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Impact of cervical cancer education on knowledge, attitudes and preventive practices among adolescent girls in secondary schools: a scoping review

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Background: Cervical cancer remains one of the most preventable yet deadliest cancers affecting women in Africa. Despite global advances in prevention through human papillomavirus (HPV) vaccination, screening, and early treatment, Sub-Saharan Africa continues to experience disproportionately high incidence and mortality rates because of limited health infrastructure, inadequate awareness, and delayed diagnosis. Given that adolescence represents a critical window for establishing lifelong health behaviors, school-based cervical cancer education may provide an effective platform for improving knowledge and promoting preventive practices in line with the World Health Organization's (WHO) cervical cancer elimination strategy.

Methods: This review was conducted in accordance with the Joanna Briggs Institute (JBI) methodology for scoping reviews and reported following the PRISMA-ScR guidelines. A comprehensive search of PubMed, Scopus, Web of Science, CINAHL, African Journals Online (AJOL), the Cochrane Library, and Google Scholar was undertaken for studies published up to 2026. A total of 1,700 records were identified and screened, resulting in the inclusion of 20 eligible studies. Data were extracted, charted, and synthesized using a narrative approach.

Results: Evidence suggests that baseline knowledge of cervical cancer and HPV among adolescent girls in African secondary schools remains generally low to moderate. A consistent knowledge-attitude gap was identified, whereby positive attitudes toward prevention frequently coexisted with limited factual understanding of cervical cancer risk factors, screening, and HPV vaccination. Educational interventions, including peer-led programmes, classroom-based teaching, health campaigns, and multimodal educational strategies, consistently produced significant improvements in knowledge and awareness. However, improvements were less pronounced for more complex concepts, including disease curability, recommended screening intervals, and vaccine mechanisms. Furthermore, an intention-behavior gap was observed, as high levels of vaccine

acceptance rarely translated into actual uptake because of parental, sociocultural, and health system barriers. Geographical analysis revealed a substantial concentration of studies in a limited number of Anglophone countries, particularly Nigeria, Ghana, Ethiopia, Kenya, and Uganda, highlighting important gaps in evidence across many African settings.

Conclusion: School-based cervical cancer education represents a feasible and scalable strategy for improving cervical cancer literacy among African adolescents. However, achieving the WHO's cervical cancer elimination targets will require a shift from isolated educational sessions toward sustainable, curriculum-integrated, multilevel interventions involving schools, families, healthcare providers, and policymakers. Future research should prioritize the evaluation of long-term behavioral outcomes, particularly HPV vaccine uptake and participation in cervical cancer screening programmes.

KEYWORDS

adolescent girls, attitudes, cervical cancer, health education, human papillomavirus, knowledge, preventive practices, secondary school

1 Introduction

Cervical cancer remains one of the most significant yet preventable threats to women's health in Africa. In 2022, the continent recorded an estimated 125,699 new cases and 80,614 deaths, with Nigeria accounting for the highest absolute number of both cases and deaths (1). This burden is expected to increase substantially over the coming decades. Projections indicate that by 2050, 43 African countries, representing almost 80% of the continent, will experience a 100% or greater increase in cervical cancer cases, while countries such as Equatorial Guinea, Tanzania, and Zambia may experience increases exceeding 200% in incidence and more than 210% in mortality (1). Equally concerning is the poor survival associated with the disease. A pooled analysis of 57 studies conducted across Sub-Saharan Africa reported an overall mortality rate of 32.06%, indicating that nearly one in three women diagnosed with cervical cancer dies from the disease (2). This high mortality rate is strongly associated with late-stage presentation, HIV infection, inadequate screening programmes, and limited access to comprehensive treatment services (2). Consequently, Sub-Saharan Africa continues to bear the highest cervical cancer burden globally, despite ongoing international efforts to reduce the disease through prevention and early detection strategies (3).

The persistence of this burden is particularly troubling because cervical cancer is one of the few cancers that can be effectively prevented through evidence-based public health interventions. Persistent infection with high-risk human papillomavirus (HPV) types is the primary cause of cervical cancer, making the disease largely preventable through HPV vaccination, routine screening, early diagnosis, and timely treatment of precancerous lesions (4). Recognising this opportunity, the World Health Organization (WHO) launched the Global Strategy to Accelerate the Elimination of Cervical Cancer in 2020, establishing the ambitious "90-70-90" targets: 90% of girls fully vaccinated against HPV by 15 years of age, 70% of women screened using a high-performance test by 35 and again by 45 years of age, and 90% of women identified with cervical disease receiving appropriate treatment by 2030 (4). Unlike many disease-control initiatives that focus primarily on clinical interventions, the WHO strategy explicitly acknowledges the importance of education as a critical component of primary prevention. Specifically, the strategy identifies comprehensive sexual and reproductive health education and the promotion of protective health practices among children and adolescents as essential mechanisms for reducing future cervical cancer risk (4).

vaccination and screening remain the cornerstone of cervical cancer prevention, these interventions cannot achieve their intended impact without adequate knowledge, favourable attitudes, and informed health-seeking behaviours. This challenge is particularly evident in many African countries, where health systems are often constrained by limited resources, inadequate healthcare infrastructure, insufficient healthcare personnel, and inconsistent implementation of national vaccination and screening programmes. In such settings, health educational interventions become even more important because they empower individuals to make informed decisions regarding preventive healthcare. Health education has consistently been recognised as an effective strategy for improving health literacy, increasing risk awareness, correcting misconceptions, and encouraging positive behavioural change. Therefore, strengthening cervical cancer education among adolescents may represent one of the most practical and sustainable approaches for improving future participation in preventive services.

Adolescent girls enrolled in secondary schools occupy a particularly strategic position within this prevention framework. Adolescence represents a critical developmental period during which health beliefs, social norms, and future health behaviours are established. It is also the period during which HPV vaccination is most effective, as vaccination before exposure to HPV provides the greatest level of protection. Secondary schools offer an ideal environment for delivering health education because they provide structured, organised settings that can reach large numbers of adolescents through existing educational systems. School-based interventions also create opportunities for repeated exposure to health information, peer learning, and curriculum integration, all of

which can strengthen knowledge acquisition and support long-term behavioural change.

Despite the strategic importance of this population, evidence from across Africa suggests that adolescent girls continue to have limited knowledge of cervical cancer and its prevention. In Kenya, women with only primary or secondary education were significantly less likely to have ever heard of cervical cancer, a finding attributed partly to the lack of deliberate educational initiatives targeting school-aged girls (5). Similarly, a cross-sectional study among female secondary school students in Enugu State, Nigeria, reported that fewer than half of participants demonstrated good knowledge (42.7%) or favourable attitudes (48.5%) toward cervical cancer (6).Similarly, a cross-sectional study among female secondary school students in Enugu State, Nigeria, reported that only 42.7% of participants demonstrated good knowledge and 48.5% demonstrated favourable attitudes toward cervical cancer (6). Another study conducted among female secondary school students in the Enugu North educational district reported substantial gaps in knowledge of cervical cancer risk factors, early symptoms, and preventive measures, together with unfavourable attitudes and low levels of reported preventive practices. These findings led the authors to recommend the integration of cervical cancer education into the secondary school curriculum (7). Likewise, research conducted among adolescent girls in Northern Uganda revealed that peers and friends were the primary source of cervical cancer information (8), raising concerns about the accuracy and reliability of the information being disseminated through informal social networks.

Furthermore, a growing body of evidence suggests that these knowledge deficits are responsive to structured educational interventions. A school-based educational intervention conducted in Ghana significantly improved adolescents' understanding of cervical cancer, particularly regarding disease curability, the association between early sexual debut and cervical cancer risk, and the appropriate age for cervical cancer screening (9). Similarly, a quasi-experimental study conducted in Embu County, Kenya, demonstrated that structured health education significantly improved adolescents' knowledge, attitudes, and beliefs regarding cervical cancer prevention (5). Comparable findings have been reported in studies from Ghana, Tanzania, Ethiopia, Uganda, and Malaysia, with interventions ranging from peer education and classroom lectures to health campaigns and multi-day educational programmes (8). These findings suggest that school-based education may provide an effective and scalable approach for improving cervical cancer-related knowledge, attitudes, and preventive practices among adolescent girls.

Despite an expanding evidence base, the literature on cervical cancer education among adolescent girls in African secondary schools remains fragmented because studies have been conducted in relatively few African countries and differ substantially in study designs, educational approaches, intervention duration, outcome measures, and the domains of knowledge, attitudes, and preventive practices assessed. In addition, some studies focus primarily on cervical cancer knowledge and awareness, whereas others examine HPV vaccination, attitudes, or preventive practices, making direct comparison across studies difficult. The evidence is also geographically concentrated, particularly in countries such as Nigeria, Ghana, Ethiopia, Kenya, and Uganda, with comparatively limited evidence from other African regions. Existing studies vary considerably in their educational approaches, outcome measures, intervention duration and evaluation methods, making it difficult to draw broader conclusions regarding the most effective strategies for improving adolescent cervical cancer literacy. To date, there has been no comprehensive synthesis specifically examining the impact of cervical cancer education on knowledge, attitudes, and preventive practices among adolescent girls in secondary schools.

Therefore, this scoping review aimed to systematically map and synthesise the available evidence on the impact of cervical cancer education on knowledge, attitudes, and preventive practices among adolescent girls in secondary schools.

1.1 Rationale for scoping review

Although several primary studies have examined cervical cancer education among secondary school students in different African countries, the available evidence is dispersed across a limited number of countries and varies considerably in study design, educational approach, intervention duration, and outcome measurement. Some studies focus mainly on knowledge and awareness, whereas others assess attitudes, HPV vaccination, or preventive practices. This variation, together with the limited geographical coverage of the available studies, makes it difficult to compare findings across settings and to determine the consistency of reported outcomes. Therefore, a comprehensive mapping of the available evidence is needed to describe the range of educational approaches, outcomes assessed, and geographical distribution of research across Africa. Existing studies differ widely in geographic scope (national versus sub-national), study design (cross-sectional surveys, quasi-experimental pre-post designs, randomized interventions), educational modality (single lectures, multi-session curricula, peer education, audiovisual or digital tools), outcome measures (knowledge scores, attitude scales, self-reported or observed preventive practices such as screening or vaccination uptake intention), and the specific KAP domains emphasized. No single study or systematic review has yet mapped the full breadth of this evidence across the African continent, and it remains unclear how consistently these interventions are designed, delivered, measured, and reported, or where substantive gaps in geographic coverage, intervention type, and outcome measurement persist.

A scoping review is therefore particularly well suited to this stage of the evidence base. Rather than restricting inclusion to a narrow set of designs to answer a single effectiveness question, a scoping review allows for systematic mapping of the volume, nature, and characteristics of available research; identification of the range of educational strategies used and outcomes measured; and clarification of key concepts and terminology used inconsistently across studies. This approach can surface where evidence is concentrated (and where it is absent), highlight methodological patterns and limitations across the literature, and identify priority areas for future primary research and for policy and curriculum

development, including the case for integrating cervical cancer education into formal secondary school curricula, as several of the studies reviewed here have explicitly recommended (7).

1.2 Aim

This scoping review aims to systematically map and synthesize the available evidence on cervical cancer education among adolescent girls in secondary schools, with particular emphasis on its reported effects on knowledge, attitudes, and preventive practices.

1.3 Specific objectives

1. 1.Identify and describe the types, content, delivery modes, and characteristics of cervical cancer education interventions implemented among adolescent girls in secondary schools in Africa.
2. 2 Map the available evidence on knowledge, attitudes, and preventive practices related to cervical cancer, human papillomavirus (HPV), HPV vaccination, and cervical cancer screening among adolescent girls in secondary schools.
3. Describe the reported outcomes of cervical cancer education interventions, particularly changes in knowledge, attitudes, preventive practices, and preventive intentions among adolescent girls.
4. Examine the geographical and methodological distribution of the available evidence across African countries and identify gaps and limitations in the existing literature.
5. Identify gaps in the evidence base to inform future research, school-based health education programmes, and cervical cancer prevention strategies for adolescent girls

1.4 Review question

What is the nature and extent of evidence on cervical cancer education interventions and their effects on knowledge, attitudes, and preventive practices among adolescent girls in African secondary schools?

2 Materials and methods

2.1 Study design, methodological framework and reporting

This study was conducted as a scoping review to systematically map and describe the available evidence on cervical cancer education among adolescent girls in secondary schools in Africa, with particular attention to knowledge, attitudes, and preventive practices. The review was conducted in accordance with the methodological framework originally proposed by Arksey and O'Malley and subsequently refined by Levac et al. The methodology was further informed by the Joanna Briggs Institute (JBI) guidance for conducting scoping reviews. Reporting was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist.

The review protocol was developed before commencement of the review and registered with the Open Science Framework (OSF).

2.2 Eligibility criteria

Eligibility criteria were developed using the Population, Concept and Context (PCC) framework recommended for scoping reviews.

Population: The primary population of interest was adolescent girls approximately 10–19 years of age enrolled in secondary or high schools in African countries. Studies conducted in mixed-gender schools were eligible when findings for female students were reported separately or could be disaggregated by sex. Relevant evidence syntheses focusing on adolescent populations in Africa were also considered when their findings addressed the review question.

Concept: The concept of interest was cervical cancer education, including educational interventions, programmes, curricula, awareness activities, and other educational approaches addressing cervical cancer or HPV-related prevention. Evidence assessing knowledge, attitudes, perceptions, preventive practices, HPV vaccination, or cervical cancer screening was also considered.

Context: The primary context was secondary or high school settings and school-linked or school-based programmes in African countries. Evidence syntheses addressing adolescent cervical cancer or HPV education and prevention across multiple African countries were also considered where relevant to the review question.

2.3 Inclusion and exclusion criteria

Sources were included if they provided evidence relevant to cervical cancer or HPV education, knowledge, attitudes, preventive practices, vaccination, or screening among adolescents, with particular emphasis on school-based evidence from Africa. Eligible sources included quantitative, qualitative, mixed-methods, experimental, quasi-experimental, systematic review, and scoping review studies.

Primary studies were included when they involved adolescent students in school or school-linked settings and reported findings relevant to at least one of the review outcomes. Evidence syntheses were included where they addressed adolescent cervical cancer or HPV education, communication, knowledge, attitudes, vaccination, screening, or preventive practices and contained evidence relevant to the review question.

Where an evidence synthesis included studies from multiple geographical regions rather than Africa alone, it was retained when its findings provided relevant evidence on school-based cervical cancer or HPV education among adolescents that could inform interpretation of the African evidence base. Such evidence syntheses were treated as contextual or supplementary evidence and were not considered equivalent to primary African studies.

Sources were excluded when they focused exclusively on adult women, healthcare providers, or populations outside the scope of the review; were editorials, commentaries, conference abstracts

without accessible full texts, or protocols without reported findings; or did not address cervical cancer, HPV, or related preventive education.

Because the review sought to map the breadth of available evidence, relevant evidence syntheses were retained as supplementary sources rather than treated as equivalent to primary intervention or observational studies.

2.4 Information sources

A comprehensive literature search was conducted in PubMed/MEDLINE, Scopus, Web of Science, CINAHL, African Journals Online (AJOL), and the Cochrane Library. Google Scholar was also searched to identify relevant grey literature, with the first 200 results screened for relevance.

In addition, the reference lists of included studies and relevant systematic and scoping reviews identified during the search were examined through backward citation tracking to identify additional potentially eligible studies.

2.4.1 Search strategy

The search strategy followed the three-step approach recommended by the JBI. First, an initial limited search was conducted in PubMed and Scopus to identify relevant keywords, terms appearing in titles and abstracts, and database-specific indexing terms. Second, the identified keywords and index terms were used to conduct a comprehensive search across all selected databases. Third, reference lists of included studies and relevant reviews were manually searched to identify additional studies.

The search strategy was structured around five concept areas, which were combined using the Boolean operator AND, while synonyms within each concept were combined using OR. The concepts addressed:

1. Cervical cancer and HPV;
2. Education and educational interventions;
3. Knowledge, attitudes, and preventive practices;
4. Adolescents and school populations; and
5. Africa and individual African countries.

The core search strategy was structured as follows:

("cervical cancer" OR "cervical neoplasm*" OR "HPV" OR "human papillomavirus") AND ("education*" OR "intervention*" OR "awareness" OR "health literacy" OR "program*") AND ("knowledge" OR "attitude*" OR "practice*" OR "belief*" OR "perception*") AND ("adolescent*" OR "teenage*" OR "young women" OR "girl*" OR "secondary school*" OR "high school*" OR "student*") AND ("Africa" OR "sub-Saharan" OR individual country names, including "Nigeria," "Kenya," "Ghana," and "Uganda").

The search strategy was adapted to the syntax and controlled vocabulary of each database, including Medical Subject Headings (MeSH) and CINAHL subject headings where applicable. Searches were restricted to publications from 2015 to 2026 and to studies published in English. The complete database-specific search strategies are provided in Supplementary Table 1.

2.4.2 Study selection

All records identified through the electronic database searches and supplementary searching were exported to a reference management programme for removal of duplicate records. The deduplicated records were subsequently uploaded to a systematic review screening platform.

Two reviewers independently screened titles and abstracts against the predefined eligibility criteria. Potentially relevant records were then assessed independently at the full-text stage. Disagreements were resolved through discussion and consensus, with a third reviewer consulted where necessary.

During full-text assessment, sources were categorized according to their methodological design and relevance to the review question. Primary studies and relevant evidence syntheses were retained where they met the predefined Population, Concept and Context criteria. Evidence syntheses were not treated as equivalent to primary studies during interpretation of the findings.

The study selection process, including records identified, screened, excluded, assessed for eligibility, and included, is presented in the PRISMA-ScR flow diagram in Figure 1.

2.4.3 Data charting process

A standardized and pilot-tested data charting form was developed to ensure consistency in the extraction of relevant information from the included studies. Two reviewers independently piloted the charting form using five included studies before applying it to the remaining studies.

Consistent with the iterative nature of scoping reviews, the charting form was refined when necessary as the reviewers became more familiar with the evidence. Any modifications to the charting form were documented, and relevant previously charted studies were reviewed to ensure consistency following the modifications.

2.4.4 Data items

The following information was charted from each included study:

- author(s) and year of publication;
- country and geographical region;
- study design;
- sample size and sampling approach;
- participants' age range;
- school type and grade level;
- description of the educational intervention, where applicable;
- educational content;
- intervention format and delivery mode;
- duration and provider of the intervention;
- knowledge, attitude, and preventive-practice outcomes assessed;
- instruments or scales used for outcome measurement;
- major findings relevant to the review question;
- reported study limitations; and
- identified evidence gaps.

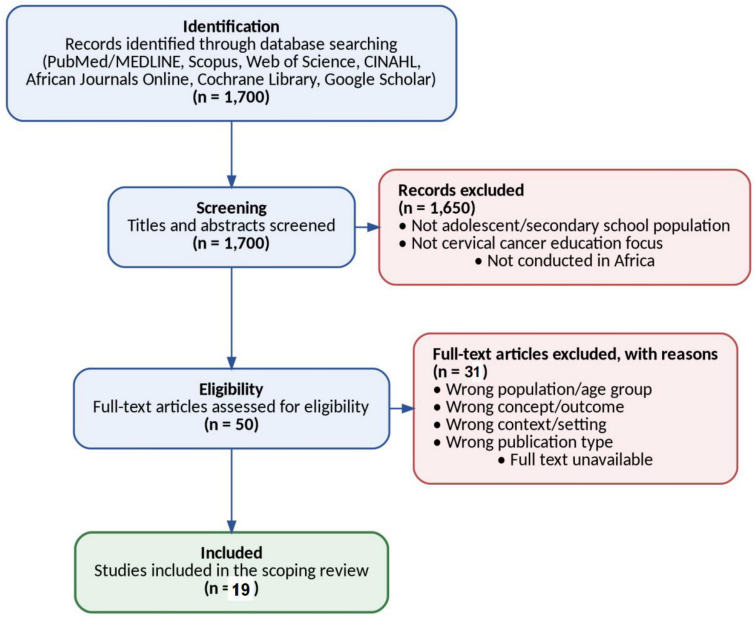


FIGURE 1
PRISMA-ScR flow diagram of the study selection process. Of 1,700 records retrieved, 1,650 were excluded at title/abstract screening, leaving 50 full-text articles assessed for eligibility; 31 were subsequently excluded, resulting in 19 studies included in the review.

2.5 Synthesis of results

Due to the nature of this work as a scoping review, no formal meta-analysis or inferential statistical evaluations were conducted. The objective of the analysis was to chart and elucidate the traits and spread of the available data rather than to assess a consolidated effect size.

The findings from the research covered were summarized descriptively. Frequencies and proportions were utilized, when applicable, to delineate study features, including study design, nation or location, population, kind of educational intervention, delivery method, and outcome domains. The findings on knowledge, attitudes, preventive activities, and intentions were narratively compiled and arranged in accordance with the objectives of the review.

To find patterns, similarities, differences, geographic concentrations, and gaps in the available data, the results were presented in narrative form and summary tables. Statistical pooling of effect estimates was deemed inappropriate due to significant variation in study designs, intervention strategies, outcome measurements, and reporting techniques. Rather than estimating a pooled effect size, the analysis's goal was to map and characterize the features and distribution of the available evidence.

3 Results

A total of 1,700 records were identified through database searching and supplementary sources (grey literature and hand-searching of reference lists). Following title and abstract screening, 1,650 records were excluded as ineligible, leaving 50 full-text articles assessed for eligibility. Of these, 31 were excluded, with reasons detailed in Figure 1, resulting in a final total of 19 studies that met all eligibility criteria and were included in this scoping review. The full study selection process is summarized in the PRISMA-ScR flow diagram presented in Figure 1.

A total of 19 sources were included in the scoping review. These comprised 17 primary research studies and 3 evidence syntheses. The primary studies included 10 cross-sectional studies, 1 mixed-methods study, 5 experimental or quasi-experimental intervention studies and 3 evidence syntheses.

The three evidence syntheses comprised systematic or scoping reviews addressing adolescent cervical cancer and HPV-related knowledge, vaccination, communication strategies, and school-based educational interventions. Two of the evidence syntheses focused on African or sub-Saharan African populations, while one examined school-based HPV educational interventions across broader geographical settings. The latter was retained as contextual evidence because its findings were directly relevant to the review question concerning school-based cervical cancer and HPV education among adolescents.

The primary evidence was concentrated in a limited number of African countries, particularly Nigeria, Ghana, Ethiopia, Uganda, +and Kenya, with additional evidence from Zambia, South Africa, and Mozambique. The included sources examined both existing levels of knowledge, attitudes, and preventive practices and reported outcomes following educational interventions.

Table 1 presents the characteristics of the 19 included sources, including study design, country or geographical coverage, population, intervention or focus, and reported knowledge, attitude, and preventive-practice outcomes.

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TABLE 1 Characteristics and key findings of the 20 studies included in the scoping review.

Author(s) & year	Country	Study design	Population	Intervention/focus	Key findings (KAP outcomes)
Bardaji et al. (10)	Mozambique	Cross-sectional survey	1,147 adolescent girls	Assessment only; awareness and vaccine acceptance	84% had heard of CC; only 33% had heard of HPV; 91% would accept vaccination
Ampofo et al. (11)	Ghana	Cross-sectional survey	2,400 female SHS students	Assessment only; knowledge + social/systemic correlates	Knowledge gaps in >65% of students; school-based sex ed outperformed home-based
Mburu et al. (12)	Kenya	Cross-sectional comparative	60 vaccinated + 120 unvaccinated adolescents	Assessment only; vaccinated vs. unvaccinated comparison	93.3% of vaccinated vs. 5% unvaccinated knew of HPV vaccine; school = main info source
Addisu et al. (13)	Ethiopia	Systematic review & meta-analysis (10 studies)	Adolescent schoolgirls	Synthesis of knowledge/attitude/uptake studies	Pooled: 55.12% good knowledge, 45.34% positive attitude, 42.05% uptake
Amorha et al. (6)	Nigeria	Cross-sectional survey	103 all-girls school students	Assessment only; existing KAP levels measured	42.7% good knowledge; 48.5% favourable attitude; 84.5% good practices
Sadoh et al. (14)	Nigeria	Intervention (pre-post)	1,337 students, 4 secondary schools	Peer-delivered lecture using information fliers	Knowledge score rose from 12.94 to 53.74 post-training ($p < .0001$)
Oringtho et al. (8)	Uganda (Northern)	Cross-sectional survey	624 secondary school girls	Assessment only; information-source mapping	97% had heard of CC; only 15% recognized early sexual debut as a risk factor
Ifediora & Azuike (15)	Nigeria	Cross-sectional/RCT-linked survey	432 female SSS students	Assessment only; awareness and attitudes	42.7% had heard of CC; general HPV/Pap knowledge poor (~41-43%)
Nsaful et al. (16)	Ghana	Cross-sectional survey	9,767 students, 14 schools	Assessment only; knowledge across 4 domains	58.4% adequate general knowledge; females outperformed males
Dedey et al. (9)	Ghana	Quasi-experimental (pre-post)	2,383 high school girls	In-person classroom health talk on cervical cancer/HPV	Knowledge rose from 79.1% to 92.3%; only 46.2% grasped curability post-education
John-Akinola et al. (17)	Nigeria (Ibadan)	Quasi-experimental (pre-post)	544 female secondary students	Face-to-face education on HPV vaccination	Awareness rose from 35.2% to 94% ($p < .001$)
Kivuti-Bitok et al. (5)	Kenya (Embu County)	Quasi-experimental (single-group, pre-post)	Mixed-day high school adolescents	Structured health education session	Knowledge rose from 105.23 to 131.8 (Cohen's $d = 0.58$); 48% found lecture complex
Mbulawa et al. (18)	South Africa	Quasi-experimental (pre-post)	2,652 learners (both sexes)	Structured lecture on HPV	Pre-intervention awareness only 4.08%; significant gains post-education ($p < .001$)
Lubeya et al. (19)	Zambia	Qualitative (semi-structured interviews)	30 adolescent girls	No intervention; knowledge/perception exploration	Variable knowledge; positive attitudes; barriers = consent, side-effect fears, myths
Bitariho et al. (20)	Uganda (Kampala)	Mixed-methods, school-based	524 adolescent girls (10–14 yrs)	Assessment only; knowledge/perceptions/uptake	51.9% held negative perceptions toward HPV vaccination; rural girls less knowledgeable
Flood et al. (21)*	Not Africa-specific	Systematic review (15 RCTs/QEDs)	Adolescents 15–17 yrs	Synthesis of school-based HPV educational interventions	All 15 studies improved ≥1 outcome; only 3 measured vaccination uptake directly
Yohannes et al. (22)	Ethiopia (Ambo)	Cross-sectional survey	422 adolescent girls	Assessment only; knowledge and attitude	24.9% good knowledge; 55.6% favourable attitude (knowledge-attitude gap)
Oketch et al. (23)	Sub-Saharan Africa (multi-country)	Systematic review & meta-analysis	Adolescents (region-wide)	Synthesis of communication strategies for HPV uptake	Decision-facilitating strategies achieved up to 100% uptake; multi-stakeholder targeting most effective
Amzat et al. (24)	Sub-Saharan Africa (multi-country)	Systematic scoping review	Adolescents (region-wide)	HPV knowledge, screening, vaccination acceptability	School-based HPV interventions improved knowledge and acceptability, but evidence on vaccination impact is limited

3.1 Characteristics of included studies

Table 1 summarizes the key characteristics of the 19 included studies, including author(s) and year of publication, country of study, study design, sample size, population and setting, and the knowledge, attitude, and/or preventive practice (KAP) domain (s) assessed.

3.2 Types of educational interventions

The main educational types are didactic formats such as lectures, presentations, seminars, and structured discussions. Interactive formats include case-based or small-group discussion and role play. Practice-based formats include simulation, mentoring, reflective exercises, and practical teaching sessions. Peer education is a distinct school-based type in which students lead education for other students. Video-based interventions were grouped into animated presentations, professionals in practice, and patient narratives. Digital intervention types included apps, websites, games, virtual reality, mobile text messaging, online modules, and virtual simulation.

3.3 Evidence coverage across topic

Table 2 summarizes the number of included studies reporting data across five intervention categories (school/lecture/multimodal education, peer or near-peer education, parent/teacher engagement, vaccine implementation programmes, and screening-related education) and five outcome domains (intervention data, knowledge effect, attitude effect, practice/uptake, and long-term follow-up). Notable gaps emerge in long-term follow-up data for peer/near-peer education and screening-related education, both marked as evidence gaps in the charted literature.

3.4 Outcome domains and measurement approaches: knowledge, attitudes and preventive practices

Baseline knowledge of cervical cancer and HPV was consistently low-to-moderate across the cross-sectional studies. Ampofo et al. (11) found knowledge gaps in more than two-thirds of Ghanaian students; Amorha et al. (6) found only 42.7% of Nigerian students demonstrated good knowledge; Yohannes et al. (22) found only 24.9% good knowledge among Ethiopian adolescents; and the pooled estimate across ten Ethiopian studies (13) put good knowledge at 55.12%. Where measured, attitudes were often more favourable than knowledge scores would predict; for example, Yohannes et al. (22) found 55.6% favourable attitudes alongside only 24.9% good knowledge, and Lubeya et al. (19) documented broadly positive attitudes toward the HPV vaccine among Zambian adolescent girls despite variable underlying knowledge. This knowledge-attitude gap recurs across multiple studies and suggests that a positive disposition toward prevention does not by itself guarantee accurate understanding of risk factors, screening age, or vaccine mechanics.

Reported preventive practices and vaccine uptake were assessed less consistently than knowledge or attitudes, and where reported, a similar gap between intention and behaviour emerged. Mburu et al. (12) found that 63.7% of unvaccinated Kenyan adolescents expressed willingness to be vaccinated, and Bardaji et al. (10) found that 91% of Mozambican girls would accept vaccination if available, yet actual uptake in the Ethiopian pooled analysis was only 42.05% (13), and Bitariho et al. (20) found that 51.9% of girls in Kampala held negative perceptions toward vaccination, with rural residence associated with lower knowledge. Taken together, these findings suggest that stated willingness to accept prevention measures substantially outpaces documented uptake, a gap likely shaped by structural barriers (e.g., parental consent requirements, vaccine access, cost) rather than attitudes alone, as the qualitative findings of Lubeya et al. (19) illustrate directly.

3.5 Reported outcomes of school-based educational interventions

Every intervention study among the charted evidence reported a statistically significant improvement in at least one knowledge outcome, often a large one: Sadoh et al.'s (14) peer-education intervention in Nigeria raised knowledge scores from 12.94 to 53.74; Dedey et al. (9) raised overall knowledge from 79.1% to 92.3% following a classroom health talk in Ghana; John-Akinola et al. (17) raised HPV vaccination awareness from 35.2% to 94% in Ibadan; Kivuti-Bitok et al. (5) produced a moderate effect size (Cohen's d = 0.58) following a single structured session in Kenya; and Mbulawa et al. (18) documented significant gains in HPV knowledge among South African learners whose pre-intervention

TABLE 2 Evidence coverage across intervention categories and outcome domains among the 20 included studies.

Intervention category	Intervention data	Knowledge effect	Attitude effect	Practice/uptake	Long-term follow-up
School/lectures/multimodal education	5	4	6	3	1
Peer or near-peer education	2	2	1	1	Gap
Parent/teacher engagement	4	4	3	4	1
Vaccine implementation programs	5	3	3	8	2
Screening-related education	2	3	2	1	Gap

awareness was below 5%. This pattern, replicated across five countries and several intervention formats (peer-led, classroom lecture, structured single-session education), supports the conclusion that even brief, single-exposure school-based education can produce measurable and sometimes substantial gains in cervical cancer and HPV knowledge.

However, gains were not uniform across knowledge domains, and important gaps persisted even after intervention. Dedey et al. (9) found that only 46.2% of participants understood that cervical cancer is curable when detected early, and only 37.2% knew the recommended age to begin screening, even after their education programme, essentially unchanged from pre-intervention levels on these specific items despite large gains elsewhere. Similarly, Kivuti-Bitok et al. (5) found that 48% of participants still found the lecture content complicated. These findings suggest that single-session interventions may improve general awareness and simple factual recall more readily than they improve nuanced, action-relevant knowledge such as when and how to seek screening, precisely the knowledge most proximal to actual preventive behaviour.

3.6 The role of schools and multi-level communication strategies

Across several studies, schools emerged as the dominant or preferred source of cervical cancer and HPV information: Mburu et al. (12) found that both vaccinated and unvaccinated adolescent cohorts identified school as their main information source, while Oringtho et al. (8) found that although friends were the most commonly cited source, school health programmes were independently associated with greater knowledge of preventability. This reinforces the rationale for embedding cervical cancer education within formal school curricula rather than relying on informal peer transmission of information. At a broader level, Oketch et al.'s (23) sub-Saharan Africa-wide review found that decision-facilitating communication strategies (e.g., decision aids, motivational interviewing) achieved uptake rates as high as 100%, and that interventions targeting both healthcare workers and community or school stakeholders simultaneously outperformed single-audience approaches. This suggests that the single-session, single-audience model reflected in most of the charted primary studies may understate what is achievable with multi-level, multi-stakeholder designs.

3.7 Geographic and methodological gaps

The charted evidence is concentrated in a small number of predominantly Anglophone countries. Nigeria, Ghana, Ethiopia, Uganda, and Kenya account for 14 of the 20 studies, with only single studies from South Africa, Zambia, and Mozambique, and no studies identified from Francophone, Lusophone (beyond Mozambique), Central African, or North African countries. Given that Zhou et al. (1) project some of the steepest increases in cervical cancer burden in precisely these underrepresented regions, this concentration represents a substantial gap between where the evidence base is strongest and where future burden is projected to grow fastest.

4 Limitations

This review has several limitations. The search was restricted to English-language publications, which likely excluded relevant literature from Francophone and Lusophone African countries, a limitation that compounds the geographic concentration already noted in the charted evidence.

The majority of intervention studies used single-group pre-post designs without a concurrent control group, leaving reported knowledge gains vulnerable to alternative explanations such as testing effects or maturation, independent of the studies' own internal validity.

5 Conclusion

This scoping review mapped the available evidence on cervical cancer education among adolescent girls in secondary schools in Africa, with particular attention to knowledge, attitudes, and preventive practices. The included evidence indicates that knowledge of cervical cancer and HPV was generally limited or variable among adolescent girls, while attitudes and willingness to engage in preventive measures were more variable across settings. School-based educational interventions were associated with improvements in reported knowledge and awareness in the intervention studies identified. However, evidence relating to preventive practices, vaccination uptake, and longer-term outcomes was less consistently reported.

The evidence base was geographically concentrated in a limited number of African countries, particularly Nigeria, Ghana, Ethiopia, Uganda, and Kenya, with comparatively limited evidence from other African regions. Methodological variation across the included sources, together with limited follow-up and the frequent use of pre-post intervention designs, also constrained the ability to determine whether reported improvements were sustained over time.

Overall, the review identifies a growing but uneven evidence base on cervical cancer education among adolescent girls in African secondary schools. Further research is needed to address geographical and methodological gaps and to provide more consistent evidence on longer-term preventive practices, HPV vaccination, screening-related knowledge, and sustained outcomes following school-based cervical cancer education.

Author contributions

KJ: Conceptualization, Data curation, Formal analysis, Methodology, Resources, Writing – original draft. DE: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing. OA: Formal analysis, Writing – review & editing. AO: Data curation, Formal analysis, Writing – review & editing. TE: Data curation, Formal analysis, Writing – review &

editing. CR: Formal analysis, Project administration, Writing – review & editing.

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Supplementary material

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