Research Paper

Applying the Health Belief Model to Assess Human Papillomavirus Knowledge and Vaccination Attitudes among Women in Saudi Arabia: A Cross-Sectional Study

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CHuman papillomavirus, a widespread sexually transmitted infection, is associated with significant health complications, including cervical cancer, other anogenital cancers, and oropharyngeal cancers. The human papillomavirus vaccine has been shown to effectively reduce the incidence of these human papillomavirus-related diseases. Despite the availability of the vaccine and its proven benefits, uptake rates remain suboptimal in various regions, including Saudi Arabia. Understanding the factors influencing human papillomavirus vaccine acceptance is crucial for designing effective public health interventions. A cross-sectional survey was carried out involving women aged 18 y and above in Saudi Arabia from March 5th to April 30th, 2023. Participants were recruited through social media platforms. Data was gathered using a self-administered questionnaire adapted from a survey used in a previous study. Data analysis was performed using statistical package for social sciences version 21.0, with $p<0.05$ considered statistically significant. In this study among 792 participants, only 4.3 % were vaccinated against human papillomavirus, and many showed limited knowledge about the virus and its vaccine. Most were unsure about human papillomavirus's risks, its link to cervical cancer, and vaccine recommendations. Only 24.5 % believed females were at risk, and 31.69 % saw vaccination as beneficial for preventing warts. Common concerns included cost, safety, and religious or moral beliefs. Older participants and those who were married had better knowledge and a stronger sense of risk. While many women are aware of human papillomavirus, there are still misunderstandings about its risks, seriousness, and the benefits of prevention. This highlights the need for educational efforts that encourage vaccination, address common barriers, and promote open conversations about sexual health, helping women make informed choices for better health.

Key words: Human papillomavirus, cervical cancer, vaccination, health belief model

Human Papillomavirus (HPV) ranks among the most common sexually transmitted infections worldwide and poses a significant public health concern due to its association with various cancers, particularly cervical cancer[1,2]. Cervical cancer is the 4th most frequently diagnosed cancer in women worldwide, with approximately 660 000 new cases and 350 000 deaths recorded in 2022[3]. The World Health Organization (WHO) emphasizes the HPV vaccine's role in preventing cancers related to HPV[4]. Despite this, vaccination rates remain alarmingly low worldwide. In Saudi Arabia, national HPV vaccination coverage is currently unknown due to a lack of published data on vaccine uptake. However, several surveys suggest low vaccination rates, ranging from 1 % to 8.7 %[5-9]. In 2023, Saudi Arabia reported 358 cases of cervical cancer, with a crude rate of 2.4 per 100 000 women and a mortality-to-incidence ratio of 0.5[10]. Although the incidence rate is lower than global figures, the low vaccination coverage remains concerning. This issue is particularly pressing, as HPV is linked not only to cervical cancer but also to other anogenital and oropharyngeal cancers, which could largely be prevented with higher vaccine uptake[11,12].

The Health Belief Model (HBM) provides a valuable framework for understanding the psychological factors that influence health behaviours, including vaccination decisions. By examining these factors,

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we can identify barriers and facilitators that help shape public health interventions[13,14]. According to Rosenstock *et al*.[14], the HBM posits that individual's decisions to engage in health-promoting behaviours, such as receiving the HPV vaccine, are shaped by their perceived risk of contracting the disease, perceived severity, perceived benefits of preventive measures, perceived barriers, and self-efficacy. In the context of HPV vaccination, perceived susceptibility refers to a woman's belief about her risk of contracting HPV, while perceived severity reflects her attitudes toward health risks like cervical cancer. Perceived benefits relate to the vaccine's effectiveness, whereas perceived barriers might include concerns about vaccine safety, cost, or social stigma[15].

Currently, no research has applied the HBM to investigate HPV-related preventive behaviours among Saudis. Existing studies primarily focus on general knowledge and attitudes toward HPV and the vaccine without using the HBM framework to assess how perceptions of susceptibility, severity, benefits, barriers, and self-efficacy influence vaccine uptake[6-9,16,17]. This study aims to evaluate HPV knowledge and attitudes among Saudi residents using the HBM framework. By analysing how perceptions of susceptibility, severity, benefits, barriers, and self-efficacy shape vaccination attitudes, this research seeks to identify key factors impacting HPV vaccine uptake and to inform targeted health promotion strategies.

MATERIALS AND METHODS

Study design and setting:

This cross-sectional study involved women aged 18 y and older, with participants recruited through social media channels such as Twitter, Facebook, and WhatsApp. The survey was distributed electronically and data was collected from March 5th to April 30th, 2023.

Data collection:

A self-administered, predesigned questionnaire was developed for this study, drawing from a validated instrument used in Saudi Arabia. The questionnaire was adapted with permission from a previous study[17]. Questionnaire comprises three sections; sociodemographic, knowledge about HPV and HBV scale for HPV and HBV vaccine. The first section gathers demographic data including gender, age, nationality, marital status, education level, and employment. The second section, included participants' knowledge of HPV. Topics include the prevalence of HPV, its role in cervical cancer, the availability of the HPV vaccine, and common misconceptions about HPV infection and vaccination. Responses were categorized as true, false or i do not know. Scores were assigned as follows; one point was given for true responses to correct statements and for false responses to incorrect statements. Responses of do not know and incorrect answers (where true was given for incorrect statements and false for correct ones) were assigned a score of zero. To assess the internal consistency of the survey items, Cronbach's Alpha was calculated. The last section was the HBM related questions. To assess the internal consistency of the survey items, Cronbach's Alpha was calculated. The Cronbach's Alpha coefficient for the scale was between 0.769-0.825, indicating acceptable reliability of the measure. To ensure the validity of the survey, a pilot study with a sample size of 20 was conducted to examine the validity of the questionnaire. This preliminary assessment ensured the clarity of the questions and estimated the time required for completion, which was approximately 6-10 min. The questionnaire was refined based on pilot study feedback, and participants from the pilot study were excluded from the main research.

Statistical analysis:

Data analysis was performed using Statistical Package for Social Sciences (SPSS) version 21.0 (SPSS Inc., IBM, USA). Socio-demographic characteristics and HPV knowledge of the participants were presented as counts and percentages. The average scores on the HBM scale for HPV and the HPV vaccine were reported in terms of counts, percentages, and medians. Non-parametric tests (Kruskal-Wallis test) assessed differences in knowledge and HBM scores across different demographic groups. A $p<0.05$ was considered statistically significant.

RESULTS AND DISCUSSION

The study included a total of 792 participants, with the majority (54.7 %) falling in the age range of 18 y-25 y, followed by those aged >35 y (33.8 %). Most participants were Saudi nationals (96.4 %), while only 3.5 % were non-Saudi. Regarding marital status, the majority were single (58.1 %). In terms of HPV vaccination status, only 4.3 % of participants had received the vaccine, while the overwhelming majority (95.7 %) had not been vaccinated. The socio-

demographic characteristics and HPV vaccination status for study participants were presented in Table 1.

The participant's knowledge of HPV was summarized in Table 2. The median knowledge score of all participants was 1 with a range of scores from 0 to 7. A majority (62.1 %) were unsure whether HPV is a relatively rare sexually transmitted infection, and 58.9 % did not know if most people with genital HPV infections are symptomatic. Moreover, 66.5 % were unsure whether the same HPV strains responsible for cervical cancer also cause genital warts, and 56.4 % were uncertain if sexually active adolescents should undergo HPV testing before vaccination. Additionally, 63.4 % were unaware that nearly all cervical cancers result from HPV infection, and 65.9 % did not know the HPV vaccine is not recommended for women over 26 y. Over half (56.3 %) were unclear on whether the HPV vaccine is available for both genders, and 68.7 % were unsure if individuals diagnosed with HPV should avoid vaccination. Lastly, 62.5 % did not know that nearly all sexually active women contract HPV by age 26 y.

Table 3 shows that 24.5 % of participants strongly believed that females are at risk for HPV infection (perceived susceptibility). In addition, around 26.8 % of participants strongly agreed with the statements regarding the severity of the disease. Regarding perceived benefits of HPV vaccine, 31.69 % of participants strongly agreed that vaccinating females is important to prevent genital and anal warts, and over 20.45 % believed it would also prevent males from HPV infection. Furthermore, 33.46 % of participants agreed that vaccinating males could help protect partners from cervical cancer. Sixteen percent of the participants strongly agreed with the statements concerning the perceived barriers to HPV vaccination. For example, 17.55 % of participants expressed concerns about the cost of the HPV vaccine, while 19.95 % of participants were concerned about its safety, and 19.57 % had concerns about its efficacy. Additionally, 16.92 % of respondents believed that HPV vaccination could encourage riskier sexual behaviour. Religious or moral opposition to the HPV vaccine was noted by 11.62 %, and about 21.46 % of participants expressed concern about the novelty of the vaccine, believing it might be too new. In terms of self-efficacy, 21.6 % of participants expressed interest in the HPV vaccine for females, while 18.31 % were more comfortable administering the vaccine to females than to males.

Age significantly impacts knowledge, susceptibility and severity; specifically, individuals aged (26-30) y demonstrated higher knowledge regarding HPV. In contrast, those in more than 31 y exhibited a greater perception of susceptibility to the HPV. Married participants showed a greater understanding of the severity and susceptibility associated with HPV compared to single women. Table 4 illustrates the relationship between demographics, knowledge, and HBM

TABLE 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF STUDY PARTICIPANTS (n=792)

Variables	Category	n	(%)
Age	18-25	433	54.7
	26-30	38	4.8
	31-35	53	6.7
	>35	268	33.8
Nationality	Saudi	764	96.4
	Non-Saudi	28	3.5
Marital status	Single	460	58.1
	Married	293	37
	Divorced	30	3.8
	Widowed	9	1.1

Education level	Primary school	9	1.1
	Middle school	25	3.2
	High school	226	28.5
	Diploma	78	9.9
	Bachelor's	417	52.7
	Master's	37	4.7
Occupation	Student	401	50.7
	Government sector employee	218	27.5
	Private sector employee	47	5.9
	Free work	5	0.6
	Retired	32	4
	I do not work	89	11.2
Vaccinated against HPV	Yes	34	4.3
	No	758	95.7

TABLE 2: PARTICIPANT'S KNOWLEDGE OF HPV

Statement	Yes (n, %)	No (n, %)	I don't know (n, %)
HPV is an uncommon sexually transmitted infection	191 (24.12 %)	109 (13.76 %)	492 (62.12 %)
The majority of people with genital HPV infections show symptoms	187 (23.61 %)	139 (17.55 %)	466 (58.84 %)
The same types of HPV that cause cervical cancer also lead to genital warts	205 (25.88 %)	60 (7.58 %)	527 (66.54 %)
Sexually active adolescents should undergo HPV screening prior to receiving the vaccine	285 (35.98 %)	60 (7.58 %)	447 (56.44 %)
Individuals diagnosed with HPV should not receive the HPV vaccine	139 (17.55 %)	109 (13.76 %)	544 (68.69 %)
HPV infection is responsible for nearly all cases of cervical cancer	200 (25.25 %)	90 (11.36 %)	502 (63.38 %)
The HPV vaccine is not recommended for use in women over 26 y old	102 (12.88 %)	168 (21.21 %)	522 (65.91 %)
The HPV vaccine is available for both gender (males and females)	230 (29.04 %)	116 (14.65 %)	446 (56.31 %)
By age 26 y, the majority of sexually active women have been exposed to HPV	194 (24.49 %)	103 (13.01 %)	495 (62.50 %)

TABLE 3: PARTICIPANT RESPONSES TO HBM CONSTRUCTS

HBM construct	Statement	Strongly agree (n, %)	Somewhat agree (n, %)	Neither disagree nor agree (n, %)	Somewhat disagree (n, %)	Strongly disagree (n, %)
Perceived severity	Genital and anal warts may lead to significant physical, emotional, and financial impact for me	226 (28.53 %)	177 (22.35 %)	362 (45.71 %)	19 (2.4 %)	8 (1.01 %)
	HPV infections can lead to cancers in the anus, vulva, vagina, and cervix in women	158 (19.95 %)	176 (22.22 %)	422 (53.28 %)	25 (3.16 %)	11 (1.39 %)
	Average score	212 (26.8 %)	177 (22.35 %)	392 (49.54 %)	22 (2.8 %)	9.5 (1.2 %)
Perceived susceptibility	As a woman, I feel that I am at risk of getting HPV	215 (27.15 %)	212 (26.77 %)	333 (42.05 %)	21 (2.65 %)	11 (1.39 %)
	I believe that HPV infection is common among women like me	173 (21.8 %)	226 (28.5 %)	356 (36.6 %)	26 (2.7 %)	11 (1.39 %)
	Average score	194 (24.5 %)	237 (29.9 %)	344.5 (43.5 %)	23.5 (2.9 %)	11 (1.39 %)
Perceived benefits	It is important for me to be vaccinated against HPV to prevent genital and anal warts	251 (31.69 %)	187 (23.61 %)	327 (41.29 %)	15 (1.89 %)	12 (1.52 %)
	It is important for me to be vaccinated against HPV to prevent males from getting infected	162 (20.45 %)	162 (20.45 %)	396 (50 %)	40 (5.05 %)	32 (4.04 %)
	Men should receive the vaccine to help protect their future partners from cervical cancer and other HPV-related health concerns	265 (33.46 %)	166 (20.96 %)	342 (43.18 %)	9 (1.14 %)	10 (1.26 %)
	Average score	226 (28.5 %)	171.6 (21.6 %)	355 (44.8 %)	21.3 (2.7 %)	18 (2.3 %)
Perceived barriers	I worry that vaccination against a sexually transmitted infection might promote earlier or riskier sexual behaviour	134 (16.92 %)	170 (21.46 %)	375 (47.35 %)	48 (6.06 %)	65 (8.21 %)
	I believe the vaccine is too recent and has not been available long enough	170 (21.46 %)	217 (27.4 %)	338 (42.68 %)	37 (4.67 %)	30 (3.79 %)
	I have concerns regarding the vaccine's cost	139 (17.55 %)	159 (20.08 %)	369 (46.59 %)	49 (6.19 %)	76 (9.6 %)
	I object to HPV vaccination due to moral or religious beliefs	92 (11.62%)	136 (17.17 %)	388 (49 %)	71 (8.97 %)	105 (13.26 %)
	I have concerns about the efficacy of the HPV vaccine	155 (19.57 %)	200 (25.25 %)	347 (43.81 %)	43 (5.43 %)	47 (5.94 %)
	I have concerns regarding the safety of the HPV vaccine	158 (19.95 %)	197 (24.87 %)	344 (43.4 %)	49 (6.19 %)	44 (5.56 %)
	I am not aware that the vaccine is offered to both males and females	156 (19.7 %)	188 (23.74 %)	366 (46.21 %)	28 (3.54 %)	54 (6.82 %)
	I believe HPV causes too few cancers in females to justify vaccination against it	157 (19.82 %)	159 (20.08 %)	415 (52.4 %)	40 (5.05 %)	21 (2.65 %)
	Vaccinating females seems unnecessary to me, as genital and anal warts can be addressed through other treatments	91 (11.49 %)	131 (16.54 %)	420 (53.03 %)	54 (6.82 %)	96 (12.12 %)
	It’s too late for me to be vaccinated against HPV if I am already sexually active	93 (11.74 %)	128 (16.16 %)	443 (55.96 %)	57 (7.2 %)	71 (8.96 %)
	Average score	134.5 (16.9 %)	168.5 (21.3 %)	385.5 (48.7 %)	47.6 (6 %)	60.9 (7.7 %)
Self-efficacy	I am interested in the HPV vaccine for females	197 (24.87 %)	192 (24.24 %)	334 (42.17 %)	45 (5.68 %)	28 (3.54 %)
	I feel more comfortable providing the HPV vaccine to females than males	145 (18.31 %)	173 (21.84 %)	358 (45.2 %)	55 (6.95 %)	61 (7.7 %)
	Average score	171 (21.6 %)	182.5 (23 %)	346 (43.6 %)	50 (6.3 %)	44.5 (5.6 %)

TABLE 4: RELATIONSHIP BETWEEN DEMOGRAPHICS, KNOWLEDGE, AND HBM

Demographic characteristics	n	Knowledge about HPV	Susceptibility	Severity	Benefits	Barriers	Self-efficacy
	Total	Median	Median	Median	Median	Median	Median
18-25	433	1 (0-7)	4 (2-10)	5 (2-10)	7 (3-15)	29 (10-50)	6 (2-10)
26-30	38	2 (0-7)	4 (2-7)	4 (2-6)	7 (3-10)	28 (11-50)	5.5 (2-10)
31-35	53	1 (0-5)	5 (2-8)	6 (2-9)	9 (3-12)	30 (10-44)	6 (2-9)
>35	268	1 (0-7)	5 (2-10)	5 (2-9)	7 (3-13)	28 (10-50)	6 (2-10)
p value		0.002	0.042	0.021	0.055	0.301	0.805
Saudi	764	1 (0-7)	5 (2-10)	5 (2-10)	6 (3-15)	30 (10-50)	6 (2-10)
Non-Saudi	28	1 (0-6)	5 (2-7)	5 (2-6)	7 (3-9)	29 (14-48)	6 (2-9)
p value		0.74	0.705	0.326	0.242	0.541	0.3
Single	460	1 (0-6)	4 (2-10)	5 (2-10)	7 (3-15)	29.5 (10-50)	6 (2-10)
Married	293	1 (0-7)	5 (2-10)	6 (2-9)	8 (3-13)	28 (10-50)	6 (2-10)
Divorced	30	0.5 (0-7)	5.5 (2-10)	5 (2-10)	7 (3-15)	30 (10-43)	6 (2-8)
Widowed	9	1 (0-4)	5 (3-10)	6 (3-6)	9 (4-11)	30 (26-38)	6 (2-9)
p value		0.036	0.013	0.042	0.058	0.011	0.511
Primary school	9	2 (0-5)	5 (2-6)	6 (2-6)	9 (3-10)	24 (11-30)	6 (2-6)
Middle school	25	0 (0-6)	6 (2-6)	6 (2-8)	8 (3-10)	30 (12-39)	5 (2-9)
High school	226	1 (0-6)	5 (2-10)	5 (2-8)	7 (3-13)	30 (10-48)	6 (2-10)
Diploma	78	1 (0-6)	5 (2-10)	6 (2-9)	6 (3-13)	27 (10-40)	4 (2-8)
Bachelor's	417	1 (0-7)	5 (2-10)	5 (2-10)	7 (3-15)	29 (10-50)	6 (2-10)
Master's	37	2 (0-7)	4 (2-8)	5 (2-9)	7 (3-13)	30 (10-50)	6 (2-10)
p value		0.427	0.762	0.049	0.169	0.245	0.141
Student	401	1 (0-6)	4 (2-10)	5 (2-10)	7 (3-15)	29 (10-50)	6 (2-10)
Government sector employee	218	1 (0-7)	5 (2-10)	5 (2-10)	7 (3-12)	30 (10-44)	6 (2-10)
Private sector employee	47	1 (0-7)	5 (2-10)	5 (2-8)	7 (3-13)	28 (11-42)	6 (2-9)
Free work Retired	5	1 (0-4)	5 (3-6)	5 (3-6)	9 (5-9)	29 (20-33)	4 (4-6)
I do not work	32	0 (0-5)	6 (2-8)	6 (2-8)	9 (3-13)	30 (13-50)	6 (2-10)
Retired	89	1 (0-6)	5 (2-10)	5 (2-10)	7 (3-11)	27 (10-37)	6 (2-10)
p value		0.01	0.193	0.621	0.161	0.448	0.749

This study applied the HBM to assess HPV knowledge and vaccination attitudes among women in Saudi Arabia examined the relationship between these health beliefs and various socio-demographic factors. In our study, we found that the HPV vaccine uptake was only 4.3 %, which is consistent with previously reported studies from Saudi Arabia showing uptake rates ranging from 1 % to 8.7 %. Moreover, when comparing our findings with other gulf cooperation council countries, Saudi Arabia's HPV vaccination rate of 4.3 % aligns with the overall low uptake in the region[18]. A study that included several Gulf countries reported vaccination rates of 18.9 % in the United Arab Emirates, 5.8 % in Qatar, 4.6 % in Saudi Arabia, 3.2 % in Oman, 2.9 % in Bahrain, and 2.7 % in Kuwait, indicating a generally low regional uptake[18]. This rate is significantly lower than those observed in other countries such as the United Kingdom (62.9 %-83.2 %)[19], and the United States of America (USA) (61 %-94.6 %)[20]. These comparisons highlight the need for enhanced public health efforts across both Saudi Arabia and the broader Gulf region to improve awareness and vaccination rates. Additionally, our finding is far below the targets set by the WHO's global strategy to eliminate cervical cancer[4]. According to the WHO, to eradicate cervical cancer, countries must reduce its incidence to <4 per 100 000 women. To achieve this goal by 2030, three main targets must be met; vaccinating 90 % of girls with the HPV vaccine by

age of 15 y, screening 70 % of women by age of 35 y and again by age of 45 y, treating 90 % of women with pre-cancer, and ensuring 90 % of women with invasive cancer receive appropriate care[4]. The low vaccination rate we observed highlights a significant gap that could hinder progress toward these global targets[4]. Further research is needed to identify the national prevalence of HPV. Thus, it is essential to initiate HPV awareness campaigns and strengthen vaccination efforts in Saudi Arabia. Overall, knowledge about HPV and the HPV vaccine was low among participants. For >50 % of the knowledge-based questions, participants reported don't know as their response, highlighting a significant gap in awareness and understanding of HPV-related information. This lack of awareness may stem from HPV not being as widely discussed or prioritized in public health conversations compared to other health issues. Additionally, cultural norms in some regions, including Saudi Arabia, may limit open discussions about sexually transmitted infections[16]. Furthermore, limited educational outreach and public health campaigns focused specifically on HPV could contribute to this knowledge gap. To address this, the Saudi Ministry of Health recently introduced a school-based vaccination program[21], which includes lectures on HPV vaccination for healthcare workers and middle school staff, as well as distributing informational booklets to students and their parents[21]. However, there is still a need to further increase awareness about HPV and its vaccine. Despite the efforts made, the low knowledge levels among participants indicate that more extensive educational campaigns are necessary to improve public understanding and encourage vaccination uptake. In the present study, 24.5 % strongly agreed that they were susceptible, while 29.9 % somewhat agreed. These findings align with previous study that suggest many individuals are aware of their risk of contracting HPV but may not perceive it as an immediate or personal threat, as reflected by the 43.5 % who were neutral in their responses. The large proportion of neutral responses may suggest a gap in understanding or a lack of urgency regarding personal risk, which could be a barrier to vaccination uptake. These findings are consistent with previous research that highlights the importance of perceived susceptibility in shaping health behaviours, particularly preventive actions such as vaccination[22]. In this context, the relatively neutral responses in our study suggest that while participants may be aware of HPV, there is a need for education that emphasizes the personal relevance of HPV infection.

In this study, participants over the age of 30 y were more likely to believe they were susceptible to HPV infection. In contrast, individuals who were single tended to perceive themselves as less susceptible. Reporting lower agreement with susceptibility statements. This suggests that both age and marital status may influence how individuals perceive their risk of contracting HPV, with older and partnered individuals feeling more vulnerable compared to younger or single participants.

Religion and religious practices can significantly influence the acceptance of the HPV vaccine. In our study, approximately 16 % of participants opposed the vaccine on religious reasons. Similar finding from another study that was conducted in Saudi Arabia[17]. Bodson *et al.*[23] found that young women with religious backgrounds were both under-vaccinated and lacked adequate information about HPV and the vaccine. Nevertheless, the relationship between religious practice and vaccine attitudes is complex. Redd *et al.*[24] found that religious traditions were positively associated with better knowledge about HPV and more favourable vaccine attitudes, indicating that following religious guidelines may serve as a protective factor against HPV as Islamic actually encourage self-care[25], seeking treatment, and providing health support[26]. Healthcare institutions play a crucial role in promoting and administering the HPV vaccine. In our study, a large portion of participants were uncertain or unaware that the vaccine is available for both males and females. This finding is consistent with the results of a similar study conducted in Saudi Arabia[17].

A systematic review of barriers to HPV vaccine found that in over 2/3rd of studies, the cost of HPV vaccines was identified as a concern[27]. In contrast, only 17.55 % of participants in our study expressed concerns about cost. This difference may be attributed to the fact that the HPV vaccines are available free of charge or for a fee in private hospitals[28], which may further explain why cost was not a significant concern for most participants in our study, and the relatively high-income levels of the Saudi population.

The results indicated that only 28.53 % of participants strongly agreed that genital and anal warts can result in significant physical, emotional, and financial impacts. Although this is a concerning

statistic, the majority were neutral or undecided, suggesting a lack of conviction about the severity of potential HPV-related outcomes. This could hinder motivation to seek vaccination. Additionally, only 19.95 % strongly believed that HPV infections could contribute to serious cancers, demonstrating the need for improved educational initiatives to convey the seriousness of HPV-related health risks.

The study revealed that a substantial number of participants recognized the benefits of vaccination, with 31.69 % strongly agreeing on the importance of vaccination against HPV to prevent genital and anal warts, and 33.46 % acknowledging the importance of protecting future partners from cervical cancer. However, it is crucial to note that 50 % of participants were neutral regarding vaccination's importance for preventing male infections, similar to findings from another study conducted in Saudi Arabia[17]. This suggests a gap in understanding the broader public health implications of HPV vaccination, reinforcing the need for campaigns that emphasize the collective benefits of vaccination for both genders.

The study found that only 24.87 % of participants expressed strong interest in the HPV vaccine for females, which suggests that self-efficacy, regarding vaccination remains low. Initiatives to increase self-efficacy through training and education may empower healthcare providers to advocate more effectively for HPV vaccination.

In summary, while there is some awareness of HPV and its potential consequences, significant gaps remain in perceptions of severity, susceptibility, benefits, and barriers. These findings indicate a need for comprehensive educational campaigns tailored to address these misconceptions and encourage proactive health behaviours among women. Such initiatives should focus not only on the importance of vaccination but also on dismantling perceived barriers, enhancing self-efficacy, and fostering a culture of open discussion regarding sexual health.

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Conflict of interests:

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