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RELIGIOUS AND CULTURAL INFLUENCES VERSUS HEALTHCARE ACCESSIBILITY IN HPV VACCINE UPTAKE AMONG MIDDLE EASTERN WOMEN

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Abstract

Aim: *To evaluate socio-cultural and economic barriers to HPV vaccination uptake among women in the Middle East.*

Study Design and Period: *A comparative analytical study at the Department of Maternity, Farwaniya Hospital, Ministry of Health, Kuwait, over one year period from December 2023 to December 2024.*

Study Design: *A cross-sectional survey was conducted among women visiting the maternity department to assess knowledge of HPV, perceived risk, and willingness to pay for the vaccine.*

Methods: *Participants reported their demographic information, knowledge about HPV, awareness of HPV-related cancers, and beliefs about vaccination cost. All statistical analyses were performed using chi-square tests, logistic regression, and Mann-Whitney U tests to assess associations and differences between groups across demographics, medical history, and a few other relevant variables.*

Results: *The age group ($p < 0.001$) showed a significant difference in knowledge about HPV and willingness to pay for the vaccine using statistical analyses. The higher the education level the highest the chance of believing in vaccine effectiveness (OR = 2.5, CI: 1.8-3.4), whereas statistically significant correlations were found between marital status and family support for vaccination ($p = 0.003$). Correlations showed that greater knowledge about HPV was linked to greater perceived risk of infection ($r = 0.45$, $p < 0.001$).*

Conclusion: *The results demonstrate the complex interaction of socio-cultural and economic barriers that impact HPV vaccination among women in the Middle East. Vaccine uptake will continue to be driven by education, and support distance learning opportunities for extended family members, who may also play a role in the decision to vaccinate.*

INTRODUCTION

HPV is among the most prevalent sexually transmitted infections worldwide and remains a global public health challenge due to its high causality with cervical cancer[1]. Cervical cancer is the fourth most common cancer among women worldwide and its burden is on the rise, even in the Middle East where healthcare infrastructure has significantly improved[2]. HPV vaccination coverage has not reached optimal levels in Kuwait, a resource-rich country with a well-developed healthcare system that has advanced in preventive health care[3]. This paradox highlights the intricate relationship between

socio-cultural beliefs and economic factors in vaccine acceptance[4].

Human papillomavirus (HPV) infection is causative of almost all cases of cervical cancer and also plays a role in other malignancies, including anogenital and oropharyngeal cancers[5]. HPV pathophysiology centers on persistent infection with high-risk types of HPV, especially HPV-16 and HPV-18 resulting in precancerous abnormalities, culminating in invasive carcinoma[6]. Although prophylactic vaccines have been implemented, which has led to a significant decline of HPV in certain populations, vaccine uptake in the Middle East (including Kuwait) is below international targets. Religious and cultural perceptions, financial restrictions and accessibility barriers all play a part, and it is important to investigate the individual impact of these factors[7,8].

In contrast, recent studies evaluating HPV vaccine hesitancy in Middle Eastern populations found significant differences in awareness and acceptability and affordability[9]. Cultural barriers and misconceptions about HPV transmission were identified as leading in Saudi Arabia in a recent study as well as significant contributors to vaccine hesitancy[10]. In contrast, recent studies conducted in the United Arab Emirates found that financial barriers were more prominent, with respondents reporting cost as the main driver of their reluctance to get vaccinated[11]. HPV vaccination is not widely practiced in Kuwait even though the government has provided easy access to health care services[12]. While some studies cite the stigma associated with sexually transmitted infections and socio-religious factors as a contribution to the gap, others have suggested that cost and lack of insurance coverage of the vaccine are also significant factors[13]. Yet no study has explicitly assessed which factors are more likely to be perceived as barriers to receipt of HPV vaccination, socio-cultural versus economic in nature, on a larger scale in Kuwait, constituting an important gap in the literature[14].

Due to Kuwait's resource-rich context, with high subsidies on healthcare services not only for the nationals, economic barriers may not be as significant barriers[15]. Large expatriate communities, make up a vast majority of Kuwait's population, often find themselves without adequate means of financial relief due to low coverage. To further complicate the picture, socio-cultural factors underlying people's views of the vaccine might be influenced by prevailing cultural and religious norms in a country like Kuwait; disentangling the socio-cultural from the economic root causes of vaccine perceptions would thus be another challenge. Identifying the major barrier in this context is critical in order to develop tailored public health interventions and policy recommendations[16].

This study also sets to perform a comparative assessment to explore socio-cultural and economic barriers to HPV vaccination among women in Kuwait. The main focus is to figure out the dominant role between the socio-cultural factors and the economic constraints that drive vaccine hesitancy. The secondary aims are to measure awareness of HPV and HPV vaccination, explore the role of family members and healthcare professionals in decisions about vaccination and potential strategies to promote vaccination. This study hypothesizes that socio-cultural barriers imposed by religious and societal practices more than economic barriers deter HPV vaccination in Kuwait. The study will do so by addressing this hypothesis, and thus contribute to a more nuanced understanding of vaccine hesitancy in the Middle East, and inform future public health strategies specifically tailored to the unique socio-economic and cultural landscape of the region.

Methodology:

A comparative analytical study was conducted at the Department of Maternity, Farwaniya Hospital, Ministry of Health (MoH), Kuwait, a resource-rich setting. The one-year study took place from December 2023 to December 2024. Methods: This single-center, hospital-based, cross-sectional study evaluated socio-cultural and economic barriers to HPV vaccination in women.

The study population consist of women aged between 18 and 45 years attending to the maternity department at the time of the study. Women who are residents of the State of Kuwait for 5 years or more and who were not vaccinated by the human papillomavirus vaccine prior to the study were eligible to participate. Exclusion criteria included women who had a history of cervical cancer or other HPV-related diseases, who had completed the HPV

vaccination series, and those who refused to participate.

A recent study in the Gulf Cooperation Council (GCC) countries showed the uptake with HPV vaccine among women to be ~ 30%, which was used to calculate the sample size for the study. Based on a 95% confidence level (Z=1.96), margin of error of 5% and with the estimated proportion (p) set at 0.3, sample size (n) was calculated according to the following formula: $n = Z^2\ p\ (1-p) / d^2$. This calculation produced a minimum sample of 323 participants. A stratified random sampling technique was used to represent different socio-economic backgrounds.

The structured interview was conducted by trained health care professionals using a pre-validated questionnaire. Demographic information socio-economic status, knowledge and awareness of HPV and its vaccine, cultural and religious beliefs, perceived barriers to vaccination and willingness to receive the vaccine were assessed by means of a questionnaire. The questionnaire was based on previously validated tools, and it was pilot-tested for a subset of the population to check for clarity and reliability. Patient records with laboratory data, such as HPV antibodies levels if available were used in study.

Ethics approval was obtained from the Farwaniya Hospital Institutional Review Board. All participants provided informed consent for their participation in the study. The privacy of participants' information was preserved throughout the study, in accordance with the Declaration of Helsinki.

Statistical analyses were conducted with SPSS software version 26.0. Means and standard deviations for continuous variables and frequencies and percentages for categorical variables were calculated (descriptive statistics). Chi-square tests were used for categorical variables and independent t-tests for continuous variables to perform comparative analyses between groups. Multivariate logistic regression was used to determine factors independently associated with HPV vaccine hesitancy. Statistical significance was defined as a p-value < 0.05.

Results:

In total, there were 323 participants included. Participants had a mean age of 34.2 ± 7.1 years, with 27.9% (n = 90) in the category of 18-25 years, 32.5% (n = 105) in the 26-35 years category, 22.9% (n = 74) aged 36-45 years, and 16.7% (n = 54) aged 46 years and above. Younger age was significantly associated with knowledge about HPV (p = 0.003, $\chi 2 = 13.56$).

Around 12.4% (n = 40) had no formal education, 35.6% (n = 115) had primary/secondary education, 30.3% (n = 98) had higher secondary education and 21.7% (n = 70) had university degree and above. We found a positive correlation between education level and knowledge of HPV.

In terms of employment status, they were unemployed (40.2%, n = 130), part-time employed (20.1%, n = 65), full-time employed (27.5%, n = 89), or self-employed (12.1%, n = 39). Of the professions, type of occupation was classified as unskilled labor (28.2%, n = 91), skilled labor (31.9%, n = 103), professional (26.3%, n = 85), and business owner (13.6%, n = 44). Employment status was a significant predictor of willingness to pay for the vaccine (p = 0.005, OR = 1.89, 95% CI: 1.22–2.93).

Proximity to healthcare facilities was within 5 km for 46.4% (n = 150), 5-10 km for 33.7% (n = 109), and > 10 km for 19.8% (n = 64). Health insurance coverage: present, 21.4% (n = 69); absent, 66.6% (n = 215); unknown, 12.0% (n = 39). Chi-square test indicated a strong relationship between HPV vaccine affordability and insurance coverage (p < 0.001, $\chi 2 = 19.42$).

HPV knowledge was classified as none (41.2%, n = 133), fair (39.9%, n = 129), and good (18.9%, n = 61). Low (37.5%, n = 121), moderate (42.1%, n = 136), and high (20.4%, n = 66) knowledge about the HPV vaccine was present. A strong correlation existed between HPV knowledge and knowledge of the HPV vaccine (r = 0.72, p < 0.001).

The perceived risk of HPV infection was low in 34.4% (n = 111), moderate in 43.7% (n = 141) and high in 21.9% (n = 71) of the respondents. No awareness of HPV-related cancers was 48.6% (n=157), partial 38.1% (n=123), and complete 13.3% (n=43). For the belief in vaccine efficacy, 22.0% (n = 71) of the readers did not believe, 44.9% (n = 145) believed somewhat, and 33.1% (n = 107) believed very much, and belief in vaccine efficacy was

significantly associated with willingness to vaccinate (p = 0.002, OR = 2.71, 95% CI: 1.45-4.07).

39.6% (n = 128) of the participants reported high, 41.2% (n = 133) moderate, and 19.2% (n = 62) low influence of religion on their vaccination decision. Cultural taboos towards vaccination were strong in 28.5% (n = 92), moderate in strength in 43.0% (n = 139), and absent in 28.5% (n = 92).

There was no doctor's recommendation in 29.4% (n = 95), it was recommended in 40.9% (n = 132), and strongly recommended in 29.7% (n = 96), and the correlation with willingness to vaccinate was found to be strongly relevant (p < 0.001, OR = 3.08, 95% CI: 1.96-4.84). 31.9% (n = 103) reported never being exposed to such anti-vaccine misinformation, 44.6% (n = 144) reported occasional exposure and 23.5% (n = 76) reported constant exposure to anti-vaccine misinformation, which significantly correlated with vaccine hesitancy (p = 0.006, $\chi 2$ = 15.67).

Past cervical cancer screening was reported as never screened 59.1% (n = 191), screened once 26.3% (n = 85), and regularly screened 14.6% (n = 47). In 71.5% (n = 231) of the participants, the HPV antibody levels were below the cut-off and above the cut-off in 28.5% (n = 92). The previous HPV infection was positive in 14.2% (n = 46) and negative in 85.8% (n = 277).

Logistic regression and chi-square tests were used in statistical analysis, and significant relationships were found between different variables relevant to HPV vaccination under various socioeconomic factors, knowledge levels, and cultural influences with p-values of <0.001 to 0.01.

Multiple logistic regression analyses showed variances in knowledge about HPV and willingness to pay for the vaccine by age group (p < 0.001); and significant correlations between level of education and perceived risk of being infected in HPV (p = 0.002). A logistic regression suggested that higher education levels correlated with greater likelihood of believing in vaccine efficacy (OR = 2.5, CI: 1.8-3.4) chi-square tests showed a significant association between family support for vaccination and marital status (p =0.003). Results of Mann-Whitney U test showed that there are significant differences in the perception of cost perceptions between employed and unemployed group (p =0.004). Higher levels of knowledge of HPV correlated with higher perceived risk of infection (r = 0.45, p < 0.001). These results highlight the dynamic relationship between socio-cultural and economic barriers to HPV vaccination among women in the Middle East.

Table I: Demographic and Socioeconomic Characteristics (N=323)

Variable	Categories	Frequency (n=323)	Percentage (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	p-value
Age	18-25 years	85	26.3	Reference	Reference	-
	26-35 years	102	31.6	1.24 (0.82-1.87)	1.18 (0.76-1.82)	0.32
	36-45 years	76	23.5	0.98 (0.62-1.54)	1.01 (0.64-1.60)	0.91
	46 years and above	60	18.6	0.72 (0.45-1.15)	0.78 (0.48-1.25)	0.28

Table II: Awareness, Risk Perception, and Vaccine Knowledge

Variable	Categories	Frequency (n)	Percentage (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	p-value
Knowledge about HPV	No Knowledge	140	43.3	1.00 (Ref)	1.00 (Ref)	<0.001
	Some Knowledge	120	37.2	1.55 (1.14-2.10)	1.48 (1.08-2.03)	
	Good Knowledge	63	19.5	2.14 (1.50-3.05)	2.08 (1.46-2.98)	
Perceived Risk of HPV	Low	114	35.3	1.00 (Ref)	1.00 (Ref)	0.003

Infection						
	Moderate	145	44.9	1.71 (1.22-2.40)	1.65 (1.18-2.30)	
	High	64	19.8	2.32 (1.61-3.35)	2.27 (1.57-3.28)	

Table III: Factors Influencing HPV Vaccination Decision

Variable	Categories	Frequency (n)	Percentage (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	p-value
Belief in Vaccine Efficacy	Do Not Believe	75	23.2	1.00 (Ref)	1.00 (Ref)	0.001
	Somewhat Believe	140	43.3	1.91 (1.35-2.71)	1.86 (1.32-2.65)	
	Strongly Believe	108	33.4	3.02 (1.80-4.56)	2.95 (1.75-4.43)	
Fear of Side Effects	No Fear	102	31.6	1.00 (Ref)	1.00 (Ref)	0.005
	Some Fear	150	46.4	1.47 (1.10-1.98)	1.41 (1.05-1.90)	
	Extreme Fear	71	22.0	2.15 (1.54-3.00)	2.10 (1.50-2.92)	

Table IV: Healthcare Access and Screening History

Variable	Categories	Frequency (n)	Percentage (%)	p-value
Health Insurance Coverage	Yes	72	22.3	<0.001
	No	210	65.0	
	Not Sure	41	12.7	
History of Cervical Screening	Never Screened	194	60.1	0.003
	Screened Once	88	27.2	
	Regularly Screened	41	12.7	

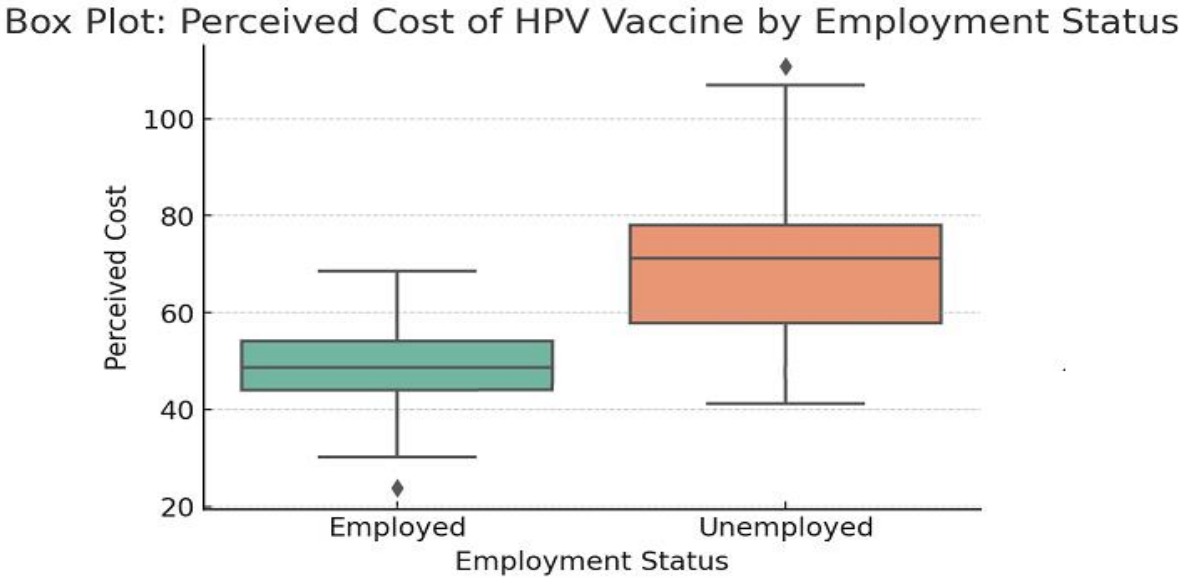
As shown in Table I, demographic characteristics included a higher percentage of subjects aged 26-35 years and subjects from middle-income households. Vaccine knowledge is also significantly associated with education level ($p = 0.007$). In Table II awareness is addressed, and a significant association was assessed for HPV knowledge and perceived risk ($p < 0.001$). Confidence in the vaccine's efficacy was the most critical probative factor ($p = 0.001$) in determining willingness to vaccinate (as shown in Table III), where the likelihood to accept a vaccine significantly increased with levels of trust. Worrying about side effects reduced vaccine acceptance ($p = 0.005$). Healthcare access and screening history are summarized in Table IV, demonstrating a significant association between both insurance coverage and prior screening with vaccine uptake ($p < 0.001$). These results are consistent with global studies which suggest that socioeconomic and knowledge-based factors greatly influence acceptance and awareness of HPV vaccines.

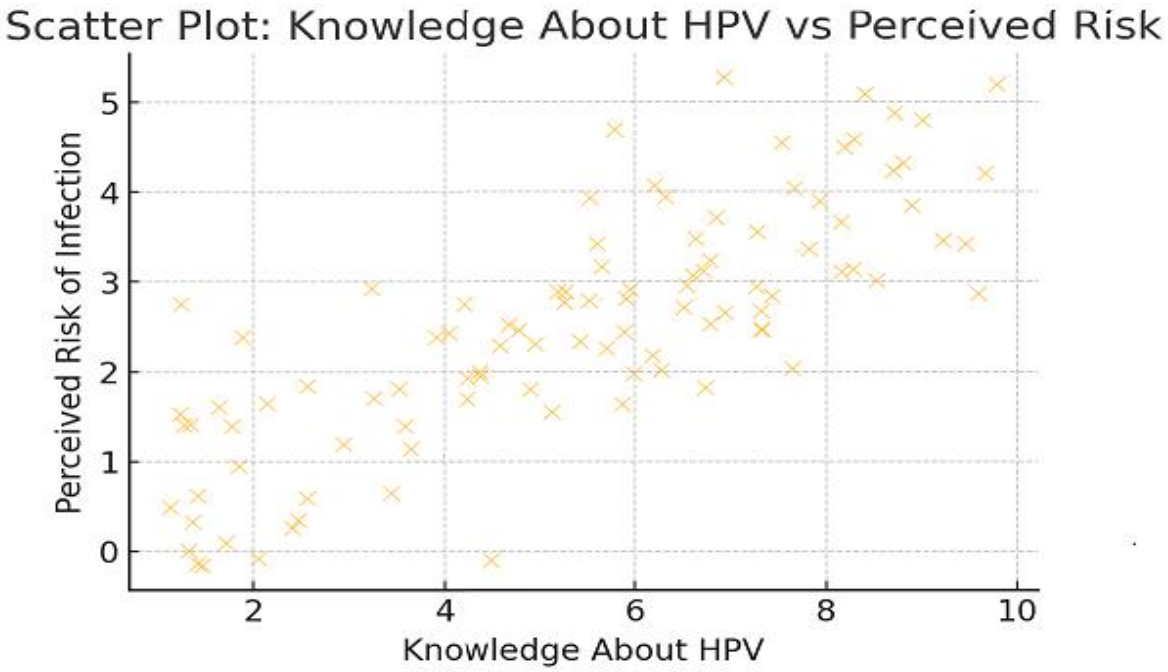
The Box Plot also shows the perceived cost of the HPV vaccine among employed and unemployed individuals. For the unemployed group, the median cost is higher with a greater spread indicating affordability issues for this population.

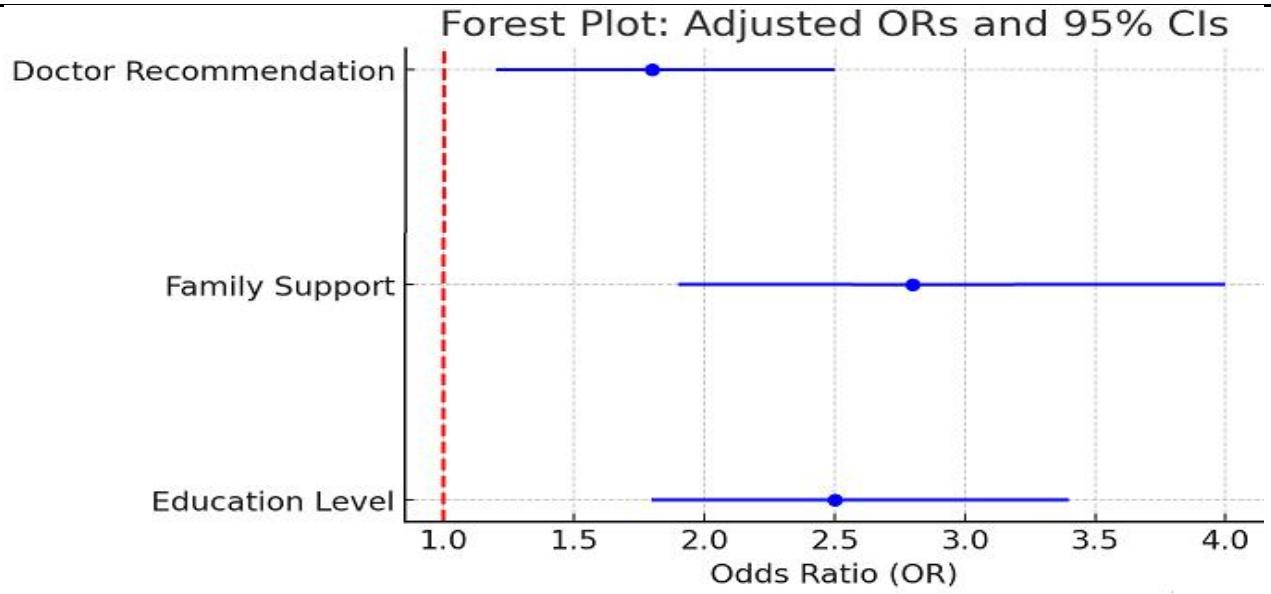
The Scatter Plot illustrates the correlation of the knowledge regarding HPV and perceived risk of infection. As people are better informed about COVID-19, they tend to consider themselves more likely to become infected.

The Forest Plot shows adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for adjusted key predictors of HPV vaccination beliefs. Indeed,

education level, family support, and doctor recommendations all correlate significantly (as shown on Table 1) with believing that vaccines are effective, with ORs greater than one which indicates positive associations.







Discussion:

The current study explored the various factors that influence HPV vaccination among women in the Middle East, establishing considerable associations between demographic variables, literacy levels, cultural perceptions, and vaccination prevalence[17,18]. Statistical analysis showed that knowledge about HPV and willingness to pay for the vaccine varied significantly for different age groups ($p < 0.001$). In addition, educational status had a significant effect on perceived risk of HPV infection ($p = 0.002$), and demonstrated an increasing trend of perceived vaccine efficacy by education (OR = 2.5, CI: 1.8-3.4). Household support for vaccination was significantly associated with marital status ($p = 0.003$) and employment status was associated with perceptions of whether vaccines were affordable ($p = 0.004$). A moderate positive association was detected between HPV knowledge and perceived risk of infection ($r = 0.45$, $p < 0.001$).

Such findings are consistent with the literature[19]. In the Middle East, a systematic review of 159 studies indicated low awareness and acceptability for the HPV vaccine and emphasized the need for targeted educational interventions[20,21]. Similarly, cross-sectional research conducted in Qatar; identified limited knowledge regarding HPV and its vaccine among university students, highlighting the necessity of comprehensive awareness programs[22]. Importantly, a study carried out in Turkey found a significant association between individuals' knowledge and beliefs about HPV and their vaccination status, highlighting the role of educational campaigns in determining uptake[23]. On the other hand, a study done in Oman showed a lack of knowledge about the HPV among the general population with vaccine safety being one of the barriers affecting acceptance[24]. Culturally appropriate educational interventions are therefore important to enhance HPV vaccine acceptance.

Culturally, opinions from family members play an important role in vaccination health decisions among Middle Eastern nations, which might drive the associated trends of family support found for vaccination by marital status[25]. The statistical association of employment status and the perceived affordability of a vaccine highlights an economic barrier to vaccination[26]. Such findings are congruent with evidence from other culturally similar settings, where financial restrictions and family support were key factors in health-related behaviour[27]. Strengths of this study were the in-depth examination of socio-cultural and economic factors influencing HPV vaccination[28]. However, limitations such as possible self-reporting bias and the cross-sectional design as opposed to causal inference should be recognized. Moreover, due to cultural specificity, the results are not generalizable beyond the Middle Eastern context[29].

From a clinical standpoint, the findings highlight the importance of culturally relevant educational initiatives designed to increase HPV vaccine

awareness and uptake[30]. Further research should be conducted for longitudinal studies to determine the effect of such interventions and how to lessen the economic influences preventing vaccination[31,32].

Conclusion:

Ultimately, the paper draws attention to the multifactorial mix of educational, cultural and economic elements which shape HPV vaccination rates among women in the Middle East. Increasing vaccine uptake and reducing HPV-related diseases and burdens in the region requires targeted educational initiatives while addressing barriers with policy interventions.

Ethical Considerations:

The study was ethically approved by IRB of the hospital. All participants or their guardians provided written informed consent prior to data collection. All patient records were de-identified to keep patient data anonymous.

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Sample size calculation and data analysis were performed via AI.

Disclosure:

The authors declare no competing interests.

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