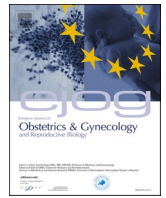




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Full length article

HPV awareness and vaccine decision-making: healthcare professionals vs social media in a cross-sectional study from Italy

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ABSTRACT

Introduction: Social media is used increasingly as a source of health information. This study explored how women access information about human papillomavirus (HPV), and whether the use of social media influences vaccine decision-making.

Methods: A cross-sectional survey was conducted between October 2018 and March 2019 among 90 women aged 18-45 years attending the University Hospital of Palermo, Sicily (Italy). A 25-item questionnaire assessed socio-demographic characteristics, knowledge about HPV and vaccination, and sources of information. Descriptive statistics and odds ratios (OR) were calculated for behavioural risk factors associated with HPV infection.

Results: Overall, 89 % of women reported that they were aware of HPV, and 70 % had heard about HPV vaccination. Only 14 % were vaccinated. Physicians (34 %) and television (20 %) were the main sources of information, while the Internet accounted for 18 %, and social media was rarely used for HPV information (59 % of participants reported no use of social media for HPV information). Most participants (63 %) did not know how to access vaccination services. Risk factors significantly associated with HPV infection included early sexual debut [≤ 17 years; OR = 3.0, 95 % confidence interval (CI) 1.56-5.7], multiple partners in the past year (OR = 2.3, 95 % CI 1.6-2.5), and low educational level (OR = 2.8-3.1).

Discussion: Despite relatively high awareness of HPV, vaccination uptake was low, and social media played only a marginal role in shaping knowledge and decision-making among women. Healthcare professionals remained the main trusted source of information. The gap between awareness and actual vaccination highlights the need for targeted campaigns and easier access to vaccination services.

Conclusion: Strategies to increase HPV vaccine uptake should prioritize direct communication from healthcare providers and improve service accessibility, while social media currently appears to have limited influence.

Introduction

Social media has emerged as a significant source of health information, both complementing and challenging traditional communication by healthcare professionals [1,2]. It improves the rapid diffusion of preventive information and institutional initiatives, but also promotes the spread of disinformation and antivaccination narratives, which may have an adverse effect on public trust and health behaviours [3,4].

Human papillomavirus (HPV) is the most common sexually transmitted infection worldwide, affecting more than 80 % of the population at least once in their lifetime [5]. Persistent infection with oncogenic HPV types is a cause of cervical cancer, and is also associated with other anogenital and oropharyngeal malignancies [6]. Vaccination represents an effective and safe primary prevention strategy, as confirmed by international surveillance and the World Health Organization [7,8].

Despite the strong evidence, HPV vaccine uptake remains suboptimal in many countries, with important regional differences [9].

Previous research has indicated that the way in which health information is framed has a strong influence on vaccine acceptance, particularly in high-risk groups [10]. Healthcare professionals consistently emerge as the most trusted sources of information, yet the role of social media in shaping vaccine-related decisions remains uncertain [11]. While online platforms can enhance awareness, they do not necessarily translate into higher vaccination rates, and the relative weight of digital vs professional sources of information has not been established clearly [12,13]. In Italy, HPV vaccine coverage remains below target and shows substantial regional disparities. According to recent national data, coverage among females aged 12–23 years ranges from 41.6 % to 70.4 % across regions, reflecting inequalities in healthcare access and preventive service delivery [14].

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As such, the aim of this study was to explore how women in Italy access information about HPV and HPV vaccination, and to assess the relative influence of healthcare professionals vs social media in shaping awareness and vaccine decision-making.

Methods

Study design and participants

This cross-sectional study was conducted between October 2018 and March 2019 at the University Hospital of Palermo, Sicily (Italy). A convenience sample was used, including all women aged 18–45 years who attended the outpatient prevention and treatment clinic during the study period and met the predefined inclusion criteria. Recruitment was therefore purposive, as it targeted women of reproductive age who sought preventive or screening services at the clinic during that time. No exclusion criteria were established. All participants provided written informed consent before enrolment.

Questionnaire

The questionnaire was adapted from a questionnaire used in a related study conducted among women attending the same outpatient clinic [15]. For the present study, the questionnaire was updated to include new items on social media and online information sources. These additional questions were developed based on current literature, and were reviewed by a panel of clinicians and public health experts to ensure content and face validity. Although this new section was not formally validated, it was pilot tested with five participants to confirm clarity and relevance.

Data were collected using a structured 25-item questionnaire that covered five areas: (i) sociodemographic characteristics (age, education, place of residence); (ii) personal information and reproductive/sexual history; (iii) knowledge about HPV; (iv) knowledge and attitudes toward HPV vaccination; and (v) sources of information (healthcare professionals, television, Internet, social media, family/friends). Questions were a mix of multiple choice, Likert scale [16] and yes/no items. HPV infection status was obtained from participants' medical records and laboratory results of cytological and molecular screening tests, rather than self-reported information.

Data collection and management

After providing consent, participants completed the questionnaire anonymously. Responses were recorded in a secure database, with sociodemographic identifiers stored separately to maintain confidentiality. Participation was voluntary.

Statistical analysis

Descriptive statistics [frequencies, percentages, means with standard deviations (SD)] were used to summarize participants' characteristics, knowledge and sources of information. Odds ratios (OR) and 95 % confidence intervals (CI) were calculated to explore associations between selected sociobehavioural factors (age at sexual debut, number of partners, parity, smoking, educational level) and HPV infection status. Analyses were performed using STATA Version 15 (StataCorp, College Station, TX, USA).

Ethical approval

This study was approved by the Ethics Committee of 'P. Giaccone' University Hospital of Palermo, Italy.

Results

Sample characteristics

In total, 90 women participated in the study (Table 1). The mean age was 34 years (SD 7.6). Approximately two-thirds (64.5 %) were aged 30–45 years, while 35.5 % were aged 18–29 years. Most participants were residents of Palermo (91.2 %), and the majority held at least a high school diploma (76.7 %), with 42 % reporting a university degree.

Knowledge of HPV and vaccination

Overall, 89 % of women reported that they were aware of HPV, and 87 % correctly identified sexual transmission as the main route of infection. More than three-quarters (77 %) knew that HPV is linked to cervical and other cancers, while 68 % recognized its role in anogenital warts and precancerous lesions.

Regarding vaccination, 70 % of women had heard of the HPV vaccine, but only 14 % reported being vaccinated. Among those vaccinated, 88 % did not recall which type of vaccine they had received. Knowledge of vaccine types was limited: 42 % knew that different formulations exist, but 67 % could not distinguish between bivalent, quadrivalent and nonavalent vaccines. Despite these gaps, 94 % of respondents stated that they would vaccinate their children, although 63 % reported not knowing how to access vaccination services.

Sources of information

Physicians were the main source of vaccine information (34 %), followed by television (20 %) and the Internet (18 %). Families and friends played a smaller role (13 %). Social media was rarely used: 58.7 % of women reported that they had never used platforms such as Facebook or X for HPV information. Among the respondents, 53 % rated information on vaccine side effects obtained from the Internet as 'not very' or 'not at all' useful. Overall, 30 % stated that online information had not influenced their decision-making, while 3.3 % reported feeling strongly influenced.

HPV infection and risk factors

HPV infection status was confirmed clinically from participants' medical records.

Univariate analysis showed significant associations between HPV infection and several sociobehavioural factors. Early sexual debut (≤ 17 years) was linked to a three-fold higher risk of HPV positivity (OR = 3.0, 95 % CI 1.56–5.7). Having more than one sexual partner in the past year was also associated with increased risk (OR = 2.3, 95 % CI 1.6–2.5). Low educational attainment (none/elementary school) was strongly

Table 1
Sociodemographic characteristics of participants (n = 90).

Age (years)	Frequency	%	Cumulative frequency
18–29	32	35.5	35.5
30–45	58	64.5	100
Place of birth			
Palermo and nearby	73	81.1	81.1
Sicily	15	16.6	97.7
Italy	1	1.2	98.8
Europe or elsewhere	1	1.1	100
City of residence			
Palermo	82	91.2	91.1
Near Palermo	8	8.8	100
Education			
None/elementary school	3	3.3	3.3
Middle school	18	20.0	23.3
High school diploma	31	34.5	57.7
Degree or more	38	42.2	100

associated with infection (OR = 2.8–3.1). Protective factors included having at least one pregnancy (OR = 0.3, 95 % CI 0.10-0.37) and not smoking (OR = 0.8, 95 % CI 0.49-1.56). These associations are summarized in Table 2.

Discussion

This cross-sectional study investigated how women in Italy access information on HPV and vaccination, and the relative role of healthcare professionals vs social media in shaping awareness and decision-making.

The findings highlight three main points: first, awareness of HPV is high, yet vaccination coverage remains low; second, healthcare professionals remain the most influential and trusted source of information, whereas social media plays a marginal role; and third, sociobehavioural risk factors, particularly early sexual debut and low educational attainment, are strongly associated with HPV infection.

Awareness-uptake gap

Nearly nine in 10 women in the study sample had heard of HPV, and the majority were aware of its link with cancer. However, only 14 % reported being vaccinated. This discrepancy confirms that knowledge alone is insufficient to drive vaccine uptake, echoing previous studies showing that information does not automatically translate into preventive behaviours [17,18]. The finding that 63 % of participants did not know how to access vaccination services further supports the importance of organizational barriers, beyond individual awareness or intention.

Healthcare professionals vs social media

The results show that physicians were the main source of vaccine information, followed by television and the Internet. Social media played only a limited role, with almost 60 % of women reporting that they never used social media for HPV information and very few feeling influenced by online content. This contrasts with concerns about the strong influence of digital misinformation, but is consistent with Italian and international studies showing that healthcare professionals remain the most trusted and impactful actors in vaccine communication [19,20]. Strengthening their capacity to deliver clear, evidence-based messages may therefore be a more effective strategy than relying

primarily on social media campaigns [21].

Sociobehavioural risk factors

The associations reported in Table 2 indicate that early sexual debut, multiple partners and low educational level were strongly related to HPV positivity in this sample. These findings mirror international evidence that highlights behavioural and social determinants as major drivers of the risk of HPV infection [22,23]. Educational level appears to play a dual role: it affects both risk of infection and access to information, reinforcing the need for targeted interventions for less educated women [24].

Implications for practice and policy

The limited role of social media observed in this study may be explained by several factors. First, the level of trust in online sources remains low among adult women, who tend to consider healthcare professionals as the most reliable source of vaccine information. Second, demographic characteristics such as age, education level and digital literacy likely influenced the extent to which participants relied on social media for health decisions. These findings suggest that the effectiveness of social media campaigns depends on their ability to integrate credible, evidence-based content and to reach users through trusted networks.

Future strategies should therefore combine digital communication with direct counselling and community-based interventions led by healthcare professionals. Integrating social media campaigns within existing prevention programmes could enhance the consistency of messages and promote informed decision-making about HPV vaccination. Further research should explore the types of online content that foster trust and engagement, as well as how healthcare professionals can actively participate in shaping online health communication.

The restricted influence of social media identified in this study can be explained through many contextual considerations. Adult women frequently demonstrate lower trust in online health information, while expressing increased confidence in healthcare professionals as credible sources of immunization advice. Recent research has established that disinformation and fragmented communication on social platforms diminish perceived trustworthiness, especially among adult and clinic-attending populations [25,26]. Additionally, demographic and behavioural characteristics – such as older age, reduced digital literacy, and restricted participation in online health communities – further constrain the influence of social media on vaccine decision-making. These findings align with other research indicating that although social media can affect attitudes, its effect on behaviours is controlled by individual trust and contextual circumstances [27].

From a public health perspective, the increasing significance of digital communication should not be ignored, but should be incorporated carefully with professional counselling. Strategies grounded in empirical evidence include improving provider communication competencies; systematic training for physicians and midwives has demonstrated an improvement in HPV vaccination rates and confidence [28]. Mixed campaigns that combine online information with individualized suggestions from healthcare professionals provide a greater behavioural impact than social media advertising alone [27], enhancing the reliability and dissemination of online information. Healthcare organizations must implement proactive digital strategies utilizing platform-specific formats, collaborate with credible communicators, and counter disinformation rapidly [25].

Review of the literature indicates a persistent gap: most studies on social media communication focus on teenagers or parents, whereas few investigate adult women in clinical settings. Subsequent studies should concentrate on this subgroup, evaluating the interplay of trust, digital engagement, and sociodemographic variables in influencing vaccination choices.

Table 2
Prevalence of human papillomavirus (HPV) and odds ratios (OR) by socio-behavioural characteristic.

Age (years)	n	HPV positive	%	OR	95 % CI	p-value
18–29	32	22	68.7	2.5	0.66–9.33	0.175
30–45	58	47	81	1		
Age at sexual debut (years)						
≤17	22	20	90	3.0	1.56–5.7	0.00089
≥18	36	12	33.3	1		
More than one partner in last 12 months						
Yes	14	12	85.7	2.3	1.6–2.5	<0.0001
No	72	53	73.6	1		
Pregnancies (n)						
0–1	73	57	78	0.3	0.10–0.37	0.00031
≥2	17	12	70.5	1		
Smoker						
Yes	30	25	83.3	1		0.450
No	60	44	73.3	0.8	0.49–1.56	
Educational level						
None/elementary school	3	2	66.6	3.1	2.9–3.3	<0.0001
High school diploma	18	16	88.9	2.8	2.4–3.1	<0.0001
Diploma	31	25	80.6	1		0.249
Degree	38	25	68.4	1.1	0.94–1.3	

CI, confidence interval.

Taken together, these results suggest that public health strategies should prioritize the role of healthcare professionals as trusted messengers, while simultaneously addressing practical barriers by ensuring clear and accessible pathways to vaccination services. In addition, communication and prevention initiatives need to be tailored to vulnerable groups, particularly immigrant women and those with lower educational attainment, who may be at greater risk of both HPV infection and reduced vaccine uptake.

Strengths and limitations

A strength of this study is the detailed exploration of both knowledge and sources of information in a real-world Italian context. However, the findings should be interpreted with caution due to the relatively small sample size and the use of a convenience sample drawn from a specialist outpatient clinic, which may have introduced selection bias and limits generalizability. This population provided meaningful insight into women's information pathways and vaccine decision-making, offering preliminary evidence to guide future large-scale and multi-centre studies. Future studies with larger and more diverse populations are needed to better understand the interplay between social media, professional communication, and vaccine adherence. The cross-sectional design of the present study also prevented causal inference.

Conclusion

Despite high awareness of HPV among Italian women, vaccination uptake remains low, and social media only plays a marginal role in vaccine decision-making. Healthcare professionals remain the most trusted and impactful source of information, underscoring their central role in public health strategies.

To close the gap between awareness and action, policies should strengthen professional-led communication, ensure clear pathways to vaccination services, and target vulnerable groups with tailored interventions. Investing in these approaches is essential to increase HPV vaccine coverage and reduce the burden of HPV-related cancers.

CRediT authorship contribution statement

Cristina Lumia: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

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Declaration of competing interest

The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data are available from the corresponding author on reasonable request.

References

- [1] Kanchan S, Gaidhane A. Social media role and its impact on public health: a narrative review. *Cureus* 2023;15:e33737.
- [2] Farsi D, Martinez-Menchaca HR, Ahmed M, Farsi N. Social media and health care (Part II): narrative review of social media use by patients. *J Med Internet Res* 2022; 24:e30379.
- [3] Dunn AG, Surian D, Leask J, et al. Mapping information exposure on social media to explain differences in HPV vaccine coverage in the United States. *Vaccine* 2017; 35:3033–40.
- [4] Ortiz-Sánchez E, Velando-Soriano A, Pradas-Hernández L, et al. Analysis of the anti-vaccine movement in social networks: a systematic review. *Int J Environ Res Public Health* 2020;17:5394.
- [5] Wolf J, Kist LF, Pereira SB, Quessada MA, et al. Human papillomavirus infection: epidemiology, biology, host interactions, cancer development, prevention, and therapeutics. *Rev Med Virol* 2024;34:e2537.
- [6] Trottier H, Franco EL. The epidemiology of genital human papillomavirus infection. *Vaccine* 2006;24(Suppl. 1):S1–.
- [7] Slade BA, Leidel L, Vellozzi C, et al. Postlicensure safety surveillance for quadrivalent human papillomavirus recombinant vaccine. *J Am Med Assoc* 2009; 302:750–7.
- [8] Klein NP, Hansen J, Chao C, et al. Safety of quadrivalent human papillomavirus vaccine administered routinely to females. *Arch Pediatr Adolesc Med* 2012;166: 1140–8.
- [9] Giorgi Rossi P, Chini F, Bisanzì S, et al. Distribution of high and low risk HPV types by cytological status: a population based study from Italy. *Infect Agent Cancer* 2011;6:2.
- [10] Angioli R, Casciello M, Lopez S, et al. Assessing HPV vaccination perceptions with online social media in Italy. *Int J Gynecol Cancer* 2019;29:453–8.
- [11] Sharon AJ, Yom-Tov E, Baram-Tsabari A. Vaccine information seeking on social Q&A services. *Vaccine* 2020;38:2691–9.
- [12] Hwang J. Health information sources and the influenza vaccination: the mediating roles of perceived vaccine efficacy and safety. *J Health Commun* 2020;25:727–35.
- [13] Hansen RK, Baiju N, Gabarron E. Social media as an effective provider of quality-assured and accurate information to increase vaccine rates: systematic review. *J Med Internet Res* 2023;25:e50276.
- [14] Bogani G, Ghelardi A, Sopracordevole F, et al. Human papillomavirus (HPV) vaccination: a call for action in Italy. *Int J Gynecol Cancer* 2023;33:1132–9.
- [15] Matranga D, Lumia C, Guarneri R, et al. The vaccination & Hpv Knowledge (THINK) questionnaire: a reliability and validity study on a sample of women living in Sicily (southern Italy). *PeerJ* 2019;7:e6254.
- [16] Vagias WM. Likert-type scale response anchors. Clemson, SC: Clemson University, Clemson International Institute for Tourism & Research Development, Department of Parks, Recreation and Tourism Management; 2006.
- [17] Corace K, Garber G. When knowledge is not enough: changing behavior to change vaccination results. *Hum Vaccin Immunother* 2014;10:2623–4.
- [18] Nuti SV, Armstrong K. Lay epidemiology and vaccine acceptance. *J Am Med Assoc* 2021;326:301–2.
- [19] Warner EL, Ding Q, Pappas L, et al. Health care providers' knowledge of HPV vaccination, barriers, and strategies in a state with low HPV vaccine receipt: mixed-methods study. *JMIR* 2017;3:e12.
- [20] Alasmari A, Larson HJ, Karafillakis E. A mixed methods study of health care professionals' attitudes towards vaccination in 15 countries. *Vaccine X* 2022;12: 100219.
- [21] Hofstetter AM, Rosenthal SL. Factors impacting HPV vaccination: lessons for health care professionals. *Expert Rev Vaccines* 2014 Aug;13:1013–26.
- [22] Vinodhini K, Shanmughapriya S, Das BC, Natarajaseenivasan K. Prevalence and risk factors of HPV infection among women from various provinces of the world. *Arch Gynecol Obstet* 2012;285:771–7.
- [23] Zimet GD, Rosberger Z, Fisher WA, et al. Beliefs, behaviors and HPV vaccine: correcting the myths and the misinformation. *Prev Med* 2013;57:414–8.
- [24] Ismail H, Rafiq S, Shakoor S, et al. Assessing the role of education in adult women's knowledge and awareness of human papillomavirus and human papillomavirus vaccine. *J Ayub Med Coll Abbottabad* 2017;29:128–31.
- [25] Giannella L, Grelloni C, Natalini L, et al. The role of internet information on anti-HPV vaccines: a comprehensive overview of a double-edged sword. *Vaccines (Basel)* 2025;13:445.
- [26] Rodrigues F, Ziade N, Jatuworapruk K, Caballero-Urbe CV, Khursheed T, Gupta L. The impact of social media on vaccination: a narrative review. *J Korean Med Sci* 2023;38:e326.
- [27] Ilic I, Jakovljevic V, Gajdacs M, Paulik E, Ilic M. Multilevel interventions aimed at improving HPV immunization coverage: a systematic review and meta-analysis. *Vaccines (Basel)* 2025;13:1001.
- [28] Chandeying N, Thongseiratch T. Clinician communication training to increase human papillomavirus vaccination uptake: a systematic review and meta-analysis. *Vaccines (Basel)* 2024;12:611.