
EFFECTIVENESS OF A SCHOOL-BASED EDUCATIONAL INTERVENTION ON KNOWLEDGE REGARDING HUMAN PAPILLOMAVIRUS VACCINATION AND CERVICAL CANCER PREVENTION AMONG ADOLESCENT GIRLS: A QUASSI-EXPERIMENTAL STUDY

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Abstract

Background: Cervical cancer is largely preventable through human papillomavirus (HPV) vaccination, appropriate screening, and timely management of precancerous lesions. Adolescents require accurate, age-appropriate information to understand prevention and make informed decisions. **Objective:** To assess baseline knowledge regarding HPV vaccination and cervical cancer and evaluate a school-based educational programme among adolescent girls. **Methods:** A quantitative, quasi-experimental, single-group pre-test–post-test study enrolled 60 adolescent girls through simple random sampling using an envelope method at a selected school in Thoubal, Manipur. A structured knowledge questionnaire was administered before the educational programme and again seven days later. Descriptive and inferential statistics were reported in the source study. **Results:** At baseline, 42 (70.0%) participants had inadequate knowledge, 15 (25.0%) average knowledge, and 3 (5.0%) adequate knowledge. Following education, corresponding figures were 7 (11.7%), 8 (13.3%), and 45 (75.0%). Mean scores increased from 12.17 ± 5.80 to 23.73 ± 6.37 , an absolute mean increase of 11.56 points. The source reported $t = 8.84$, indicating a statistically significant pre–post difference; however, the paired-score standard deviation, degrees of freedom, and exact p-value were unavailable for independent verification. **Conclusion:** A school-based educational programme was associated with substantially improved short-term knowledge. Controlled studies with longer follow-up are needed to establish causal effectiveness and durability.

Keywords: adolescent girls; cervical cancer; health education; HPV vaccine; knowledge; school health.

Introduction

Cervical cancer remains an important public health challenge, particularly in settings where preventive vaccination, screening, and treatment are not consistently accessible. Persistent infection with oncogenic human papillomavirus types is the central causal factor in nearly all cervical cancers. Infection is common, but most infections resolve spontaneously; persistent high-risk infection may progress through precancerous changes over years before invasive cancer develops [1,3,6]. This extended natural history creates opportunities for prevention across the life course.

Primary prevention focuses on vaccination against HPV before exposure, alongside age-appropriate health education. Secondary prevention depends on evidence-based cervical screening and management of abnormal results. The World Health Organization (WHO) recommends HPV vaccination as a priority for girls aged 9–14 years and has established a global strategy to accelerate cervical cancer elimination [7–9]. Vaccination is preventive rather than therapeutic: it does not treat existing HPV infection or remove the need for future screening according to applicable national guidelines.

Adolescence is a particularly suitable stage for preventive education because health beliefs, understanding of vaccination, and communication with caregivers are developing. Yet awareness can be constrained by misinformation, discomfort discussing reproductive health, limited access to credible resources, and uncertainty about vaccine safety or eligibility. Educational interventions delivered in schools can reach learners in a familiar environment and support informed discussions with parents, teachers, and health professionals [2,4,5].

Knowledge is an important proximal outcome, but it is not equivalent to vaccine acceptance, completed immunization, or reduction in cancer incidence. Effective education should explain HPV transmission without stigma, clarify the relationship between persistent infection and cancer, discuss vaccination schedules in accordance with current policy, and encourage consultation with qualified healthcare providers. The present investigation examined whether a structured school-based educational programme was associated with improved knowledge after seven days.

Objectives and Hypothesis

The objectives were (1) to assess knowledge regarding HPV vaccination and cervical cancer among adolescent girls before the intervention and (2) to evaluate change in knowledge following a school-based educational programme. The research hypothesis (H1) proposed a significant difference between pre-test and post-test knowledge scores.

Materials and Methods

Study design and setting: A quantitative quasi-experimental, one-group pre-test–post-test design was used at Ananda Purna School of Sciences, Thoubal, Manipur, India, as identified in the original study. This design assesses within-group change but does not provide a contemporaneous comparison group. The original document does not specify the study dates, the age distribution, or the duration of the educational session.

Participants and sampling: Sixty adolescent girls were enrolled using simple random sampling by the envelope method. The source does not provide the sampling frame, eligibility criteria, refusals, attrition, or a sample-size calculation. Accordingly, the representativeness of the sample and possible selection bias cannot be fully assessed. No participant-level demographic characteristics were available for reporting.

Measurement: Knowledge regarding HPV vaccination and cervical cancer was measured with a structured knowledge questionnaire at both time points. The original document does not describe the total possible score, number of items, scoring rubric, cut-offs for inadequate/average/adequate knowledge, language of administration, or evidence of validity and reliability. The three

knowledge categories are therefore presented exactly as originally reported, without assigning unverified numerical thresholds.

Intervention and procedure: Participants completed a baseline pre-test, received the school-based educational programme on HPV vaccination and cervical cancer, and completed a post-test seven days later using the same questionnaire. The source does not specify the teaching materials, educator training, session duration, instructional methods, or intervention fidelity. These details should be added from the investigators' study records before journal submission to permit replication.

Statistical analysis: Frequencies and percentages summarize categorical knowledge levels; means and standard deviations summarize total knowledge scores. The original report provides a *t* statistic of 8.84 and describes a significant pre–post difference. Because raw paired data, the standard deviation of paired differences, and degrees of freedom were not supplied, the statistic cannot be independently reconstructed. The absolute mean change ($23.73 - 12.17 = 11.56$) and changes in percentages are descriptive calculations from reported aggregates, not newly collected results. No inferential analyses of demographic subgroups are presented.

Ethical considerations: The supplied report does not state institutional ethics committee approval, parental/guardian consent, adolescent assent, confidentiality procedures, or permissions from the school. These must be verified and documented by the authors before submission. No approval number or consent statement is invented here.

Results

All reported results refer to the original sample of 60 adolescent girls. Baseline knowledge was predominantly inadequate, whereas adequate knowledge was the largest category seven days after the educational programme. Table 1 details the category distributions.

Knowledge category	Pre-test n (%)	Post-test n (%)
Inadequate	42 (70.0)	7 (11.7)
Average	15 (25.0)	8 (13.3)
Adequate	3 (5.0)	45 (75.0)
Total	60 (100.0)	60 (100.0)

Table 1. Distribution of knowledge levels before and seven days after education. Category labels are reproduced from the original report; score thresholds were not supplied.

The percentage classified as adequate increased by 70.0 percentage points, from 5.0% to 75.0%. The proportion with inadequate knowledge declined by approximately 58.3 percentage points, from 70.0% to 11.7%. These figures describe marginal distributions and cannot reveal how many individual students moved between categories, because participant-level paired classifications were not available.

Statistic	Pre-test	Post-test
Sample size	60	60
Mean knowledge score	12.17	23.73
Standard deviation	5.80	6.37
Absolute mean change	—	+11.56
Reported <i>t</i> statistic	—	8.84

Table 2. Summary of knowledge scores and reported test statistic. The score range and paired-difference variability were not provided. The original document compares $t = 8.84$ with a stated tabulated value of 3.37 but does not specify the degrees of freedom or significance level used.

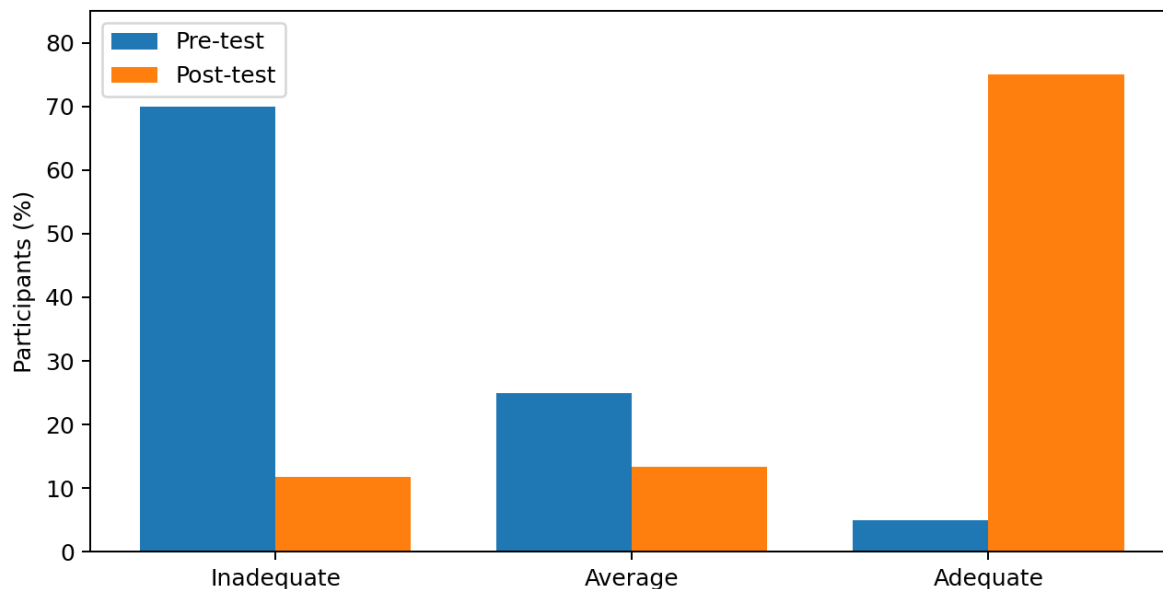


Figure 1. Percentage distribution of participants by knowledge category at pre-test and post-test (n = 60 at each assessment).

The increase in mean score is consistent with the shift toward adequate knowledge in the categorical findings. The reported t value suggests that the investigators observed a statistically detectable difference; nevertheless, the exact inferential procedure and associated p-value should be confirmed against the original statistical output. The lack of a control group means that improvement cannot be attributed exclusively to the educational programme.

Discussion

The principal finding was a marked improvement in short-term knowledge following a school-based educational intervention. Before education, seven in ten participants were classified as having inadequate knowledge. At follow-up, three in four were classified as having adequate knowledge. The mean score increased by 11.56 points, supporting the interpretation that participants understood more of the material measured by the questionnaire after the programme. These results address the study's stated objectives and are directionally consistent across categorical and continuous summaries.

The findings are plausible in light of the preventable nature of HPV-associated disease and the capacity of structured instruction to correct misconceptions. School-based teaching can explain why HPV vaccination is recommended before exposure, distinguish infection from cancer, and clarify that cervical screening remains relevant later in life [6–9]. When appropriately designed, educational sessions may also provide opportunities to ask questions about safety, access, and parental involvement. However, these specific educational mechanisms were not measured in the present study and should not be treated as established explanations for the observed change.

Broader prevention evidence underscores the importance of providing accurate information. HPV vaccines have demonstrated strong protection against vaccine-type infection and associated precancerous lesions, and population-level evidence supports reductions in cervical cancer outcomes where vaccination coverage is high [10–13]. Nevertheless, improvement in knowledge is only one step toward prevention. The present study did not measure vaccine uptake, completion, willingness, screening participation, or subsequent health outcomes. Claims about increased vaccination coverage or reduced cancer incidence would therefore exceed the data.

The seven-day follow-up is a strength for demonstrating an immediate educational response, but it leaves knowledge retention uncertain. Repeated use of the same questionnaire may produce

testing effects, while concurrent exposure to other information, maturation, and social desirability may contribute to observed changes. Without a control group, these competing explanations cannot be separated from the intervention effect. Additionally, missing information about questionnaire validation, scoring cut-offs, intervention content, and sample characteristics limits appraisal of measurement quality and generalizability.

For nursing practice, the findings suggest that school health nurses and nurse educators may have an important role in delivering culturally appropriate HPV and cervical cancer prevention education. Future programmes should involve parents and school authorities as appropriate, use locally understandable language, avoid stigmatizing messaging, and incorporate evidence-based vaccine information. A stronger evaluation would use a controlled or cluster-randomized design, validated instruments, prespecified outcomes, and follow-up at several months. It could also measure vaccination intention and verified uptake while addressing access barriers [14–18].

Nursing Implications

Nursing education: Integrate HPV prevention into adolescent health teaching and prepare student nurses to communicate evidence-based vaccine messages. Nursing practice: Collaborate with school staff and caregivers to deliver accessible, confidential, and nonjudgmental health education. Nursing administration: Establish standardized teaching modules, quality checks, and referral pathways to vaccination services. Nursing research: Validate culturally adapted knowledge tools, compare teaching modalities, and evaluate long-term behavioural outcomes rather than knowledge alone.

Limitations

The study involved a single school and 60 participants; there was no comparison group or long-term follow-up. Questionnaire psychometrics, knowledge cut-offs, participant characteristics, intervention dosage, and full paired statistical outputs were not available in the supplied manuscript. The results are therefore best interpreted as an association between programme participation and short-term knowledge improvement, rather than definitive proof of a causal effect.

Conclusion

The school-based educational programme was followed by a substantial increase in knowledge regarding HPV vaccination and cervical cancer among adolescent girls. Mean scores rose from 12.17 ± 5.80 to 23.73 ± 6.37 , and the proportion categorized as having adequate knowledge rose from 5.0% to 75.0%. School-based nursing education appears promising for strengthening adolescent awareness, but rigorous controlled research is required to establish effectiveness, persistence of learning, and impact on vaccination decisions.

Declarations

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