

Knowledge, Attitudes and Practices Regarding Human Papillomavirus and HPV Vaccination among Healthcare Professionals and Students in Morocco: A Cross-Sectional Study

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DOI: <https://doi.org/10.36348/sjpm.2026.v11i08.003>

| Received: 12.08.2026 | Accepted: 03.10.2026 | Published: 08.10.2026

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Abstract

Background: Persistent infection with oncogenic human papillomavirus (HPV) is the necessary cause of almost all cervical cancers and contributes to several other anogenital and oropharyngeal malignancies. In Morocco, HPV vaccination was introduced into the National Immunization Program in October 2022, making healthcare professional's key actors in vaccine communication and recommendation. **Objective:** To assess knowledge, attitudes, and practices (KAP) regarding HPV infection and vaccination among healthcare professionals and healthcare students in Morocco, and to identify factors associated with vaccine recommendation. **Methods:** A cross-sectional study was conducted among healthcare professionals and healthcare students in Morocco. A systematic questionnaire was used to examine knowledge, attitudes, practices, and perceived barriers to HPV vaccination. A composite knowledge score (0-100) was derived. We studied factors associated with knowledge and systematic recommendation of the HPV vaccine by multivariable linear and logistic regression, respectively. **Results:** A total of 205 participants were included, among them 67.3% were health care professionals and 32.7% students. The awareness about HPV was quite high (98.5%), while the mean composite knowledge score was 65.8 ± 14.1 . There were major gaps in HPV DNA-based screening (19.0%) and knowledge on HPV vaccination in the Moroccan National Immunization Program (52.7%). Only 5.9% reported being vaccinated and 51.2% systematically advocated immunization for girls aged 9–14 years. The most important perceived hurdles were lack of information (87.8%), fear of adverse effects (62.0%) and perceived lack of need (58.0%). Higher knowledge was independently linked with systematic endorsement of vaccination (aOR=1.026, 95% CI 1.005-1.048; p=0.015). **Conclusion:** Although knowledge and attitudes toward HPV are generally favorable among Moroccan healthcare professionals and students, important gaps persist in practice. Strengthening education on HPV-related diseases, screening strategies, and vaccine safety may improve recommendation practices and support national cervical cancer prevention efforts.

Keywords: human papillomavirus; HPV vaccination; knowledge, attitudes and practices; Morocco; healthcare professionals; cervical cancer.

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INTRODUCTION

Persistent infection with high-risk HPV types is the principal cause of cervical cancer and also contributes to anal, vulvar, vaginal, penile, and oropharyngeal cancers (1). Cervical cancer remains a major global public health problem, with an estimated

660 000 new cases and 350 000 deaths in 2022, most of them occurring in low- and middle-income countries [2].

In Morocco, cervical cancer is the second most common cancer among women. According to GLOBOCAN 2022 estimates, 2 644 new cervical cancer

Citation: Tagajdid, M. R., Benjelloun, M., Jafari, M., Akhsass, A., Znady, R., Aabi, R., Elannaz, H., Elkochri, S., Laraqui, A., Bouaiti, L., Hilali, F., Touil, N., El Qatni, M., Reggad, A., Amine Lahlou, I., Ennibi, K. (2026). Knowledge, Attitudes and Practices Regarding Human Papillomavirus and HPV Vaccination among Healthcare Professionals and Students in Morocco: A Cross-Sectional Study. *Saudi J Pathol Microbiol*, 11(8), 218-224. <https://doi.org/10.36348/sjpm.2026.v11i08.003>

cases and 1468 related deaths were reported in 2022 (3). Morocco has therefore strengthened its prevention strategy through screening and, more recently, by integrating HPV vaccination into the National Immunization Program in October 2022, initially targeting 11-year-old girls [4].

In 2020, the World Health Organization (WHO) launched the global strategy to accelerate the elimination of Cervical cancer as a public health problem with the “90-70-90” targets to be achieved by 2023, 90% HPV vaccination coverage among girls, 0% screening coverage using a high-performance test and 90% access to treatment for cervical precancer and cancer. Healthcare professionals play an essential role in achieving these goals through vaccination promotion, patient education and encouragement to engage in screening programs. Consequently, their knowledge, confidence and recommended practices have a direct impact on vaccine uptake and cervical cancer preventive efforts [5].

In line with WHO cervical cancer elimination strategy, healthcare professionals are considered as credible providers of vaccine information and have a significant role in promoting HPV vaccination. Their recommendation is one of the biggest indicators of vaccine uptake. Thus, proper knowledge, positive attitudes and confidence in the safety of the vaccine are critical for the successful implementation of national vaccination programs. Knowledge gaps and inadequate advice of HPV vaccination among healthcare providers and students identified in research in Morocco [1,6,7].

Despite the availability of highly efficacious HPV vaccines, research from throughout the world have continuously revealed HPV transmission, HPV-related illnesses, recommendations for cervical cancer screening and grounds for vaccination. Additionally, vaccine reluctance among health care workers is a key obstacle to vaccine promotion, particularly in low- and middle-income countries, where worries about vaccine safety, lack of training and misinformation may negatively impact immunization practices [2,6–8].

Previous studies in Morocco were predominantly conducted among physicians or university students and were carried out before or shortly after the introduction of the HPV vaccination in the National Immunization Program. These studies identified variable levels of HPV-related knowledge and overall poor vaccine recommended practices, pointing to the continuous need for education of health care providers. However, there is still a gap in contemporary national evidence assessing both healthcare professionals and healthcare students in the post-implementation environment [9–11].

In this context, updated data are needed to identify persisting barriers following the introduction of the national vaccination strategy. This study aimed to assess knowledge, attitudes, and practices regarding HPV infection and vaccination among healthcare professionals and students in Morocco, and to identify factors associated with vaccine recommendation.

METHODS

Study design and setting

A cross-sectional descriptive and analytical study was conducted in Morocco between September and December 2025.

The study used a national distribution of an anonymous, self-administered, internet-based questionnaire. We choose this approach to allow participation of healthcare professionals and healthcare students from diverse region of Morocco while preserving anonymity and reducing interviewer related bias.

Participants and recruitment

The study targeted healthcare professionals and senior healthcare students, including physicians, pharmacists, residents, medical and pharmacy students in the third year or above. Participants were recruited using a non-probability convenience sampling method through online dissemination of an anonymous structured questionnaire via professional networks, institutional mailing lists, and social media platforms.

Questionnaire and variables

The questionnaire comprised 31 items covering four parameters: sociodemographic characteristics, knowledge of HPV infection and prevention, attitudes toward HPV vaccination, and self-reported practices. The instrument was developed from previous knowledge, attitudes, and practices (KAP) studies and international recommendations, then pilot-tested to improve clarity and relevance.

HPV- relative knowledge score

HPV-related knowledge was assessed in five prespecified domains covering key aspects of HPV infection and cervical cancer prevention: (1) general knowledge of HPV, including the route of HPV transmission and the largely asymptomatic course of infection; (2) knowledge of HPV-associated diseases; (3) knowledge of established risk factors for cervical cancer; (4) HPV vaccination knowledge, including the priority target population, recommended vaccination schedule, vaccine effectiveness, and knowledge of the Moroccan National Immunization Program; and (5) cervical cancer screening knowledge, including the recommended primary screening method, age to start screening, and HPV self-sampling. Correct replies were defined a priori according to the recommendations of the World Health Organization and proven scientific evidence and not

according to the distribution of responses within the research populations. Incorrect and "don't know" responses were graded as incorrect.

A composite knowledge score was then calculated. Raw domain scores were standardized to a 0–1 scale because the five domains contained various numbers of items to prevent domains with more items from receiving disproportionate weight. For the HPV vaccine domain, the vaccination-schedule component consisted of three statements. The number of accurate responses to these statements was divided by three, giving this component the same weight as the other vaccination-schedule components. The five normalized domain scores were then summed, equally weighted and multiplied by 100 to get an overall knowledge score between 0 and 100 for the key analyzes without applying artificial thresholds to group people as having little, moderate or high knowledge.

Statistical analysis

Statistical analyses were performed using Jamovi biostatistical software (Version 2.3.28, The Jamovi Project, Australia) and GraphPad Prism software (Version 8, GraphPad Software, Inc., USA). Categorical variables were presented as frequencies and percentages. The composite HPV-related knowledge score was presented as mean and standard deviation (SD), median and interquartile range (IQR), and minimum and maximum values. Distribution of the composite knowledge score was examined using graphical inspection and the Shapiro–Wilk test.

HPV-related knowledge composite score was modeled as a continuous variable (range: 0-100). The knowledge score distribution revealed indications of departure from normality and the group-specific distributions were non-normal, so the Mann–Whitney U test was used to compare knowledge scores between healthcare professionals and healthcare students.

To explore whether age, sex and professional position were independently associated with the composite HPV-related knowledge score, a multiple linear regression model was built. Model assumptions were checked by inspecting residual plots and Q-Q plots, Shapiro-Wilk test of residuals, variance inflation factors (VIFs) and Cook's distance for influential observations. Regression coefficients were estimated with 95% confidence intervals (CIs). The overall fit of the model was tested using the F test and coefficient of determination (R^2 and modified R^2).

A binomial logistic regression was employed to evaluate factors correlated with systematically recommending HPV vaccination for girls aged 9–14 years. The dependent variable was dichotomized into systematic versus non-systematic recommendation, non-systematic recommendation being the reference

outcome. Univariable logistic regression models were used to generate initial crude odds ratios (ORs) and 95% CIs for the composite knowledge score, sex and professional status, and age. A multivariable logistic regression model was then built including the composite knowledge score, age, sex and professional status simultaneously. Adjusted odds ratios (aOR) with 95% CIs were presented. Female sex and healthcare professional status were utilized as reference categories for the relevant categorical variables. Composite knowledge score and age were used as continuous variables. Statistical significance was defined as $p < 0.05$.

Ethical considerations

Participation was voluntary and anonymous, and electronic informed consent was obtained before questionnaire completion.

RESULTS

Participant characteristics

A total of 205 respondents were included in the study, of whom 140 (68.3%) were female and 65 (31.7%) were male. The majority of participants were aged 25–34 years (116, 56.6%), followed by those aged 19–24 years (51, 24.9%). Healthcare professionals accounted for 138 participants (67.3%), while healthcare students represented 67 (32.7%). Among professional categories, resident physicians constituted the largest group (72, 35.1%), followed by medical students (29, 14.1%), pharmacists (21, 10.2%), and other healthcare professionals (19, 9.3%). Specialist physicians, general practitioners, medical interns, pharmacy students, and laboratory technicians represented 8.8%, 8.3%, 6.8%, 6.3%, and 1.0% of the sample, respectively.

Knowledge

Awareness of HPV was high, with 98.5% (202/205) of participants reporting having heard of HPV. Sexual skin-to-skin contact was identified as a route of HPV transmission by 98% (201/205). Knowledge was particularly high regarding the association of HPV with cervical cancer (97%; 198/205) and genital/anogenital warts (91.2%; 187/205), whereas fewer than half of participants with vulvar/vaginal (47.3%), oropharyngeal (45%), penile (43.3%), or anal cancer (44.4%). Most participants correctly identified girls aged 9-14 years before sexual initiation as the WHO priority target population for HPV vaccination (83.9%; 172/205), and 90.2% (185/205) recognized the protective effect of HPV vaccination against anogenital warts and cervical cancer. However, knowledge of cervical cancer screening recommendations was limited: only 19% (39/205) identified HPV DNA testing as the recommended first-line screening method, and 35.1% (72/205) selected 30 years as the recommended age to initiate screening. Furthermore, 48.3% (99/205) recognized the potential of HPV self-sampling to improve screening coverage, while 52.7% (108/205) were aware of the introduction and target population of

HPV vaccination within Morocco's National Immunization Program. Finally, 92.2% (189/205) recognized that HPV infection is often asymptomatic at its onset (Table I).

Attitude

The attitude, perceptions and vaccine confidence of the participants were summarized in the table II. Overall, 47.3% (97/205) of participants reported intending to receive HPV vaccination within the next 12 months, while 29.3% (60/205) were uncertain and 23.4% (48/205) reported no intention to be vaccinated. Most participants perceived HPV vaccination as safe and effective (70%; 143/205), whereas 14.1% (29/205) did not and 16.1% (33/205) were uncertain. Only 7.3% (15/205) believed that serious adverse events frequently occur following HPV vaccination, while 64.4% (132/205) did not share this perception. Approximately three-quarters of participants (76.1%; 156/205) perceived a lifetime risk of cervical cancer in the absence of HPV vaccination, and 75.1% (154/205) disagreed that spontaneous HPV clearance makes vaccination less necessary. In addition, 60% (123/205) were willing to recommend HPV vaccination for boys, and 64.4% (132/205) supported HPV self-sampling as a strategy to increase cervical cancer screening participation.

HPV vaccination and prevention practices

Personal uptake of HPV vaccination was low, with only 5.9% (12/205) of participants reporting having been vaccinated, while 82.9% (170/205) reported not being vaccinated and 11.2% (23/205) were uncertain about their vaccination status. Overall, 45% (92/205) reported having recommended HPV vaccination, whereas 32.2% (66/205) had not yet done so but intended to recommend it. Discussions about HPV screening and vaccination in professional practice or teaching were reported as occurring often by 19.5% (40/205) and sometimes by 40% (82/205) of participants. Regarding the priority target population, 51.2% (105/205) reported systematically recommending HPV vaccination to girls aged 9-14 years, while 48.8% (100/205) reported non-systematic recommendations (Table III).

Perceived barriers to HPV vaccination

Lack of information was the most frequently reported barrier to HPV vaccination (87.8%), followed by fear of side effects (62%) and the belief that vaccination was unnecessary (58%). Difficult access to the vaccine (35.1%), vaccine cost (32.5%) and religious or cultural reasons (32.2%) were reported less frequently. Only 2.9% of participants reported not knowing which factors constituted barriers to HPV vaccination (Figure 1).

Overall HPV-related knowledge score

Among 205 participants, the mean total knowledge score of HPV was 65.8 ± 14.1 out of 100, ranging from 20 to 100.

Figure 2 shows the distribution of the HPV-related knowledge score according to professional status. Healthcare professionals had higher descriptive knowledge scores than healthcare students with median values of 66.7 and 63.3 respectively. However, the distributions showed a significant overlap and the difference between the two groups was not statistically significant ($p = 0.170$).

Factors associated with HPV-Knowledge

In multivariate linear regression analysis age, sex and professional status were not significantly correlated with the HPV-related knowledge score. Age was not associated with the knowledge score ($B = -0.02$ per year, 95% CI -0.25 to 0.20 ; $p = 0.839$). Male participants had an adjusted mean knowledge score that was 3.87 points higher than female participants ($B = 3.87$, 95% CI -0.31 to 8.04 , $p = 0.069$), while healthcare students had an adjusted mean score that was 2.94 points lower than healthcare professionals ($B = -2.94$, 95% CI -7.82 to 1.95 ; $p = 0.237$). The overall model was not statistically significant ($F(3,201) = 1.56$, $p = 0.199$) and accounted for 2.3% of the variance in knowledge scores ($R^2 = 0.023$, adjusted $R^2 = 0.008$).

Factor associated with systematic HPV vaccine recommendation

In univariable analysis, higher HPV-related knowledge scores were significantly associated with systematic recommendation of HPV vaccination to girls aged 9–14 years (OR = 1.026 per one-point increase; 95% CI: 1.005–1.047; $p = 0.015$). This association remained significant after adjustment for age, sex, and professional status (aOR = 1.026; 95% CI: 1.005–1.048; $p = 0.015$). No other variable was significantly associated with vaccination recommendation in either the univariable or multivariable model: age (OR = 1.004, 95% CI 0.977–1.030, $p = 0.793$; aOR = 1.019, 95% CI 0.985–1.054, $p = 0.280$), sex — female vs. male (OR = 1.682, 95% CI 0.926–3.060, $p = 0.088$; aOR = 1.474, 95% CI 0.796–2.732, $p = 0.217$), and professional status — healthcare professional vs. healthcare student (OR = 1.519, 95% CI 0.843–2.740, $p = 0.164$; aOR = 1.998, 95% CI 0.970–4.115, $p = 0.061$).

DISCUSSION

This study shows that awareness of HPV among Moroccan healthcare professionals and healthcare students is high; however, this awareness does not fully translate into optimal preventive practice.

Although overall HPV awareness was high and the mean HPV-related knowledge score was 65.8, important knowledge gaps persisted, particularly regarding cervical cancer screening and some HPV-associated diseases. Personal vaccination uptake remained low and only half reported systematic recommendation [6,7].

These findings are consistent with previous Moroccan studies, while also suggesting some improvement following the introduction of HPV vaccination into the national program. In a national survey among Moroccan physicians conducted before the integration of HPV vaccination into the national program, awareness of key oncogenic HPV types was limited and only 16.6% of physicians reported recommending the vaccine[9]. In contrast, the present study found a higher rate of systematic recommendation (51.2%), which may reflect increased visibility of HPV vaccination following the October 2022 policy change[4,9]. Nevertheless, this level remains suboptimal and highlights substantial room for improvement. The observed improvement in the HPV vaccine recommendation in comparison with prior Moroccan research could reflect the gradual implementation of the national HPV vaccination program and the increasing public and professional knowledge after its introduction. However, the recommendation rate is still unsatisfactory, demonstrating that the introduction of a national vaccination strategy is not sufficient to guarantee a general acceptance by health care providers. Professional development and institutional support are key components of translating policy to clinical practice [5,9].

Our findings are also in agreement with data from other low- and middle-income countries where health care professionals often have high awareness of HPV but varying levels of detailed knowledge and inconsistent vaccine recommended practices. Professional education, confidence in vaccination safety, and availability to updated clinical guidelines were found as major factors of HPV vaccine recommendation in several studies. Differences seen between countries possibly reflect differences in healthcare systems, undergraduate curricula, national immunization policies and possibilities for continued professional development [6,7].

Awareness of the known association between HPV and cervical cancer was high, but knowledge on other HPV-associated malignancies, including vulvar/vaginal, oropharyngeal, penile and anal cancers, was significantly lower. The knowledge gap was greater for cervical cancer screening. Only 19% of respondents identified HPV DNA testing as the recommended first-line screening technology, and only about one-third identified 30 years as the recommended age to initiate screening. Moreover, only 52.7% of the respondents were aware of the launch and the target population of HPV vaccination within the framework of the National Immunization Program of Morocco. The results indicate that participants were more aware of the traditional cervical cancer-focused representation of HPV than of the broader spectrum of HPV-associated disease and emerging HPV-based prevention [4].

The finding that better knowledge increases the chance of recommending the vaccine is consistent with the international literature highlighting the role of knowledge and training of healthcare professionals in the practices of HPV vaccination. A recent systematic review and meta-analysis found that healthcare professional practices for recommending are very heterogeneous across settings, and are largely driven by confidence, training and local implementation context [7]. Another systematic review showed that strengthening the knowledge and communication abilities of health care workers is critical to increasing the adoption of the HPV vaccine among adolescents [6]. In the present analysis, higher awareness on HPV was still independently associated with systematically recommending for age, sex and professional status (Adjusted OR = 1.026, 95% CI 1.005-1.048). Though the size of the link was small, these findings highlight the importance of HPV-related information as one factor of vaccine recommendation behavior.

These observations are likely a reflection of the conventional focus on cervical cancer in undergraduate medical education with relatively little focus on other HPV-associated cancers. If health education curriculum were to include the full range of HPV-related disorders, health care providers would have a better appreciation of the broader benefits of HPV vaccination [1].

Vaccine confidence also emerged as an important determinant of recommendation behavior. Nearly one-third of participants remained uncertain about vaccine safety. A significant gap was found between the positive attitudes toward HPV vaccination and preventive measures. Despite 90.2% of responders acknowledging the preventive impact of HPV vaccination and 70.0% perceiving the vaccine as safe and efficient, only 5.9% reported receiving the HPV vaccination. Moreover, 51.2% reported systematically promoting immunization for girls aged 9–14 years. However, personal vaccine uptake should be regarded with caution as the present study did not investigate individual eligibility, historical access to immunization or specific reasons for non-vaccination. This finding is relevant in the Moroccan context, where sociocultural concerns, limited public information, and post-COVID-19 distrust have all been identified as barriers to HPV vaccine acceptance [12,13]. Therefore, interventions should address not only factual knowledge gaps but also confidence in vaccine safety and communication skills to effectively engage patients and families.

The pattern of perceived barriers further emphasizes the value of information and communication. The most common barrier to HPV vaccination was lack of information (87.8%), followed by fear of side effects (62.0%) and assumption that vaccination was unnecessary (58.0%). Structural barriers (e.g., problematic access to the vaccine (35.1%); vaccine

cost (32.5%)) were less frequently cited but relevant. These results show that attempts to increase HPV vaccine coverage could require a combination of educational and communication activities to address knowledge gaps and misunderstandings, together with steps to improve access to vaccination.

The findings further indicate the need to increase HPV-specific education among healthcare professionals and healthcare students from a public health perspective. Educational campaigns should target HPV transmission and vaccination but should also cover the broader spectrum of HPV-related disorders, current cervical cancer screening recommendations, HPV self-sampling and communication on vaccine safety and reluctance. This study also demonstrated a lack of understanding of the National Immunization Program and suggests that communication such as on national HPV vaccination and screening recommendations needs to be more effective. These strategies may enable more consistent HPV vaccine recommendation practices and aid to Morocco's cervical cancer elimination efforts.

This study has several strengths. It tackles a current public health problem following the integration of HPV vaccine in the National Immunization Program of Morocco and involves healthcare professionals and healthcare students, allowing assessment at different phases of training and practice. In addition to describing knowledge, attitudes and practices, the study evaluated a multidimensional composite HPV-related knowledge score and its independent association with systematic vaccine prescription using multivariable analysis. Evaluation of perceived barriers also gives potentially actionable information for future instructional and implementation measures.

However, some limitations should be acknowledged. The cross-sectional design does not allow for the establishment of temporal or causative linkages, notably with the apparent association between knowledge on HPV-related issues and systematically recommending the vaccine. Vaccination and referral practices were self-reported and hence prone to recollection and social desirability biases. Convenience sampling and online recruiting might have introduced selection bias and might restrict the generalizability of the findings to all healthcare professionals and healthcare students in Morocco. The open online recruitment strategy precluded calculation of a conventional response rate. Relatively small numbers, restricting comprehensive comparisons by occupation, represented several professional groups. Finally, the composite knowledge score was generated for this study and while based on prespecified evidence-based domains, has not been externally validated.

CONCLUSION

The present study highlights the gap between a high level of general awareness of HPV and a lack of

specific knowledge on HPV among healthcare professionals and healthcare students in Morocco, particularly concerning non-cervical HPV-associated diseases, cervical cancer screening recommendations, and the national HPV vaccination program. Though attitudes of HPV vaccination were generally positive, vaccine uptake among participants was low and only half of participants reported systematically recommending the vaccine to females aged 9–14 years. The most commonly stated hurdles were lack of information, fear of side effects, and opinion of vaccination as unnecessary. Importantly, greater knowledge about HPV was independently associated with systematic recommendation of the vaccine, whatever the age, sex and professional standing. These findings provide support for the enhancement of HPV-specific education and distribution of current vaccination and screening recommendations throughout healthcare training and practice. Overcoming informational and implementation challenges may help to improve consistency in HPV vaccine recommendation and boost Morocco's efforts toward cervical cancer elimination.

REFERENCES

1. World Health Organisation (WHO). Human papillomavirus and cancer. 2024. [Accessed 12 juill 2026]. Available from: <https://www.who.int/news-room/fact-sheets/detail/human-papilloma-virus-and-cancer>
2. World Health Organisation (WHO). Cervical cancer. 2026. [Accessed 13 juill 2026]. Available from: <https://www.who.int/news-room/fact-sheets/detail/cervical-cancer>
3. International Agency for research on cancer (IARC). 2024. [Accessed 13 juill 2026]. Available from: <https://gco.iarc.who.int/media/globocan/factsheets/populations/504-morocco-fact-sheet.pdf>
4. Zraidi M, Ibriz M. Human papillomavirus vaccination in view of the National Cancer Control Plan 2020-2029 in Morocco. *Pan Afr Med J*. 2023;45:115. doi:10.11604/pamj.2023.45.115.40004 PubMed PMID: 37745922; PubMed Central PMCID: PMC10516758.
5. World Health Organisation (WHO). Global strategy to accelerate the elimination of cervical cancer as a public health problem. 2020. [Accessed 12 juill 2026]. Available from: <https://www.who.int/publications/i/item/9789240014107>
6. Efua Sackey M, Markey K, Grealish A. Healthcare professional's promotional strategies in improving Human papillomavirus (HPV) vaccination uptake in adolescents: A systematic review. *Vaccine*. 26 avr 2022;40(19):2656-66. doi:10.1016/j.vaccine.2022.03.054 PubMed PMID: 35367068.
7. Bakare D, Gobbo E, Akinsola KO, Bakare AA, Salako J, Hanson C, et al. Healthcare worker

- practices for HPV vaccine recommendation: A systematic review and meta-analysis. *Hum Vaccines Immunother.* 31 déc 2024;20(1):2402122. doi:10.1080/21645515.2024.2402122 PubMed PMID: 39400296; PubMed Central PMCID: PMC11486212.
8. Larson HJ, Broniatowski DA. Volatility of vaccine confidence. *Science.* 26 mars 2021;371(6536):1289. doi:10.1126/science.abi6488 PubMed PMID: 33766861.
9. Yacouti A, Baddou R, Bourissi H, Ez-Zaouy S, Amayou H, Elmalki K, et al. Human PapillomaVirus Vaccine Uptake: Attitudes and Practices Among Moroccan Physicians. *J Cancer Educ Off J Am Assoc Cancer Educ.* déc 2024;39(6):588-96. doi:10.1007/s13187-024-02505-x PubMed PMID: 39414743.
10. El Mansouri N, Ferrera L, Kharbach A, Achbani A, Kassidi F, Rogua H, et al. Awareness and knowledge associated to Human papillomavirus infection among university students in Morocco: A cross-sectional study. *PLoS ONE.* 8 juill 2022;17(7):e0271222. doi: 10.1371/journal.pone.0271222 PubMed PMID: 35802731; PubMed Central PMCID: PMC9269923.
11. Yacouti A, Elkhoudri N, El got A, Benider A, Hadrya F, Baddou R, et al. Awareness, attitudes and acceptability of the HPV vaccine among female university students in Morocco. *PLoS ONE.* 8 avr 2022;17(4):e0266081. doi: 10.1371/journal.pone.0266081 PubMed PMID: 35395019; PubMed Central PMCID: PMC8993020.
12. Mouallif M, Bowyer HL, Festali S, Albert A, Filali-Zegzouti Y, Guenin S, et al. Cervical cancer and HPV: Awareness and vaccine acceptability among parents in Morocco. *Vaccine.* 9 janv 2014;32(3):409-16. doi: 10.1016/j.vaccine.2013.10.069 PubMed PMID: 24188754.
13. Bourissi H, Zinab A. HPV Vaccination in Morocco: Quiet Progress or Public Health Failure? *J Cancer Educ Off J Am Assoc Cancer Educ.* avr 2026;41(2):406-8. doi:10.1007/s13187-025-02729-5 PubMed PMID: 40903596.