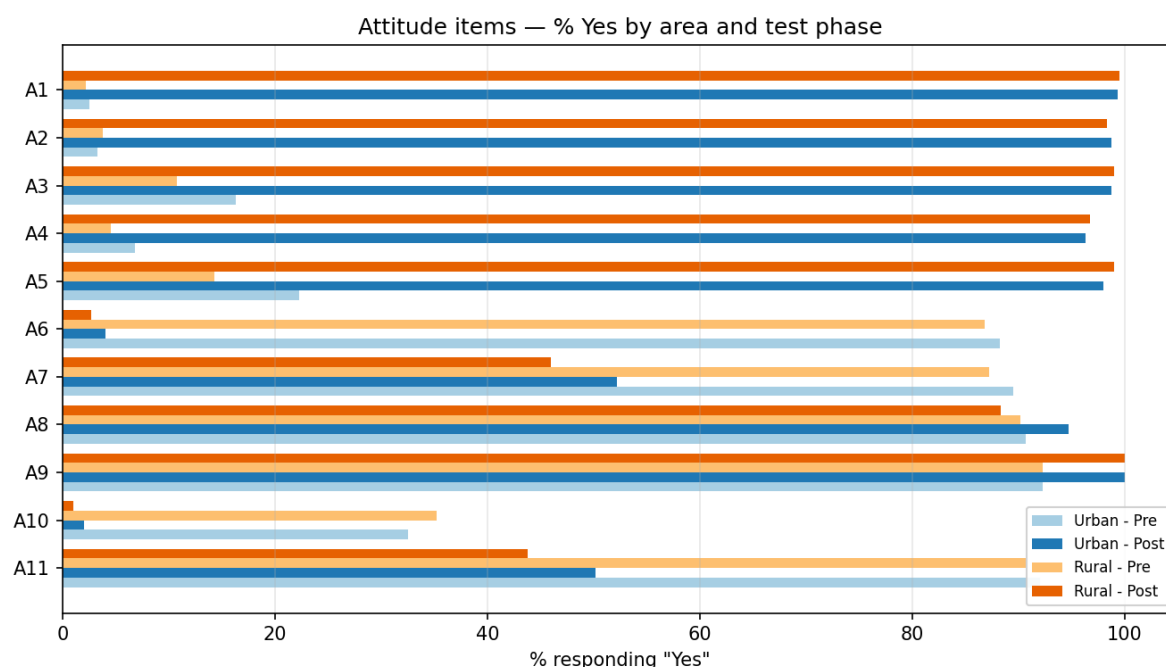


Figure 2: Comparison of Attitude Regarding Cervical Cancer, HPV Infection and HPV Vaccination Among Urban and Rural Adolescent Girls Before and After the Educational Intervention

Table 5: Comparison of Practice/Willingness Regarding HPV Vaccination Between Urban and Rural Adolescent Girls Before and After the Educational Intervention

Item	Practice/Willingness item	Urban Pre → Post	Rural Pre → Post	McNemar p (Urban/Rural)	χ^2 p (Pre/Post)
P1	Would like to receive HPV vaccination	24.8% → 97.8%	22.3% → 99.3%	<0.001 / <0.001	0.341 / 0.047
P2	Would recommend the vaccine to others	34.3% → 98.5%	31.0% → 99.3%	<0.001 / <0.001	0.242 / 0.264
P3	Believes vaccine should be part of immunization records	29.2% → 99.0%	26.0% → 98.7%	<0.001 / <0.001	0.245 / 0.788
P4	Believes steps are needed to raise awareness/acceptance	37.8% → 98.8%	35.3% → 99.2%	<0.001 / <0.001	0.401 / 0.772
P5	Would like education from a healthcare professional	41.7% → 99.3%	38.0% → 99.2%	<0.001 / <0.001	0.216 / 1.000

Table 6. Comparison of Overall Practice/Willingness Scores Among Urban and Rural Adolescent Girls Before and After the Educational Intervention

Group	Pre-test mean ± SD	Post-test mean ± SD	Median (IQR) pre	Median (IQR) post
Urban	1.68 ± 1.98 / 5	4.93 ± 0.28 / 5	1 (0–4)	5 (5–5)
Rural	1.53 ± 1.76 / 5	4.96 ± 0.22 / 5	1 (0–3)	5 (5–5)

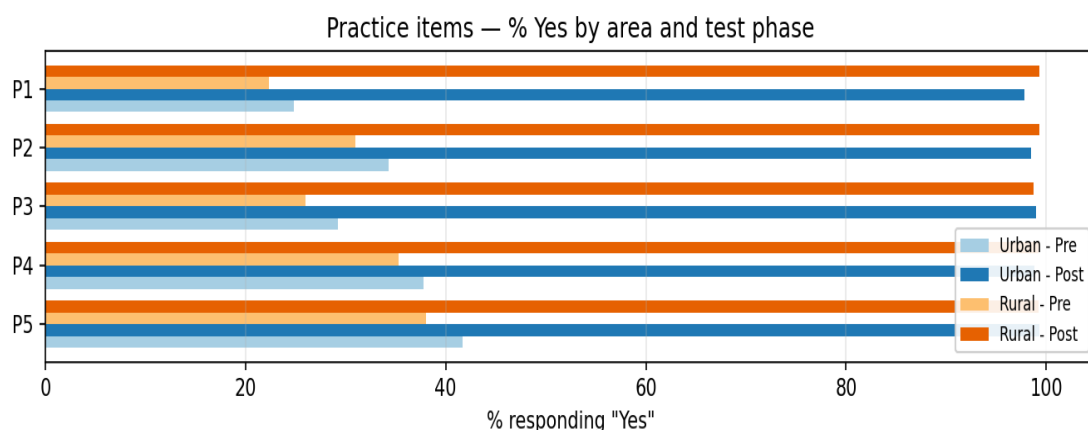


Figure 3: Comparison of Willingness Regarding HPV Vaccination Among Urban and Rural Adolescent Girls Before and After the Educational Intervention

Table 7. Comparison of Overall KAP Scores Among Urban and Rural Adolescent Girls Before and After the Educational Intervention

Group	Pre-test mean $\pm$ SD	Post-test mean $\pm$ SD	Median (IQR) pre	Median (IQR) post
Urban	7.74 $\pm$ 2.95 /29	25.57 $\pm$ 1.10 /29	7 (6–9)	26 (25–26)
Rural	7.00 $\pm$ 2.46 /29	25.39 $\pm$ 1.09 /29	7 (6–8)	26 (25–26)

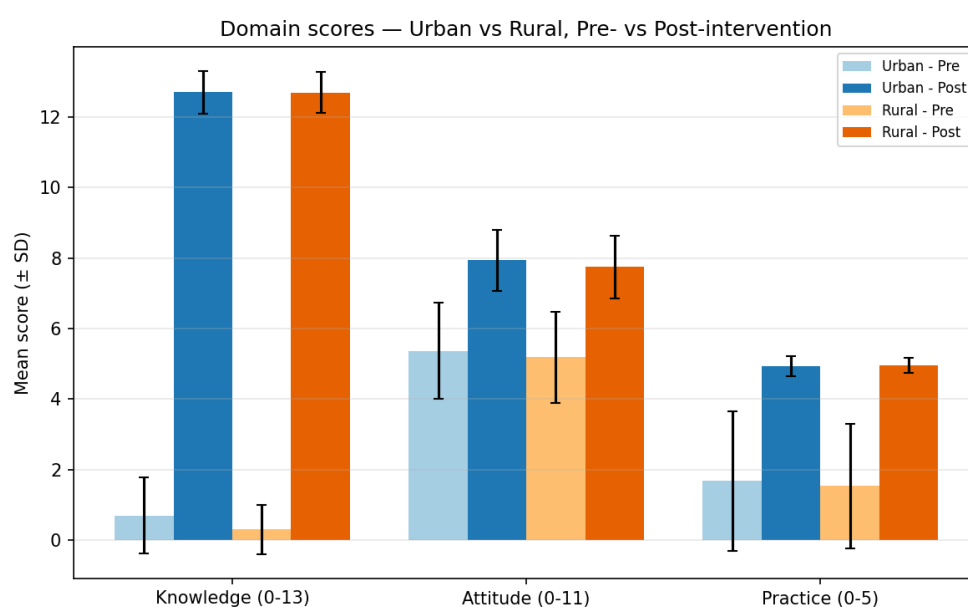


Figure 4: Comparison of Mean KAP Domain Scores Among Urban and Rural Adolescent Girls Before and After the Educational Intervention