



Cervical Cancer and HPV vaccination: Insights into knowledge, attitudes, and practices among Albanian women

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ABSTRACT

Introduction: Human papillomavirus (HPV) infection is a widespread skin-to-skin transmitted infection that poses a global health concern. Although Albania faced prior challenges, it has recently introduced a quadrivalent recombinant HPV vaccine, a critical step in preventing cervical cancer among young women. This study aims to identify potential gaps in knowledge and attitudes among Albanian women regarding cervical cancer and HPV infection, as well as provide insights into the effectiveness of the national primary prevention program.

Methods: We conducted a cross-sectional study among 473 Albanian women using an anonymous online questionnaire to collect sociodemographic information, awareness on HPV infection and cervical cancer, and HPV vaccination practices. The association between sociodemographic variables and outcome measures was explored using descriptive statistics and Chi-square tests in SPSS.

Results: Most of the participants fell within the age range of 18 to 30 years old (42.1 %). 71.7 % of the respondents lived in urban areas. According to the study findings, a considerable proportion of the participants demonstrated knowledge of cervical cancer, with 66.6 % correctly identifying HPV infection as a major cause of this disease. Additionally, the study uncovered that a substantial number of participants had an acceptable awareness (59.6 %) about the HPV vaccine. Nevertheless, 48.4 % of the participants expressed concerns about the vaccine's efficacy and safety.

Conclusions: The study reveals knowledge gaps and misconceptions about HPV transmission, hereditary aspects, and its connection to various cancers. While a positive attitude towards preventive measures exists, concerns about HPV vaccination safety and efficacy underscore the need for targeted education campaigns to enhance awareness and accessibility, addressing misconceptions and promoting informed decision-making for effective cervical cancer prevention.

1. Introduction

Human Papillomavirus (HPV) infection represents a significant global health issue. This infection is primarily transmitted through sexual contact and is caused by a small DNA virus belonging to the *Papillomaviridae* family. In this context, understanding the background and prevalence of HPV infection is essential for addressing its far-reaching impact on public health [1,2].

HPV is among the most prevalent skin-to-skin transmitted infections, affecting millions of individuals worldwide. In 2016, the World Health Organization (WHO) estimated that approximately 300 million women globally were affected by HPV [3].

HPV infections can manifest in various forms, ranging from benign conditions like genital warts to more concerning implications, including

the potential development of various cancers [4]. Sexually active individuals are expected to experience at least one type of HPV during their lifetime.

To address this significant health concern, HPV types are systematically classified into high-risk genotypes, probable high-risk, and low-risk variants based on their potential to cause cervical cancer [5]. Within the wide range of over 200 HPV types, previous evidence indicates that high-risk variants contribute to nearly 70 % of all diagnosed cases worldwide, leading to HPV-related cancers [6,7].

The most well-known association with HPV is its link to cervical cancer. Persistent infection with high-risk HPV genotypes, notably HPV-16 and HPV-18, can lead to the development of cervical cancer.

According to WHO, in 2020, there were 604,000 new cases of cervical cancer diagnosed among women globally. Cervical cancer also

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ranks as the fourth most common cancer among women globally. Each year, over 311,000 cervical cancer-related deaths are recorded, particularly in low and middle-income countries [8].

The prevalence of HPV infection varies by region, age group, and gender, and it poses a disproportionate burden on low- and middle-income countries due to limited access to vaccination and screening programs. In contrast, high-income countries have been successful in implementing comprehensive HPV vaccination and screening initiatives, leading to a significant reduction in cervical cancer rates [9].

Global efforts to reduce the incidence of HPV-related diseases, particularly cervical cancer, include vaccination programs targeting both males and females before becoming sexually active, efficient screening methods such as the Pap smear or HPV DNA testing, and educational campaigns advocating for safer sexual practices.

However, vaccination against HPV represents the most cost-effective strategy in the fight against cervical cancer [10]. Three highly immunogenic, safe, and licensed HPV vaccine types are widely utilized globally, including Gardasil 9 (9vHPV), Gardasil (4vHPV), and Cervarix (2vHPV) [11].

Albania, located in the eastern Mediterranean region, is classified as an upper-middle-income country. Over the last decade, the nation has made remarkable advancements in healthcare policies. A significant milestone was achieved in 2019 with the introduction of the National Program for cervical cancer screening (free screening offered to women aged 40–50 years old), supported by the Ministry of Health and Social Protection (MHSP) [12,13].

In 2020, cervical cancer ranked as the second most common cancer among Albanian women aged 15 to 44 years and as the sixth leading cause of cancer related deaths in the same age group [14–16].

On November 2022, Albania introduced the quadrivalent recombinant HPV vaccine (offering protection against four types of HPV, 6,11, 16 and 18) into the National Immunization Program (NIP), recommended to female adolescents of 13 years old, before the first sexual intercourse, aligning with the WHO's recommended primary target groups for HPV vaccination.

Approximately 15,000 young women in Albania are expected to benefit from the ongoing immunization program each year by receiving a single dose in accordance with the National Immunization Committee and WHO evaluations and recommendations [17].

As part of the global strategies to address cervical cancer, the introduction of the HPV vaccine in Albania will bring a new era in preventing the disease. However, to fully understand the overall approach to HPV immunization, a deeper evaluation of cultural, socio-demographic factors, public acceptance of the HPV vaccine, and influences on the target population's vaccination decisions is essential. These considerations are crucial as they may impact the effectiveness of the national primary prevention program.

To our knowledge there is a lack of qualitative studies exploring the HPV knowledge of Albanian women and their attitude towards HPV vaccine. Therefore, we strongly believe that this is the appropriate time and occasion to collect and examine local data about knowledge/awareness levels regarding cervical cancer and HPV infection, as well as to explore the acceptance of the national HPV vaccination program among Albanian women.

2. Materials and methods

2.1. Study design

This cross-sectional study was conducted from December 2023 to January 2024, through an online anonymous questionnaire distributed to women between 15 and 65 years old residing in both urban and rural areas. The sampling method employed was convenience sampling. Prior to the survey's administration, participants were adequately informed on the study's objectives, methods, and data confidentiality. All participants involved in the survey were required to explicitly agree to the

informed consent statement. This step was a crucial prerequisite for the subsequent anonymous survey administration.

The authors developed the questionnaire by drawing on related literature, consulting with experts, and incorporating questions from previous studies with the same topic, ensuring its alignment with the study objectives and feasibility within the current setting. A preliminary questionnaire draft was pilot tested in a sample of 20 women through face-to-face interviews, leading to the identification of potential misconceptions observed during the administration. Finally, the study subjects were enrolled by distributing the questionnaire link generated through the Google Forms tool.

The study was approved by the Ethical Committee at the Catholic University "Our Lady of Good Counsel" of Tirana, Albania, Prot. Nr. 630 on 16/12/2023.

2.2. Study instruments

The questionnaire was created in the Albanian language and included 3 sections. [Section 1](#) was designed to collect participants socio-demographic data. [Section 2](#) assessed knowledge/ awareness on HPV infection, cervical cancer, and HPV related diseases. Meanwhile, the final section addressed HPV vaccination practices, evaluating participants' HPV vaccine program acceptability and willingness to get vaccinated.

2.2.1. Socio-demographic variables

Sociodemographic variables included age (15–17, 18–30, 31–50, 51–65 years), city of residence, residential area (urban/ rural), educational level (high school, bachelor's degree or higher), marital status (single/ married/ divorced-widowed) and occupational status (unemployed/ healthcare workers/ non-healthcare workers). The age categories chosen were determined based on our study objectives and several key considerations, including alignment with internationally recognized life-stage definitions, consistency with national statistical databases, and statistical and analytical relevance, ensuring the survey captures relevant differences in knowledge and behavior patterns. Those having a bachelor's degree or higher were classified with higher education attainment.

2.2.2. Cervical cancer, HPV and HPV related diseases awareness and knowledge outcomes

[Section 2](#) was designed to assess participants' awareness of cervical cancer and the associated risk factors (causes, preventive measures, early detection), as well as knowledge of HPV as a major cause of cervical cancer (transmission routes, sources of knowledge acquisition). Cervical cancer and HPV knowledge questions in this section had three possible answers (Yes/No/Don't know). The single-choice knowledge questions were scored by assigning 1 point for each correct answer (Yes/True), and "no/don't know"/False answers were assigned 0 points [18]. Based on this score, participants achieving a correct answer percentage of more than 50 % were considered to have an acceptable level of HPV knowledge.

2.2.3. HPV vaccination practices outcomes

[Section 3](#) aimed to evaluate participants' knowledge about HPV vaccine (if they had heard of the HPV vaccine), also highlighting sources of information about the vaccine (multiple choice question- 5 different sources of information). Given the recent implementation of the HPV vaccine in the NIP in Albania, participants were asked to indicate the current vaccination status, willingness to receive the vaccine, and awareness of the national immunization campaign. To measure knowledge about the HPV vaccine, the participants were asked to whom the HPV vaccine is recommended (multiple choice question- 3 different statements). Those who responded correctly were considered knowledgeable. Responders' willingness to administer the HPV vaccine or to vaccinate their own children against HPV was evaluated by asking

“Would you undergo such a vaccination/ vaccinate your child against HPV?”. Those answering “Yes” were categorized as expressing willingness towards the HPV vaccine.

2.3. Sample size

The age inclusion criteria for this study were Albanian women between 15 and 65 years old, aiming to capture not only the vaccination-eligible younger women but also the attitudes and practices of mothers and other adult women, who often play a critical role in HPV vaccine-related decision-making for younger family members. According to national demographic data (INSTAT), there are 1,176,519 women in Albania within this age range [19]. The sample size was determined using the following formula: $n = [(Z^2 * p * (1-p)) / E^2]$. As a result, a minimum sample size of 385 was required [20]. However, to compensate for potential data loss due to incomplete responses and age limitation exclusions, data received from 525 respondents were collected. 23 participants didn't fully complete the survey and 31 of them were above the age of 65. Consequently, a total of 473 questionnaires were considered properly/fully completed and included for the statistical analysis.

2.4. Statistical analysis

Google Forms results were exported to Microsoft Excel spreadsheets for statistical analysis.

Statistical analysis was carried out by using Statistical Package for Social Sciences program (SPSS, Version 27.0, IBM). Descriptive statistics, expressed as frequencies and percentages, were used to delineate the characteristic of the study population. Concurrently, cross-tabulation and Chi-square (χ^2) tests were performed to determine whether there was an association between sociodemographic correlate and outcome variables (cervical cancer, HPV/ HPV vaccine awareness, knowledge, and practice outcomes). Moreover, binary loglinear model analyses in SPSS were used to explore patterns and associations between different outcome variables. The odds ratio (OR) and 95 % confidence intervals (95 % CI) were used to assess the strength of the associations. *P* values <0.001 were considered statistically significant.

3. Results

3.1. Socio-demographic characteristics of the participants

The study involved data analysis obtained from 473 respondents (Table 1). The response rate was 90.1 %, with 525 questionnaires distributed and 473 fully completed. The mean age of the participants was 33.82 ± 10.09 years, ranging from 15 to 65 years old. Within the participant, 199 of them (42.1 %) fell within age range of 18–30 years, while 183 respondents (38.7 %) were between 31 and 50 years old. Approximately 71.7 % of participants resided in urban areas, a proportion nearly three times higher compared to those residing in rural areas (28.3 %). Most participants held a bachelor's degree (79.7 %), while a small percentage had only completed high school (18.4 %).

Merely 1.9 % of the participants had attained a higher education qualification. Over half of the surveyed (55.6 %) reported being single, while 39.5 % stated being married.

A substantial portion of the cohort, accounting for 42.9 %, declared being unemployed. Conversely, participants not involved in the healthcare sector constituted a slightly larger percentage, making up 49.7 % of the overall sample. Notably, healthcare professionals constituted a minimal proportion (7.4 %) within this group.

3.2. Awareness and knowledge of HPV infection and HPV vaccine

Most respondents (73.6 %) reported having heard of HPV, highlighting an acceptable level of knowledge within the studied population

Table 1
Socio-demographic profile of the study participants (*N* = 473).

Variables		Number of subjects (%)
Age (in years)	15–17	35 (7.4)
	18–30	199 (42.1)
	31–50	183 (38.7)
	51–65	56 (11.8)
		150 (31.7)
City of residence	Tiranë	56 (11.8)
	Durrës	40 (8.5)
	Elbasan	84 (17.8)
	Korçë	8 (1.7)
	Berat	5 (1.1)
	Dibër	18 (3.8)
	Fier	10 (2.1)
	Gjirokastrë	1 (0.2)
	Krujë	8 (1.7)
	Kukës	12 (2.5)
	Lezhë	9 (1.9)
	Pogradec	5 (1.1)
	Sarandë	21 (4.4)
	Shkodër	46 (9.7)
	Residential area	Urban
Rural		134 (28.3)
Education level	High school	87 (18.4)
	Bachelor degree	377 (79.7)
	Higher degree	9 (1.9)
Relationship status	Single	263 (55.6)
	Married	187 (39.5)
	Other (widowed/ divorced)	23 (4.9)
Occupational status	Unemployed	203 (42.9)
	Healthcare workers	35 (7.4)
	Non-healthcare workers	235 (49.7)

(Table 2). The most frequently mentioned sources for obtaining information about HPV were the internet (31.9 %), medical experts (30.1 %), and television and radio (18.5 %) (Table 3). Comparable tendencies emerged in terms of awareness against HPV vaccine. The primary information sources were the media (28.3 %) and health experts (30.5 %), with the internet (25.1 %) also having a substantial impact. The least mentioned sources included informative journals and input from friends and family (3.7 % and 12.4 %, respectively) (Table 3).

Unprotected sexual intercourse as the primary way of possible HPV transmission was correctly identified by most of participants (70.8 %). However, nearly one-third of interviewees (29.5 %) lacked precise understanding regarding the HPV transmission methods. In addition, a notable misconception regarding the hereditary nature of HPV, was observed, as 38.3 % of respondents incorrectly believe that high-risk HPV genotypes can be inherited, suggesting a potential lack of clarity or a need for additional information. Among the respondents, 25.6 % provided an incorrect response by stating that the Papillomavirus causes HIV/AIDS.

When asked about the types of cancer associated with HPV, approximately two-thirds of the respondents (65.5 %) correctly identified cervical cancer. In contrast, only a small percentage of individuals linked HPV to ovarian cancer (3.4 %) or breast cancer (1.3 %). Notably, there is a knowledge gap concerning the health consequences of HPV-related diseases, as evidenced by 33.4 % of the participants who either possessed lack of information or did not recognize the connection between Papillomavirus infection and cervical cancer.

Most respondents (77.6 %) exhibited a positive outlook on preventive measures, asserting that cervical cancer can be prevented. A recognition of the potential for early diagnosis of cervical cancer was affirmed by 81 % of respondents, demonstrating though an acceptable level of knowledge, with 46.9 % expressing confidence in the safety and efficacy of HPV vaccinations. Concerns or uncertainties about the efficacy and safety of HPV vaccinations were indicated by nearly half of the participants (48.4 %), suggesting a need for further information.

Awareness of HPV vaccines was acceptable, with 59.6 % of respondents reporting familiarity with it. Out of the total responses, 58.8

Table 2
Frequency distributions of questionnaire answers.

<i>Cervical cancer and HPV knowledge questions</i>		Number of subjects (%)
Have you ever heard of HPV?	Yes	348 (73.6)
	No	125 (26.3)
	Don't know	–
Do you think Papillomavirus infection is the major cause for developing cervical cancer?	Yes	315 (66.6)
	No	17 (3.6)
	Don't know	141 (29.8)
Do you think Papillomavirus is the cause of HIV/AIDS disease?	Yes	121 (25.6)
	No	171 (36.1)
	Don't know	181 (38.3)
Do you have a family history of cervical cancer?	Yes	35 (7.4)
	No	438 (92.6)
	Don't know	–
How do you think Papillomavirus is transmitted?	Mother to child	19 (4.0)
	Sexually	309 (65.3)
	Non- sexually	6 (1.3)
	Don't know	139 (29.4)
Some types of Papillomaviruses can cause:	Breast cancer	6 (1.3)
	Cervical cancer	310 (65.5)
	Ovarian cancer	16 (3.4)
	Don't know	141 (29.8)
How common do you think cervical cancer is?	Globally rare	97 (20.5)
	Globally common	255 (53.9)
	Uncommon in Albania	121 (25.6)
	Don't know	–
<i>Cervical cancer and HPV attitude questions</i>		
Do you think that unprotected sexual intercourse may be crucial for HPV transmission?	Yes	335 (70.8)
	No	19 (4.0)
	Don't know	119 (25.2)
Are high-risk HPV hereditary?	Yes	181 (38.3)
	No	292 (61.7)
	Don't know	–
Do you think cervical cancer is a preventable disease?	Yes	367 (77.6)
	No	2 (0.4)
	Don't know	104 (22.0)
Do you think cervical cancer can be detected in early stages?	Yes	383 (81.0)
	No	10 (2.1)
	Don't know	80 (16.9)
Do you think cervical cancer can be prevented through mass vaccination programs?	Yes	278 (58.8)
	No	19 (4.0)
	Don't know	176 (37.2)
<i>HPV vaccination awareness and practices questions</i>		
Are you aware of the existence of the HPV vaccine?	Yes	282 (59.6)
	No	191 (40.4)
	Don't know	–
Did you know that the HPV vaccine is now part of the national vaccination calendar?	Yes	214 (45.2)
	No	259 (54.8)
	Don't know	–
Do you think HPV vaccines are effective and safe?	Yes	222 (46.9)
	No	22 (4.7)
	Don't know	229 (48.4)
Have you ever been vaccinated against HPV?	Yes	34 (7.2)
	No	439 (92.8)
	Don't know	–
Would you consider vaccinating yourself or your child against HPV infection?	Yes	219 (46.3)
	No	84 (17.8)
	Don't know	170 (35.9)

Table 3
Sources of information on HPV infection and vaccine.

	n	%	
HPV infection	Media (TV, radio)	91	18.5
	Internet	157	31.9
	Informative magazines	29	5.9
	Friends and family	67	13.6
	Health professionals	148	30.1
HPV vaccine	Media (TV, radio)	107	28.3
	Internet	95	25.1
	Informative magazines	14	3.7
	Friends and family	47	12.4
	Health professionals	115	30.5

% believed that vaccination campaigns could prevent cervical cancer, while 4.0 % disagreed. Significantly, 37.2 % of respondents expressed uncertainty, suggesting a potential lack of awareness about the contribution of immunization programs to preventing cervical cancer.

Among those surveyed, 54.8 % were unaware regarding the introduction of HPV vaccine in the mandatory immunization calendar in Albania and only 7.2 % of respondents had undergone HPV vaccination, indicating a notably low vaccination rate.

Diverse opinions emerged regarding the prevalence of cervical cancer, with 53.9 % considering it a widespread disease in Albania as well as around the world. On the other hand, 25.6 % believed it to be uncommon, and 20.5 % thought it was extremely rare, suggesting a potential mismatch between perceived and actual incidence rates.

3.3. HPV infection/cervical cancer knowledge

The level of knowledge about HPV varied significantly based on the age group (Table 4). The younger group of participants aged between 15 and 17 years old showed the lowest level of knowledge (45.7 %) and understanding of HPV as a cause of cervical cancer (31.4 %). Only 45.7 % of them knew about the possibility of detecting cervical cancer in the early stages. Additionally, 34.3 % of them correctly knew about the preventability of cervical cancer. On the other hand, respondents over 51 years of age exhibited a higher awareness and knowledge of HPV. Approximately 80.4 % of them had heard about HPV, and 73.2 % correctly linked HPV with cervical cancer.

Based on the study, there was a minimal and not statistically significant difference in the level of knowledge about HPV infection between urban (74.6 %) and rural residents (70.9 %) ($p = 0.406$). Despite the overall acceptable level of knowledge, respondents from urban areas showed a significantly higher level of knowledge regarding the possibility of detecting cervical cancer in early stages ($p < 0.001$) compared to those from rural areas. The study also highlighted that the education level was a strong predictor of HPV knowledge. Participants holding a bachelor's degree demonstrated the highest levels of knowledge (78.5 %), along with a better comprehension of the association between HPV and cervical cancer (71.9 %). This correlation was statistically significant ($p < 0.001$) when compared to participants having high school education.

Although the trend was not statistically significant, married individuals tended to have higher knowledge levels about HPV. On the other hand, significant differences in knowledge levels were observed among individuals based on their occupational status. Healthcare workers exhibited the highest levels of knowledge, with a 100 % knowledge level of HPV and 97.1 % correctly identifying its link to cervical cancer. Conversely, lower levels of knowledge were observed among unemployed individuals, and the difference was statistically significant when compared to those employed in non-healthcare roles ($p < 0.001$).

3.4. HPV vaccination awareness

The awareness level regarding the HPV vaccine was found to be correlated with the education level of the respondents, as indicated in Table 5. Those holding a bachelor's degree exhibited the highest awareness level (64.5 %), while individuals who completed high school showed a significantly lower awareness level (41.4 %). The willingness to undergo vaccination among the subgroup with high school education was lower, with only 33.3 % expressing readiness ($p = 0.001$). Additionally, the same subgroup demonstrated a lack of knowledge (26.4 %) regarding the efficacy and safety of the HPV vaccine ($p < 0.001$). Occupational status exerted a more pronounced impact on awareness of the HPV vaccine compared to relationship status. Healthcare workers demonstrated an exceptionally high level of HPV vaccine awareness (97.1 %) and expressed confidence in its effectiveness and safety (85.7 %) ($p < 0.001$). Conversely, unemployed individuals exhibited

Table 4
Relationship between participants knowledge about HPV infection/ cervical cancer and the correlate data.

Variable	Heard of HPV				Correctly indicated HPV as the major cause of cervical cancer				Correctly indicated the possibility to detect c.c in early stages				Correctly indicated c.c as a preventable disease			
	n	%	χ^2	p	n	%	χ^2	p	n	%	χ^2	p	n	%	χ^2	p
Age (years)																
15–17	16	45.7	17.412	<0.001	11	31.4	23.560	<0.001	16	45.7	33.616	<0.001	12	34.3	22.257	0.001
18–30	144	72.4			131	65.8			164	82.4			129	64.8		
31–50	143	78.1			132	72.1			155	84.7			97	53		
>51	45	80.4			41	73.2			48	85.7			40	71.4		
Residential area																
Urban	253	74.6	27.871	0.406	238	70.2	7.017	0.03	291	85.8	19.946	<0.001	210	61.9	5.680	0.058
Rural	95	70.9			77	57.5			92	68.7			68	50.7		
Education level																
High school	47	54	23.340	<0.001	40	46	26.425	<0.001	52	59.8	50.992	<0.001	35	40.2	33.147	0.001
Bachelor's degree	296	78.5			271	71.9			328	87			242	64.2		
Higher degree	5	55.6			4	44.4			3	33.3			1	11.1		
Relationship status																
Single	184	70	3.973	0.137	164	62.4	6.563	0.161	202	76.8	13.066	0.011	151	57.4	1.423	0.840
Married	146	78.1			136	72.7			165	88.2			115	61.5		
Other (widowed/divorced)	18	78.3			15	65.2			16	69.6			12	52.2		
Occupational status																
Unemployed	137	67.5	16.649	<0.001	115	56.7	26.073	<0.001	150	73.9	16.481	0.002	116	57.1	24.381	<0.001
Healthcare workers	35	100			34	97.1			35	100			30	85.7		
Non healthcare workers	176	74.9			166	70.6			198	84.3			132	56.2		

Bold p values indicate that the association between variables is significant.
C-C (Cervical cancer).

Table 5
Relationship between participants attitudes towards HPV vaccine and the correlate data.

Variable	Heard of HPV vaccine				HPV vaccine effective and safe				Aware of HPV vaccine being part of the national vaccination calendar				Willingness to administer the HPV vaccine or to vaccinate their own children			
	n	%	χ^2	p	n	%	χ^2	p	n	%	χ^2	p	n	%	χ^2	p
Age (years)																
15–17	15	42.9	5.123	0.163	12	34.3	6.169	0.405	12	34.3	9.463	0.024	12	34.3	17.761	<0.001
18–30	117	58.8			100	50.3			83	41.7			104	52.3		
31–50	115	62.8			81	44.3			84	45.9			75	41		
>51	35	62.5			29	51.8			35	62.5			28	50		
Residential area																
Urban	212	62.5	4.231	0.040	173	51	15.626	<0.001	152	44.8	0.079	0.778	160	47.2	0.391	0.822
Rural	70	52.2			49	36.6			62	46.3			59	44		
Education level																
High school	36	41.4	18.270	<0.001	23	26.4	28.673	<0.001	31	35.6	6.335	0.042	29	33.3	17.626	0.001
Bachelor's degree	243	64.5			198	52.5			181	48			187	49.6		
Higher degree	3	33.3			1	11.1			2	22.2			3	33.3		
Relationship status																
Single	150	57	1.704	0.427	122	46.4	8.762	0.067	107	40.7	4.985	0.083	125	47.5	5.330	0.255
Married	117	62.6			92	49.2			95	50.8			88	47.1		
Other (widowed/divorced)	15	65.2			8	34.8			12	52.2			6	26.1		
Occupational status																
Unemployed	112	55.2	22.435	<0.001	95	46.8	25.082	<0.001	87	42.9	8.344	0.015	98	48.3	16.987	0.002
Healthcare workers	34	97.1			30	85.7			24	68.6			26	74.3		
Non-healthcare workers	136	57.9			97	41.3			103	43.8			95	40.4		

Bold p values indicate that the association between variables is significant.

significantly lower awareness and less confidence in its effectiveness and safety compared to healthcare workers ($p < 0.001$).

Among respondents aged 15 to 17 years, there was a notable lack of awareness regarding the HPV vaccine, with 57.1 % being unaware of its existence, and 65.7 % having no confidence about its safety and effectiveness. Additionally, only 34.3 % of this age group expressed willingness to receive the HPV vaccine or vaccinate their children. In comparison, those aged 18 to 30 years demonstrated the highest willingness, with 52.3 % expressing a positive inclination ($p < 0.001$). Furthermore, the age of the interviewees significantly influenced their awareness of HPV vaccine being part of the national mandatory vaccination schedule, with only one-third of respondents aged 15 to 17 years being aware of it. Within each age group, the percentage of well-

informed respondents increased with age, however this difference was not statistically significant.

Adjusted odds ratio (ORs) along with 95 % CI for various aspects of knowledge on cervical cancer, HPV, and HPV vaccine are presented in Table 6. Participants who possessed acceptable knowledge about the HPV vaccine were about five times more likely to express confidence in its safety and effectiveness ($\chi^2 = 14.1986$; $p < 0.001$). Those who were aware of cervical cancer as a preventable disease through mass vaccination programs were 15 times more likely to express a willingness to receive the HPV vaccine ($\chi^2 = 30.1189$; $p < 0.001$). Furthermore, respondents with an acceptable knowledge level about the HPV infection were 7 times more likely to be aware of HPV vaccine inclusion in the national vaccination calendar ($\chi^2 = 65.2405$; $p < 0.001$). In addition,

Table 6

Adjusted odds ratio (ORs) along with 95 % CI for various aspects of knowledge on cervical cancer, HPV, and HPV vaccine.

Variables		χ^2	p value	Odds ratio	95 % Confidence interval	
					Lower limit	Upper limit
HPV vaccine knowledge	Knowing HPV vaccine to be safe and effective	14.1986	0.000164*	5.13	2.04	12.9
Knowing c.c can be prevented through mass vaccination programs	Willingness to receive the HPV vaccine	30.1189	0.00001*	15.42	4.54	52.32
Family history with c.c	Willingness to receive the HPV vaccine	3.785	0.051714	2.81	0.95	8.3
HPV infection knowledge	Knowing HPV infection as the major cause of c.c	3.9695	0.046331	3.15	0.96	10.32
HPV infection knowledge	Knowing HPV vaccine is now part of national vaccination calendar	65.2405	0.00001*	7.67	4.46	13.19
HPV infection knowledge	Knowing the possibility to detect c.c in early stages	1.8307	0.332628	2.37	0.65	8.60
HPV infection knowledge	Knowing c.c as a preventable disease	1.2959	0.254957	4.4	0.27	71.18
HPV infection knowledge	Correctly identified unprotected sexual intercourse may cause the HPV transmission	0.6272	0.428372	0.45	0.06	3.45
Family history with c.c	HPV vaccine knowledge	13.1599	0.000286*	5.77	2	16.64
Family history with c.c	HPV infection knowledge	2.8656	0.09049	2.26	0.86	5.97
Family history with c.c	Knowing HPV vaccine is now part of national vaccination calendar	2.1604	0.141606	1.68	0.84	3.36

p value significant at <0.001*.

Bold *p* value indicates that the association between variables is significant.

c.c (cervical cancer).

individuals with a family history of cervical cancer were approximately six times more likely to have accurate knowledge about the HPV vaccine ($\chi^2 = 13.1599$; $p < 0.001$).

4. Discussion

In the present study, participants showed acceptable cervical cancer knowledge (65.5 %), with 66.6 % correctly identifying HPV infection as the primary cause. These results are crucial for guiding future interventions to maintain or improve HPV awareness in the target group.

A previous cross-sectional survey conducted among women in Kosovo revealed a limited level of knowledge and awareness about HPV infection (33.3 %) [21]. Similarly, Chinese women aged 31 to 40 exhibited comparable trends in HPV knowledge, with a rate of 32.9 %. In China, the HPV vaccine is not included NIP and is instead privately purchased as an out-of-pocket service [22]. There were knowledge gaps observed among women in Belgium and Turkey, respectively, 83 % and 60 % didn't recognize the association between HPV infection and cervical cancer. [23,24]. In contrast, highly developed countries Denmark, Sweden, and Norway showed notable levels of HPV awareness, respectively 75.8 %, 74.8 %, and 62.4 % [25].

Previous studies have reported various factors affecting the level of knowledge and attitudes towards cervical cancer, including women's education status (with a positive association between education level and HPV knowledge), age, exposure to multiple health information sources, residential area, relationship status, and family history of cervical cancer [26–29]. Higher education is associated with improved access to accurate health information sources, greater ability to comprehend and retain health-related knowledge, and a proactive approach to seeking and understanding information about health issues like cervical cancer and HPV. Nevertheless, geographic location, particularly residing in urban areas, positively impacts the access to healthcare resources, awareness, and preventive measures campaigns, leading to increased knowledge and awareness compared to rural areas.

In the present study, the analysis conducted across all demographic variables confirmed that individuals with higher education levels and those employed in the healthcare sector exhibited greater awareness of the HPV vaccine. They demonstrated a more comprehensive understanding of its safety and efficacy, along with a higher willingness to undergo such vaccination.

In addition, our study revealed that the primary channels for obtaining information about HPV infection were the internet (31.9 %

and healthcare providers (30.1 %). Given the fact that that trusted sources were among the most frequently cited information outlets for Albanian women, it is recommended that HPV awareness campaigns target healthcare professionals. Consistent with our findings, previous studies on HPV awareness also affirm that physicians, healthcare workers, and the media are commonly mentioned as the primary sources of knowledge acquisition [29,30].

In our study, 59.6 % of participants were aware of the HPV vaccine, with 46.3 % expressing willingness to vaccinate themselves or their children. However, nearly half of the participants (48.4 %) expressed doubts concerning the efficacy and safety of the HPV vaccine, potentially serving as a barrier to future vaccination rates.

Several factors, surrounding the recently introduced HPV vaccine in our country, may contribute to vaccine hesitancy. Firstly, given Albania's previous experience with the communist regime and isolation (from 1946 to 1991), cultural and religious beliefs, especially those that "morally" based oppose the acceptance of vaccines for sexually transmitted infections, could play a role in fostering resistance. Furthermore, it is important to consider that social stigma surrounding sexual health is still present [31]. Secondly, like the introduction of any new vaccine within a population, challenges, due to parents concerns about vaccine safety influenced by negative perceptions or misconceptions, are expected to emerge. In this context, correctly addressing this final concerns is crucial, given that parental decision making to vaccinate their own children appear to be highly influenced by considerations of both vaccine risks and benefits [32].

In 2023, HPV vaccinations were administered to 15,000 young women in Albania [33]. HPV vaccination awareness campaigns, in health units and primary schools, have been organized by MHSP and Institute of Public Health. Furthermore, a recent initiative has been implemented involving an expanded HPV vaccination campaign targeting young women aged 14 to 20 years in the country [34]. This campaign initiated in January 2024 as part of UNFPA (United Nations Fund for Population Activities) Albania's commitment, in partnership with the Ministry of Health and Social Protection and the Institute of Public Health in Albania and is projected to run throughout the entire 2024.

Despite the implementation of HPV vaccination program in Albania only a few months apart from those in Kosovo and Serbia, contrasting outcomes were observed. Studies conducted in the neighboring countries of Albania have shown low levels of awareness regarding the HPV vaccine among women in Kosovo (29.6 %), Serbia (23 %), and Turkey

(40 %) [21]. In Kosovo, the HPV vaccine, recommended for young women aged 12 years, was incorporated into the NIP in October 2023, while in Serbia, the vaccine has been implemented since 2022, primarily targeting children and adolescents aged 9–19 years [35–37].

In a prior study involving young Italian women aged 14–24 years, despite relatively low levels of knowledge about HPV infection and cervical cancer (23.3 %), a significant percentage (81.7 %) expressed willingness to receive the HPV vaccine in the future [38]. This increased willingness to undergo vaccination could be linked to cervical cancer's prevalence as the fifth most common cancer among Italian women under 50 years [39]. Furthermore, well-documented evidence suggests that younger individuals exhibit more positive attitudes towards the HPV vaccine in comparison to the older ones [31]. Apart from cultural norms, healthcare access, and personal experiences, younger age groups typically benefit from information access through various digital avenues, particularly on social media platforms, contributing this way to a more favorable perception/attitudes on HPV vaccination.

As for Tukey, another southeastern Europe country, cervical cancer represents the 12th most prevalent cancer overall and the 5th most frequent cancer in the age range of 15 to 44 years [40]. Although, this country has not yet included the HPV vaccine in its national immunization program, studies have reported that women in Turkey would accept the HPV vaccination if available (70 %) [24]. This observation requires further investigation, but a possible reason could be related to a sense of individual responsibility among the population to safeguard against preventable diseases, despite the absence of a NIP effort.

In a sample cross-sectional survey conducted among Romanian women, it was observed that 50.7 % expressed a favorable attitude towards the HPV vaccine. The predominant obstacles to vaccination included concerns about potential side effects and the perception of associated risks [41].

In terms of factors influencing awareness of the HPV vaccine, it appears that being married was identified as a positive contributing factor [25]. The increased awareness of the HPV vaccine among individuals who are married or in a committed relationship may be attributed to the likelihood of more open communication about health matters within such relationships. Partnerships and marital commitments often involve shared responsibilities, including discussions about preventive healthcare measures.

Aligned with our findings, a study conducted in Poland demonstrated that the awareness towards the HPV vaccine eligible population and the willingness to get the vaccine appear to be strongly associated with sociodemographic factors [42]. This observation underscores the importance of implementing extensive media communication campaigns led by healthcare professionals and public health authorities with a primary focus on reaching parents with lower educational attainment, residents of rural areas and with no access to advanced healthcare facilities.

4.1. Recommendations

The present study aims to shape public health strategies by providing essential data on identifying trends of awareness and acceptance, though improving early detection, overcome barriers and immunization coverage. Understanding our local context is essential to support further efforts to combat HPV-related diseases and the adoption of best practices.

We strongly suggest integrating HPV education into school curricula, emphasizing the importance of vaccination, as potential strategies to improve HPV-related knowledge. Additional efforts to educate, involve and training family members, schoolteachers and other community stakeholders are also needed. Moreover, physicians/ health providers, as a trusted source of information and as main actors in improving the HPV related well-being in community, should be constantly updated on this subject.

To decrease the incidence of cervical cancer among the younger

population in Albania, it is advisable to include also young males into the national vaccination schedule. This initiative should be anticipated by providing sustained educational programs in both rural and urban areas.

According to WHO Cervical Cancer Elimination Strategy, by the end of 2030, 90 % of women by the age of 15 years should be fully vaccinated against HPV. In this context, future research is needed to examine HPV vaccination coverage, with an emphasis on the factors contributing to disparities in vaccination rates and access to healthcare among different ethnic groups. Such studies would offer a more thorough understanding of the barriers to vaccination within these communities.

Although, Albania has implemented the newly vaccination program against HPV, the vaccination alone is insufficient. To effectively achieve the elimination of the cervical cancer as a public health concern, a combination approach involving broad-scale vaccination, screening and proper treatment must be applied across the population.

4.2. Study strength and limitation

To the best of our knowledge, this is the first study exploring the level of knowledge attitudes regarding cervical cancer and HPV as well as investigating the willingness, beliefs, and practices towards HPV vaccine.

Therefore, we strongly believe that analyzing Albanian women attitudes and further comparing these findings with analogous studies conducted in other nations is of significant interest. The overall aim is to highlight trends, differences, or similarities in HPV knowledge and attitudes towards HPV vaccination practices, considering disparities in the timing and approaches adopted for HPV immunization programs and cervical cancer prevention.

Limitations of the study include the exclusive representation of females in the sample, as they were the primary targets of the NIP in Albania. This gender imbalance may restrict the generalizability of the findings to male populations. Additionally, while efforts were made to ensure the representativeness of the sample, the reliance on online questionnaires may have introduced biases such as social desirability or information-seeking tendencies. Despite these limitations, this study provides valuable insights into the understanding of HPV awareness gaps among women, thereby contributing to the identification of public health interventions in the future.

5. Conclusion

In conclusion, although the majority of respondents were aware of HPV, significant deficiencies in comprehending its transmission, hereditary characteristics, and its association with cancers beyond cervical cancer were observed. While most respondents exhibit a positive attitude towards preventive measures, apprehensions regarding the safety and effectiveness of HPV vaccinations underscore the necessity for focused educational initiatives. The observed low awareness of HPV vaccines and the lack of knowledge about its inclusion in Albania's immunization calendar, emphasize the critical need to improve public awareness and facilitate access to vaccination programs. The study also exposes varying perceptions about the prevalence of cervical cancer, indicating a potential mismatch between perceived and actual incidence rates. Addressing these knowledge gaps, misconceptions, and promoting informed decision-making regarding HPV vaccination can significantly contribute to the overall public health effort in preventing cervical cancer and associated diseases.

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