

Systematic Review

Awareness and knowledge of human papillomavirus vaccine among young adults in Saudi Arabia: A systematic review

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ABSTRACT

Objectives: Human papillomavirus (HPV) is an infectious disease transmitted sexually. It is the direct cause of cervical cancer, and it incriminates in oropharyngeal, anal, and genital cancers. Vaccination is the main control measure to exclude infection. Awareness and knowledge regarding HPV in Saudi Arabia still need improvement. Vaccination acceptance suffers from some hesitancy. This systematic review aimed to assess awareness and knowledge of HPV and HPV vaccine among young adults (18–30 years) and evaluate obstacles that prevent vaccination.

Methods: According to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses principles, a systematic search strategy was constructed through PubMed, Science Direct, Google Scholar, Scopus, and Web of Science. The search involved studies published between January 2020 and June 2025. Cross-sectional and quantitative studies that evaluate HPV and HPV vaccine among young adults (18–30) in Saudi Arabia were included. After completion of data extraction, selected studies were qualified to determine the level of bias.

Results: Ten studies achieved the eligibility criteria; they showed a variable degree of awareness (43–59.6%) with sample sizes ranging from 114–580 respondents. A knowledge shortage regarding high-risk genotypes of HPV, modes of transmission, and vaccination was observed among medical students and the public. Barriers toward vaccination varied between lack of awareness, ignorance about the eligibility of the age of vaccination, and issues related to culture, with a noticeably higher degree of awareness among females than among males.

Conclusion: Enhancement of education programs is needed; future investigations should be directed to improve the educational campaigns to promote public awareness of HPV. The development of the medical curriculum is a necessity.

Keywords: Human papillomavirus-vaccine, Human papillomavirus, Saudi Arabia, Systematic review, Young adults

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INTRODUCTION

Background

Human papillomavirus (HPV) infects numerous body tissues, but the skin, lungs, vulva, pharynx, throat, tonsils, back of the tongue, cervix, anus, vagina, and penis are the most commonly affected.^[1] HPV is a major cause of head-and-neck cancer, particularly oral and oropharyngeal squamous cell carcinoma, and is one of the most frequent sexually transmitted infections.^[2] It also accounts for the incidence of cervical cancer, which is the fourth fatal malignancy among women globally.^[3] In Saudi Arabia, cervical cancer ranks 11th overall and 9th among women aged 15–44.^[4] The recent statistics indicate that 358 new cases and 179 deaths of cervical cancer occur annually in Saudi Arabia.^[5] HPV includes low-risk (LR-HPVs) and high-risk (HR-HPVs) genotypes, with the former producing cutaneous and anogenital warts and the latter causing penile, cervical, vulvar, vaginal, anogenital, and oropharyngeal cancers. HR-HPV strains 16 and 18 account for 70% of all cervical cancer cases worldwide.^[5,6] HPV vaccinations can help prevent health issues associated with HPV and reduce the occurrence of cervical and other anogenital cancers. The World Health Organization (WHO) has prequalified bivalent, quadrivalent, and nonavalent vaccines targeting various HPV strains.^[7] In 2009, the WHO recommended listing the HPV vaccine in the National Immunization Schedules.^[7] The HPV vaccine is typically given to females aged 11–26 years old in three doses within 6 months. It proved its effectiveness in preventing cervical cancer and other HPV prone clinical problems.^[4] The vaccine was reported to decrease HPV infections and cervical lesions in females and genital warts in both males and females.^[8] For effective protection from cervical cancer, regular cervical screening is also recommended to identify and treat any emerging lesions.^[9] In 2010, the vaccine was available in Saudi Arabia and freely accessible to females who were directed to take the vaccine through medical prescriptions; they could also pay for the vaccine and obtain it from central healthcare institutions.^[4] However, several researches indicated that knowledge and awareness of HPV and its vaccine uptake among Saudi citizens remained limited. For instance, a study revealed that only 17% of college students could identify the HR genotypes associated with cervical cancer.^[10] A study reported that HPV vaccine uptake remained below 10% (7.6%) although many Saudi women were aware of the HPV hazards.^[11] Moreover, only 5.2% of health college students had actually received the vaccine, despite 49.9% of them having heard about it.^[12] These results underscore a critical gap between the availability of the vaccine and its uptake in the Saudi population.

Justification

Despite the presence of multiple studies reporting poor levels of awareness regarding HPV and its vaccine among Saudi Arabian citizens,^[10,13,14] there is no systematic review of the published studies in this field focusing on the young Saudi adults. Previous studies are limited to specific regions or only address a narrow population, such as the students of health-related colleges, limiting their generalizability. Moreover, sociocultural stigma associated with discussions of sexual health in Saudi society may exacerbate gaps in HPV awareness and acceptance of vaccination,^[10] indicating the essential need for a better understanding of how these factors influence vaccine uptake. Therefore, a systematic review is necessary to collect and reinforce the available evidence, detect gaps, and provide insights for targeted interventions.

Objective

The objective of this systematic review is to evaluate the level of awareness and understanding about HPV and its vaccination, identify sociodemographic and cultural factors that influence knowledge and attitudes, and highlight potential barriers and facilitators to vaccination. This systematic review aims to inform public health policies, support evidence-based policymaking, and guide education and communication efforts to reduce the burden of HPV-related illnesses in Saudi Arabia.

Research questions

This systematic review aims to answer the following research questions:

1. What is the level of awareness of HPV infection and its vaccine among young adults in Saudi Arabia?
2. What are the prospective factors that hinder and facilitate vaccination uptake?

MATERIALS & METHODS

This systematic review was conducted and reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines.^[15] The review protocol was not pre-registered in a public database.

Eligibility criteria

The eligibility criteria were established using the Population, Intervention, Comparator, and Outcome (PICO) framework to assist the selection of studies.^[16]

- Population (P): Young adults aged 18–30 years (both males and females) residing in Saudi Arabia.
- Intervention (I): The field of interest was the awareness,

knowledge, attitudes, or barriers related to the HPV and/or HPV vaccine.

- Comparator (C): No specific comparator was required for inclusion.
- Outcomes (O): The principal outcomes were the levels of awareness and knowledge, and the identified barriers to HPV vaccination.

Inclusion criteria

- Study design: Quantitative and cross-sectional studies that were based on survey data collection.
- Publication language: Studies published in English only.
- Publication time: Studies were published within the past 5 years (from January 2020 up to June 2025).

Exclusion criteria

- Publication type: Review articles, qualitative studies, case reports, commentaries, editorials, theses, dissertations, and any other forms of grey literature. This decision was made to ensure that all studies had undergone a rigorous and formal peer-review process.
- Population: Studies focused on populations outside the age range of 18–30 years or used undefined demographic data.
- Full text unavailability: Studies could not be accessed as full text.

Search strategy

A systematic literature search was conducted in several electronic databases, including PubMed, Scopus, Web of Science, Science Direct, and Google Scholar. The search was restricted to studies published between January 2020 and September 2025 and was limited to articles in the English language.

The search strategy was developed by combining relevant keywords (e.g., “HPV,” “vaccine,” “awareness”) and Medical Subject Headings (MeSH terms), where applicable. The following primary search string was constructed and then adapted for the syntax of each database.

(HPV OR “Human Papillomavirus”) AND (vaccine OR vaccination) AND (knowledge OR awareness OR perception OR attitude OR barriers) AND (“young adults” OR students) AND “Saudi Arabia”

Studies selection

All obtained records were imported into Zotero reference management software, and duplicates were removed with final confirmation by manual process. Subsequently, the two authors screened the selected paper independently. Study selection based on two stages; the first is screening of title and

abstract, while the second is examination of full text according to inclusion criteria. Any disagreements between the authors’ extracted data were resolved through discussion and consensus.

Data extraction

The process of data extraction was conducted separately by the two authors using a pre-designed data extraction sheet developed in Microsoft Excel. The extracted information was collected using a standardized form that focused on study characteristics (author’s name, setting, study duration, and publication year), population features (age of participants and sample size), and key outcomes (level of awareness and identified issues against vaccination).

Quality assessment

Quality assessment was determined using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Analytical Cross-Sectional Studies.^[17] The risk of bias in the included studies was assessed using the checklist, from which each study was assigned a quality score. Studies were then categorized as follows: high risk of bias (low quality) if they scored less than 50%; moderate risk of bias (moderate quality) if they scored between 50% and 69%; and low risk of bias (high quality) if they scored 70% or higher. The assessment was developed by two authors independently, and the discussion resolved any confusion.

Data synthesis

The considerable heterogeneity in study methodologies and outcomes made a meta-analysis not feasible. A narrative synthesis was performed to summarize the outcomes. The results were categorized into thematic groups, involving levels of awareness and knowledge of HPV and barriers to vaccination, to evaluate major similarities throughout the studies.

RESULTS

Study selection

The literature search initially identified 151 records. After the removal of duplicates, 123 records were screened based on their titles and abstracts, leading to the exclusion of 103 records. The full texts of the remaining 20 articles were assessed for eligibility. Of these, 10 articles were excluded. The primary reasons for exclusion at this stage were that the study’s data were not reported for the required age group ($n = 7$) or that the outcome of interest (awareness and knowledge) was not measured ($n = 3$). Ultimately, 10 studies were included in the final qualitative synthesis. The complete study selection process is detailed in the PRISMA 2020 flow diagram [Figure 1].

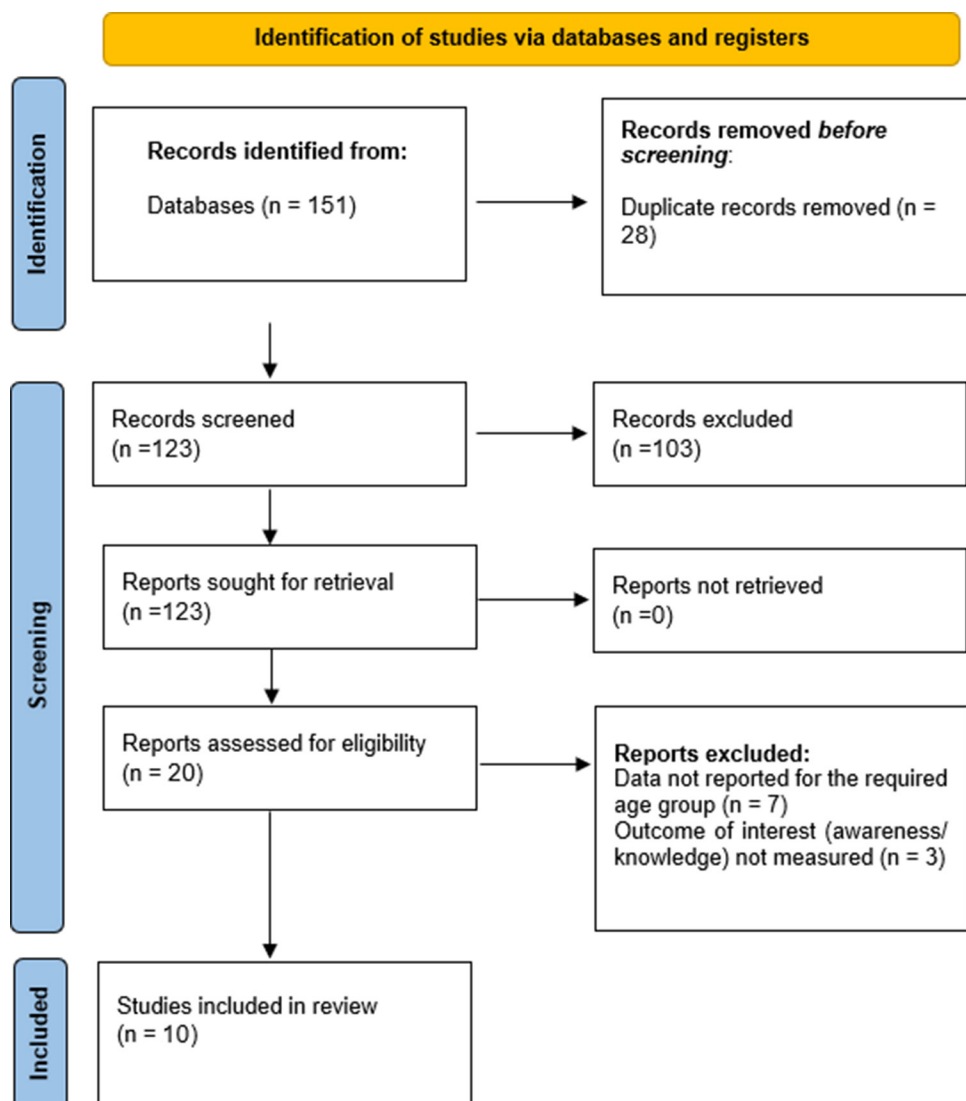


Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow chart showing the selection process of included studies in the systematic review.

Characteristics of included studies

A total of 10 cross-sectional studies published between 2022 and 2025 were included in this review. The characteristics of each study, including sample size, population type, and setting, are summarized in Table 1. Studies were included in this review, representing a cumulative sample size of 3540 participants. The sample sizes of the individual studies ranged from 114^[18] to 580.^[19] The study populations varied, including both university students (e.g., Alsahani *et al.*^[20]) and the public (e.g., Samannodi *et al.*^[14]). Data collection was primarily conducted through online surveys. The methodological quality of the included studies was generally high. Based on the JBI critical appraisal checklist, nine studies were assessed as having a low risk of bias, while one

study (Alghalyini *et al.*^[10]) was assessed as having a moderate risk of bias.

Synthesis of findings

The findings from the ten studies were synthesized and grouped into two main themes: (1) Awareness and knowledge levels, and (2) barriers to vaccination. Awareness and knowledge levels reported in the studies were categorized as: high (>70%), moderate (50–69%), or low (<50%).

Awareness and knowledge of HPV and HPV vaccine

Across the included studies, the overall level of awareness regarding HPV and its vaccine among young adults in

Table 1: The variability among studies regarding the awareness of HPV and HPV vaccine in Saudi Arabia.

Study	Sample size	Setting	Population feature	Study duration	Outcomes
Alsahani <i>et al.</i> ^[20]	451	28 public and private dental schools.	Undergraduate dental students and interns	2022–2023	High awareness of the link to genital warts (85%). High awareness that HPV is unrelated to AIDS (81%). Moderate awareness of link to oral cancer (62%). Moderate overall awareness of the vaccine (54%).
Alsharif and Alsahafi ^[21]	257	6 governmental and private dental schools located in the western region of SA	Undergraduate dental students and interns	January–August 2023	Overall awareness score: 53.4±29.3 (out of 100). Significant knowledge gap regarding common sites of HPV-related oropharyngeal cancer (53% unaware). Poor knowledge of the appropriate age for HPV vaccination (63.8% unaware).
Samannodi <i>et al.</i> ^[14]	467	The west region was the most represented	Public	May–June 2023	55.2% were uncertain about sexual contact being the main cause of transmission. 57.4% did not know if the vaccine was available in Saudi Arabia. 53.8% were unaware of the recommended age for vaccination. Factors associated with higher knowledge: <ul style="list-style-type: none"> • Participants in the 18–29 age group. • Those are working in the medical field. • Participants lived in the Eastern region.
Tobaiqi <i>et al.</i> ^[22]	403	Madinah region	Public (Female)	July–September 2024	The study found a significant knowledge gap, as the majority of participants (75.7%) had a poor overall knowledge and awareness score. Only 59.4% of participants had heard about HPV before the study. Knowledge of specifics was low, as only: <ul style="list-style-type: none"> 37% knew HPV is sexually transmitted, and 37.4% knew it causes cervical cancer. Regarding the vaccine, only 18% of participants were aware of the correct vaccination schedule. The actual vaccination rate was very low, with only 3.1% of participants having received the vaccine. Despite low knowledge, most of participants (63.9%) expressed willingness to receive the vaccine.

(Contd...)

Table 1: (Continued).

Study	Sample size	Setting	Population feature	Study duration	Outcomes
Muzaheed ^[23]	169	Applied medical Sciences at Imam Abdurrahman Bin Faisal University, Dammam	College Students (female)	September–November 2022	Moderate knowledge about HPV reported (52%). Moderate interest in receiving HPV vaccine (52%). Very low vaccination uptake reported (10%) A positive association was found between older age and higher knowledge scores. Participants with a family member in healthcare were more likely to know that HPV affects both genders.
Alghalyini <i>et al.</i> ^[10]	392	Riyadh	College students	May–September 2023	Moderate awareness of cervical cancer (66.5%) and HPV (54.1%). Very low knowledge of high-risk HPV types (e.g., HPV16/18), with only 17% recognition. Low awareness of HPV vaccine itself (36.2%). Very low vaccination rate (uptake) was reported (10%).
Aldawood <i>et al.</i> ^[12]	403	Health colleges at King Saud University (KSU), Riyadh,	College students	December 2022	Moderate awareness of HPV vaccine was reported at 49.9%. Very low vaccination rate of 5.2%. 40.9% of participants expressed willingness to receive the vaccine. A high overall vaccine hesitancy rate of 59.1% was observed.
Alanazi <i>et al.</i> ^[22]	114	Riyadh	College students (female)	October 2023–January 2024	Overall, 59.6% of participants had heard of HPV. Knowledge levels were generally low, with 81.6% scoring poorly on overall knowledge. A significant knowledge gap was identified regarding HPV infection and transmission (73.7% inadequate awareness). Low awareness of HPV vaccine and associated testing (30.7%). Vaccination rate (uptake) was 28.1%.
Aga <i>et al.</i> ^[23]	580	King Saud Bin Abdul Aziz University for Health Sciences, Jeddah	College students	February–March 2020.	Low overall awareness of HPV, with 38.3% being completely unaware. Low awareness of the link between HPV and cancer (46.2% unaware). Only 30.3% correctly identified HPV as a cause of cervical cancer. Low awareness of HPV- vaccine (45.2% unaware). 60% of students were unsure if HPV causes genital warts.

(Contd...)

Table 1: (Continued).

Study	Sample size	Setting	Population feature	Study duration	Outcomes
Abdelaliem <i>et al.</i> ^[24]	307	The College of Nursing, Princess Nourah bint Abdulrahman University, Riyadh	College students	April–May 2023	Poor overall knowledge of HPV was reported, with 73.5% having inadequate knowledge. Poor knowledge of HPV vaccine was found (77.5% had limited knowledge). A majority (57%) held a neutral or moderate attitude towards receiving the vaccine. An extremely low vaccination rate was observed, with 89.3% of participants unvaccinated.

HPV: Human papillomavirus, AIDS: Acquired immunodeficiency syndrome, SA: Saudi Arabia

Saudi Arabia was found to be low to moderate, with reported rates ranging from 43% to 59.6%. Several key knowledge gaps were consistently identified, including poor knowledge of HR HPV genotypes, modes of transmission, and the appropriate age for vaccination. A common pattern observed was that female participants generally demonstrated higher levels of awareness and knowledge compared to male participants.

Barriers to HPV vaccination

The studies identified several significant barriers preventing HPV vaccine uptake, which are summarized in Table 2. Barriers to vaccination included lack of education and awareness, fear, and the need for parental approval. Other factors were vaccine hesitancy, misinformation about safety, and cultural or religious sensitivities.

DISCUSSION

Summary of main findings

This systematic review investigated young adults' awareness of HPV and its vaccine in Saudi Arabia. There was a general pattern of limited awareness and low vaccination uptake throughout the analyzed studies, even among healthcare students. In addition, specific knowledge regarding HR HPV genotypes (e.g., HPV-16 and HPV-18), modes of transmission, and preventive measures was reported as being insufficient.^[10,12] Two studies conducted in the United Arab Emirates (UAE) and Qatar revealed similar results, where low awareness about HPV, its vaccine, and cervical cancer among university students was reported.^[25,26] This reflects a regional trend where awareness of HPV exists but often remains superficial and does not result in proper knowledge or actual vaccination uptake. This pattern of inadequate awareness also agrees with a study in Saudi Arabia, such as a study in

Taif, which recorded “unsatisfactory levels of knowledge” regarding HPV among women, with 58.5% demonstrating poor knowledge.^[27]

Students in health-related disciplines unexpectedly showed significant knowledge gaps. Similarly, in Lebanon, a study reported poor knowledge regarding the HPV vaccine and low rates of vaccination among medical students.^[28] These findings indicate the essential need to update the current medical courses to include educational materials about HPV and its protective measures.

The investigated studies reported that poor knowledge about the HPV vaccine and vaccine hesitancy hinder effective protection against HPV infections and consequent disorders.^[12,18,24] A study conducted in the Gulf Cooperation Council (GCC) countries indicated high vaccine hesitancy and low rates of vaccination, where Saudi Arabia scored 4.6%.^[29] It was reported that >40% of the respondents showed their hesitation toward getting the HPV vaccine, despite its availability.^[29] The GCC study revealed that the main barriers to HPV vaccination were a lack of awareness and poor medical counseling.^[29] The GCC study also noted that individuals having health insurance were more than twice as willing to take the vaccine.^[28] This highlights the importance of ensuring vaccine accessibility and its impact on acceptance of immunization. Such regional conclusions conform with the findings of the studies conducted in Saudi Arabia, where lack of awareness represents the primary barrier to HPV vaccination.

In this systematic review, some studies suggested that females showed more awareness than males regarding the causative relationship between HPV and cervical cancer and its preventive measures.^[20] This gender gap may be attributed to sociocultural factors that prohibit the discussion of sexual health, resulting in the spread of misconceptions and inadequate education. Sociocultural factors can also include

Table 2: The level of awareness regarding HPV and HPV vaccine and issues hindering the use of HPV vaccine in Saudi Arabia.

Study	Level of awareness	Barriers and issues against vaccination
Alsahani <i>et al.</i> ^[20]	Good, but suboptimal awareness levels reported for healthcare students/interns.	Identified gaps in foundational science knowledge (e.g., microbiology). Lack of specialized HPV-related education in the curriculum
Alsharif and Alsahafi ^[21]	Moderate (“fair”) awareness reported regarding HPV-OPSCC and the vaccine.	Limited coverage of HPV-related topics within the dental curriculum. Lack of widespread public/professional education.
Samannodi <i>et al.</i> ^[14]	Most participants (56.7%) had a poor score of knowledge.	Fear of side effects was cited as the main barrier. A belief that the vaccine is unnecessary for those not sexually active (13.2%). A feeling of not being at risk for the infection (8.2%).
Tobaiqi <i>et al.</i> ^[22]	Overall poor knowledge and awareness score were observed across age groups.	The most significant barrier was a lack of awareness about the virus and vaccine, which was reported by 57.3% of participants. The second most common barrier was concerns about vaccine safety (29.4%). Other notable barriers included: <ul style="list-style-type: none"> • Fear of needles or injections (17.5%). • Time constraints (15.3%). • Lack of access to healthcare facilities (10.3%). • Family refusal (7.1%). • Cultural or religious beliefs (5.4%). • Cost of the vaccine (4.2%).
Muzaheed ^[23]	Overall awareness assessed as inadequate.	Uncertainty about the vaccine’s primary benefit (cancer prevention) (55%). Lack of knowledge regarding the appropriate vaccination age (55%). Misconception that the vaccine is only relevant for sexually active individuals (12%). Requirement for parental approval for vaccination (24%).
Alghalyini <i>et al.</i> ^[10]	Poor awareness regarding HPV infection and HPV vaccine	Lack of education about HPV infection and HPV vaccine. Fear or embarrassment. Need for parental approval. Cultural and religious beliefs.
Aldawood <i>et al.</i> ^[12]	Poor awareness regarding HPV vaccine among health college students.	Uncertainty of vaccine accessibility. Issues about vaccine safety. Cultural and religious concerns. The study showed males exhibited significantly higher levels of vaccine hesitancy compared to females.
Alanazi <i>et al.</i> ^[18]	Overall knowledge was poor, with 81.6% of the nursing students scoring in the “poor knowledge” category, and only 0.9% scoring as “good” General awareness was mixed: 59.6% had heard of HPV, but only 30.7% had heard of the HPV vaccine itself.	The paper identifies the profound lack of knowledge as the primary barrier.
Aga <i>et al.</i> ^[19]	Overall awareness was low. Less than half of the health profession students (46.9%) had heard of HPV.	The primary barrier identified by the study’s findings was a significant lack of knowledge and awareness regarding HPV, its link to cancer, and the vaccine itself.

(Contd...)

Table 2: (Continued).

Study	Level of awareness	Barriers and issues against vaccination
	Knowledge was significantly higher among students from the College of Medicine compared to other health colleges.	The study refers to other barriers, include: The perception of HPV is a sensitive topic to discuss. Cultural and religious beliefs Lack of information available about the vaccines. Financial issues.
Abdelaliem <i>et al.</i> ^[24]	The majority of the nursing students (73.5%) was found to have a low level of knowledge regarding HPV.	Gaps in the academic curriculum and a lack of public awareness campaigns. Uncertainty of vaccine accessibility, efficacy, safety, and cost.

HPV: Human papillomavirus, OPSCC: Oropharyngeal squamous cell carcinoma

protective practices, for example, a study in India noted a significantly lower HPV prevalence among the Muslim community, suggesting that personal hygiene practices and male circumcision, rooted in cultural and religious norms, may play a protective role against HPV transmission.^[30] Accordingly, males may consider HPV infection as a feminine medical issue and misperceive their susceptibility to such infection.^[20] Aldosari *et al.* (2024) emphasized this gender knowledge gap at two prominent universities in Riyadh, Saudi Arabia.^[31] The study highlighted that the conservative nature of Saudi society explains the sensitivity of discussing STDs, and many students depend mainly on the internet for information, leaving them vulnerable to misinformation and risky behaviors. It endorses the inclusion of suitable knowledge on HPV and STDs in university courses.

In Saudi Arabia, young adults face a number of challenges in receiving the HPV vaccine. The absence of precise and comprehensive information on the vaccine was a common issue in several studies; many participants were unaware of who was eligible, where to find it, and how much it costs. Persistent misconceptions are shown in the belief held by a few respondents that the vaccine is exclusively indicated for married women or those who are currently sexually active. Numerous participants stated that they had never received a recommendation from their physician or nurse, indicating that the function of healthcare professionals was also inefficient. Despite national recommendations, many participants expressed uncertainty about their ability to obtain the vaccine or where to obtain it. Accordingly, these challenges represent a lack of public awareness and communication rather than actual structural limitations. In addition, because the HPV vaccine is frequently linked to sexual conduct, individuals are discouraged from getting vaccinated due to cultural stigma and apprehension of judgment. In conclusion, the barriers hindering HPV vaccination include limited knowledge dissemination, ambiguous eligibility criteria, lack of medical counseling, and sociocultural restrictions. These results highlight the critical need for focused educational initiatives. According to the synthesized evidence, a future-forward

approach to overcome these barriers must be comprehensive. Current initiatives depend on general awareness is inadequate. We suggest a conscious shift from passive awareness to constructive counseling. This requires, first, amending medical and nursing curricula to include practical communication training on sensitive health topics, ensuring future healthcare professionals can effectively encourage vaccination. Second, primary healthcare providers must be licensed to initiate the discussion about the HPV vaccine with all eligible individuals, rather than expecting to be asked. To address the cultural stigma and misunderstanding recognized these conversations, enhanced by national campaigns, must strategically re-frame the vaccine: highlighting its role as a significant cancer-prevention tool for both genders, instead of its relationship with sexual activity.

Limitations of the study

This systematic review may encounter some limitations. Only English-language studies were included, while relevant non-English research might have been excluded. The research keywords may be insufficient, which may impact the results. The scope of this review was young adults which may limit its generalizability. Furthermore, the heterogeneity of the populations of the included studies (ranging from medical students to the general public) may limit the ability to generalize the findings to the entire Saudi young adult population. In addition, the data collection methods were also heterogeneous varying from online surveys, which may provide selection bias, to in-person interactions. This methodological variance may affect the direct comparability of the results. The protocol of this systematic review was not registered in a public database prior to its commencement, but the methodology was rigorously developed and followed throughout the review process to minimize potential bias. This systematic review was limited to published peer-reviewed articles, which may have introduced a degree of publication bias, however, this approach was chosen to maintain high and consistent quality of evidence.

Recommendations for future research

Future research should apply more consistent methodological aspects, such as stratifying the target population (e.g., medical vs. public) to enhance the applicability of the findings. It should also consider standardized data collection measures to allow efficient comparisons between the results of the studies.

CONCLUSION

This systematic review illustrates insufficient awareness and knowledge about HPV and its vaccine among young adults in SA. Vaccine hesitancy, sociocultural factors, and inadequate public health education lead to low vaccination uptake. Policymakers, instructors, and medical professionals must collaborate to improve public health communication, correct faulty perceptions, increase access to vaccination services, and incorporate HPV knowledge into different curricula to enhance the level of awareness and manage the future burden of HPV-related malignancies in the Kingdom of Saudi Arabia.

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Declaration of patient consent: Patient's consent was not required as this study is a systematic review of publicly available literature and did not involve direct data collection from human participants.

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Availability of data and material: All the data generated or analyzed during this study are included in this published article. The datasets are derived from the publications listed in the references section.

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