



Prevalence of Human Papillomavirus Risk Factors Among Iraqi Women Attending Gynecology Clinics

A Cross-Sectional Study at Al-Sadr Teaching Hospital, Najaf, Iraq

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Article Information

Received: 11-5-2026

Accepted: 1-6-2026

Published: 1-7-2026

Abstract

Background: The human papillomavirus (HPV) is the most frequently transmitted sexually transmitted infection in the world, and it is a known contributor to cervical cancer. Cervical cancer, which is a serious public health issue in developing countries like Iraq, is associated with HPV. Even though it is clinically important, there is little evidence on the risk factors associated with HPV infection in Iraqi women, especially at the governorate level.

Objective: The purpose of this research was to identify the prevalence of risk factors for HPV and the sociodemographic characteristics associated with those risk factors among women who visited gynecology clinics at the Al-Sadr Teaching hospital in Najaf, Iraq.

Methods: This was a descriptive study conducted over a seven-month period between September 2025 and March 2026. In this study, a total of 250 women aged 18 and older were recruited through systematic random sampling. Data were collected with a structured interview-administered questionnaire, which included sociodemographic data, reproductive history, sexual behaviours, hygiene practices, tobacco use, Pap smear history, and knowledge of and vaccination against HPV. The data were analysed using SPSS version 26 and descriptive statistics with Chi-square tests.

Results: The overall mean age of the women who were surveyed was 33.4 +/- 9.2 years of age. The most common risk factors were early first marriage (< 18 years of age) in 23.2% of respondents, high parity (6 or more births) in 22.0% of respondents, previous STI infections in 17.2% of respondents and past use of oral contraceptives in 38.8% of females. There were 70.4% of respondents who had never received a Pap smear test. 72.8% of the respondents were unaware of HPV and HPV vaccinations. The rate of vaccination against HPV was 3.6%. Statistically significant associations ($p < 0.001$) were seen between early marriage

and risk factors associated with HPV, high parity and risk factors associated with HPV, STI history and risk factors associated with HPV, and inadequate genital hygiene and risk factors associated with HPV.

Conclusion: Women attending gynecology clinics in Najaf, Iraq had a high prevalence of HPV risk factors. Lack of awareness of HPV, very low vaccination rates, and almost no screening for cervical cancer all present a large public health issue. Comprehensive education to increase awareness and provide women with the opportunity to obtain vaccinations for HPV, as well as the establishment of routine screening for cervical cancer should be prioritized and targeted in Iraq both at the governorate level and the national level.

Keywords: *Human papillomavirus; HPV risk factors; cervical cancer; Iraqi women; Najaf; Pap smear; HPV vaccination; sexually transmitted infections; gynecology clinic*

Introduction

Globally, the most common sexually transmitted virus is called human papillomavirus (HPV). It is estimated that there are around 291 million women with HPV infection at any given time (Bruni et al., 2023). There are over 200 different types of HPV, and 14 of these types have been identified as high-risk for causing cancer (Brianti et al., 2020). These high-risk HPV types include HPV 16, HPV 18, which correlate with the majority of cervical and some vulvar, vaginal, anal, oropharyngeal, and penile cancers (Schiffman et al., 2016). According to data collected in 2020, cervical cancer was the 4th highest incidence (604,000) and mortality (342,000) cancer in women worldwide, with over 90% of these deaths reported from low- and middle-income countries (LMICs) (Martel et al., 2017; Youlden et al., 2022). The high incidence and mortality rates associated with cervical cancer represent a significant global health inequity and should serve to highlight the need for HPV-related disease prevention to be elevated to a public health priority (World Health Organization, 2023).

In the MENA region, the lack of epidemiological evidence on the prevalence of HPV and risk factors for it is relatively small compared to that of other areas of the world. This is due in part to cultural factors related to disclosure of personal health information, lack of adequate screening infrastructure, and lack of research capacity (Almobarak et al., 2022). Iraq is particularly vulnerable to this issue due to its decades-long history of civil unrest, war, and the significant decline in its healthcare infrastructure. There is evidence that cervical cancer in Iraq is underreported among women's cancers, in part due to cultural taboos against discussing the subject, lack of reporting, and the fact that there are currently no national screening programs (Hassan et al., 2020; Hussein et al., 2021). Currently, there is no national plan in place for the HPV vaccine or the screening for cervical cancer in the Iraqi health care system. Because of this, the Iraqi population is at a high risk of becoming infected with HPV and there are many possibilities that these infections will go undetected and cause some type of preventing malignancy (Al-Alwan et al., 2021).

The biological processes that lead to HPV-related cervical disease have been established for many years. Transmission of HPV occurs via skin contact, skin contact with mucosa, or just mucosal contact that occurs during sexual intercourse. Almost all sexually active people will become infected with HPV at

some point in their life time (Moscicki et al, 2012). There are only a few women who remain infected; even fewer women then go on to develop female precancerous lesions or cervical cancer. The rate of women who are infected with HPV, develop persistent infection, progress to precancerous lesions or progress to cervical cancer is determined by many factors, including the virus, the woman (host), and the environment. There have been many epidemiological studies done on HPV and all show that early age of sexual debut or the first time of marriage, having many children, multiple sexual partners, receiving immunosuppressive therapy; taking oral contraceptives for a long time; being infected with another STI (i.e., CT, HSV-2); smoking; and experiencing poor hygiene in the genitalia are the key risk factors associated with the acquisition and persistence of HPV (Schiffman et al., 2016; Vaccarella et al., 2013).

Many of the cultural experiences and situations surrounding the sociocultural life in Iraq create more risk and exposure for women. Early marriage is common, there may be no female access to sexual and reproductive health services and there may be a serious lack of discussion about sexual health between heterosexual women and men in Iraq, some of these risk factors may be higher than what they would be in other countries. Research in neighboring Nations, including Iran, Jordan and Egypt, has shown many sexually active females in those Nations are already infected with HPV. The prevalence has been shown to be between 10% and of 35%. Additionally, many of those females share common traits, such as being married before age 18; lower education attainment; living in rural locations; inability to obtain preventative contraception; etc., (Clifford et al 2015; Arbyn et al 2020; Zlatanou et al., 2021). There is a lack of specific or detailed data from Iraq that is separated out by governorate; therefore, creating difficulty in devising effective and specific public health interventions.

Al-Sadr Hospital, located in the city of Najaf, is the main tertiary care center for southern Iraq and its female patients come from diverse socio-economic strata and geographic locations. As such the patient population at Al-Sadr may be representative of the distribution and prevalence of HPV risk factors in the region. Additionally, since Najaf is a religious and cultural center, the women living there may exhibit unique patterns of behaviours related to health-seeking and merit special consideration when examining behaviours related to HPV. The importance of vaccinating women against HPV has been established through multiple clinical trials and years of population-based data as a means of the primary prevention of cervical cancer. Based on these studies, all three vaccines (Cervarix-bivalent; Gardasil-quadrivalent; Gardasil 9-nonavalent) have been shown to have efficacy rates of over 90% against cervix intraepithelial neoplasia caused by HPV 16 and 18 (Drolet et al 2019).

Though some steps towards the integration of an HPV vaccine have been made in Iraq, the lack of coverage among potential recipients and the absence of cervical cancer detection through Pap smears and liquid cytology in the public sector leave an entire gender (females) without a means for surveillance. Women who are aware of the association between HPV and cervical cancer are more inclined to seek health care, get screened, and be receptive to vaccination. Review studies in Arab cultures have demonstrated very limited awareness about HPV among females; those who suffer from several elements having little education, being older, or living in rural areas demonstrate significantly lower levels of awareness about HPV (a significant finding). Due to insufficient education regarding health care, social stigma about discussing sexual health issues openly, and inadequate outreach by primary care providers, it is unlikely that females will have sufficient knowledge about what preventive measure (HPV vaccine) may exist for them.

Thus, due to the combination of the epidemiology and context, there is an urgent need for empirical investigations to assess and map the distribution and magnitude of HPV-related risk factors at the local level in Iraq. The information gathered about the burden of HPV disease will not only benefit individuals but will also assist in designing culturally appropriate outreach tools and creating evidence-based advocates for changes to the current national policy that supports access to and acceptance of the HPV vaccine. The goal of this study is to examine the change in prevalence and societal characteristics associated with women who receive health care at the gynecological clinic at Al-Sadr Teaching Hospital in Najaf, Iraq, between September 2025 and May 2026. This study hopes to add to the research base available for colleges and universities as well as provide supporting evidence for promoting HPV policy reform on a national and institutional level.

Methodology

2.1 Study Design and Setting

A cross-sectional descriptive approach was utilized to investigate female patients who frequented outpatient gynecology clinics in order to determine the prevalence of HPV-related risk factors. The setting for this study was the Department of Gynecology and Obstetrics at Al-Sadr Teaching Hospital, located in Najaf, Iraq; one of Iraq's largest and most prestigious public tertiary-care hospitals in the southern part of Iraq. The hospital serves a population distributed throughout Najaf City, as well as its surrounding communities (both urban and rural). The gynecological outpatient services provided by the hospital are available Monday through Friday and serve a large number of women who use these services for reproductive and/or gynecologic health care.

2.2 Study Period

The period for which data were collected was seven months, beginning on September 1, 2025 and ending on March 31, 2026. This extended period provided sufficient time to collect the required sample size and to ensure a representative sample that captures seasonal variation within a defined timeframe.

2.3 Study Population

All women aged 18 years and older by the time the study began who visited the outpatient gynecology staff of Al-Sadr Teaching Hospital during the investigation were the target population for this research. The study excluded any female participants who were pregnant or had major surgery (operated upon) in the past four weeks. Any female participants with any prior determination of HPV infection or cervical cancer were also excluded to minimize the chance of selection bias.

2.4 Sample Size and Sampling

To calculate the required sample size, the following formula was used to estimate a proportion from a single population: $n = Z^2P(1-P)/d^2$, where Z is equal to 1.96 (for 95% confidence interval), P is equal to 0.35 (estimated prevalence of PPD among HPV risk factors from previous studies in the area), and d is equal to 0.06 (acceptable error margin). The sample size needed is 243, which was rounded up to 250 to allow for dropouts/incomplete questionnaires. Systematic random sampling was used to select every 3rd eligible individual coming into the clinic for participation in the study until the desired number of participants was enrolled.

2.5 Data Collection Instrument

To gather data from the women with whom they were working, the participants completed a structured, pre-tested questionnaire that was administered in Arabic (the native language of the participants). The researchers developed the questionnaire by reviewing the relevant literature thoroughly before pre-testing the questionnaire on 20 women not in the main study and making some minor revisions based on the pre-test results. The questionnaire had five domains: (1) sociodemographic information (e.g., age, level of education, marital status, occupation, and town of residence); (2) reproductive and obstetric history (e.g., age at first marriage, number of children, number of pregnancies, history of miscarriage or stillbirth); and (3) sexual and gynecological history (e.g., history of STIs or use of oral contraceptives, sexual activity with husband during marriage, etc.); (4) personal hygiene and lifestyle behaviours (e.g., hygiene behaviours related to the genitals, smoking status - either as an active or passive smoker); and (5) knowledge of and preventive behaviour regarding HPV (e.g., previous awareness of HPV, previous Pap smear testing for cervical cancer, HPV vaccinations received and completed)

2.6 Operational Definitions

In this research, high parity was defined as having six or more pregnancies. Early marriage was defined as getting married before turning 18 years old. Adequate genital hygiene was defined as cleaning the outside of the genital area with water after urinating or having a bowel movement regularly with no douching. Passive exposure to a risk factor for HPV was defined as living with anyone who regularly smokes. The definition of a high-risk HPV exposure profile used in this study was based on the presence of two or more established risk factors that have been documented in the literature to be associated with the development of cancer and/or cervical cancer, which included having an early marriage, having a high parity, having a sexually transmitted infection (STI) history, having inadequate hygiene, taking oral contraceptives for more than five years, and/or not having had a Pap test in the past.

2.7 Ethical Considerations

The study was reviewed and approved by the Institutional Review Board of Al-Sadr Teaching Hospital and the Najaf Health Directorate (Approval Reference: ASTH/IRB/2025-26/047). Written informed consent was obtained from each participant prior to the interview. Participants were assured of the confidentiality and anonymity of their responses and were informed that participation was entirely voluntary and that withdrawal would not affect their access to healthcare services. No personal identifiers were retained in the data records.

2.8 Data Analysis

Using IBM's SPSS Statistics software (version 26.0) which is manufactured in Armonk, NY, USA, all of the information recorded for this study was entered into the computer and prepared for analysis. Descriptive statistics such as frequency counts, percentages, means, standard deviations, etc., were calculated for the different variables being studied. For inferential analyses, a chi-squared analysis test was used as a means of evaluating relationships between the categorical variables used to determine the risk factors associated with developing HPV. A p-value less than .05 would indicate statistically significant findings. Variables that obtained statistically significant results during the bivariate analysis will also be deemed relevant to both clinical and public health practice.

Results

A total of 250 women were enrolled in the study, with a response rate of 100%. The mean age of participants was 33.4 ± 9.2 years.

Table 1. Sociodemographic Characteristics of Study Participants (n = 250)

Variable	Frequency (n)	Percentage (%)
Age Group		
18–25 years	42	16.8
26–35 years	88	35.2
36–45 years	74	29.6
> 45 years	46	18.4
Educational Level		
Illiterate	35	14.0
Primary/Secondary	121	48.4
University/Higher	94	37.6
Marital Status		
Married	198	79.2
Widowed	28	11.2
Divorced	24	9.6
Residence		
Urban	162	64.8
Rural	88	35.2
Total	250	100.0

The majority of participants were in the 26–35 age group (35.2%), married (79.2%), and residing in urban areas (64.8%). Nearly half (48.4%) had primary or secondary education (Table 1).

Table 2. Distribution of Reproductive and Sexual Health Risk Factors (n = 250)

Risk Factor	Frequency (n)	Percentage (%)
Age at First Marriage		
< 18 years	58	23.2

Risk Factor	Frequency (n)	Percentage (%)
18–24 years	142	56.8
≥ 25 years	50	20.0
Number of Pregnancies		
1–2	76	30.4
3–5	119	47.6
≥ 6	55	22.0
Use of Oral Contraceptives		
Yes	97	38.8
No	153	61.2
History of Sexually Transmitted Infections		
Yes	43	17.2
No	207	82.8
Husband with Multiple Partners (reported)		
Yes	31	12.4
No/Unknown	219	87.6

About 23.2% of participants have married before the age of 18. 22% have been pregnant 6 or more times, and 17.2% of them have had a sexually transmitted infection in their lifetime. 38.8% of participants used oral contraceptives (Table 2).

Table 3. Distribution of Hygiene, Smoking, Pap Smear History, and HPV Awareness (n = 250)

Variable	Frequency (n)	Percentage (%)
Smoking Status		
Current Smoker	18	7.2
Passive Smoker (Husband/Family)	64	25.6
Non-Smoker	168	67.2
Genital Hygiene Practices		

Variable	Frequency (n)	Percentage (%)
Adequate	141	56.4
Inadequate	109	43.6
Previous Pap Smear Test		
Never tested	176	70.4
Tested once	52	20.8
Tested more than once	22	8.8
Awareness of HPV		
Aware	68	27.2
Not Aware	182	72.8
HPV Vaccination Status		
Vaccinated	9	3.6
Not Vaccinated	241	96.4

Poor hygiene practices in the genital area were common among 43.6% of those surveyed; 7.2% of individuals reported that they actively smoke cigarettes, and 25.6 % of participants are exposed to secondhand smoke. Most respondents (70.4%) had not had a Pap smear in their lifetime, 72.8% did not know what human papilloma virus (HPV) is, and only 3.6% had received the HPV vaccination (Table 3).

Table 4. Association Between Selected Variables and HPV Risk Profile (n = 250)

Variable	High Risk n (%)	Low Risk n (%)	Chi-square	p-value
Age at first marriage < 18 yrs	41 (70.7%)	17 (29.3%)	14.32	0.001*
Parity $\geq$ 6	38 (69.1%)	17 (30.9%)	11.86	0.003*
History of STIs	29 (67.4%)	14 (32.6%)	9.74	0.008*
Oral contraceptive use	44 (45.4%)	53 (54.6%)	4.21	0.040*
Inadequate genital hygiene	58 (53.2%)	51 (46.8%)	12.09	0.001*
No prior Pap smear	99 (56.3%)	77 (43.7%)	16.48	< 0.001*
Low HPV awareness	107 (58.8%)	75 (41.2%)	19.37	< 0.001*
Rural residence	51 (58.0%)	37 (42.0%)	6.93	0.009*

The results of the chi-square analysis presented in Table 4 show that there are statistically significant relationships between HPV high-risk profile as plotted against early marriage ($p = 0.001$), parity ($p = 0.003$), STI history ($p = 0.008$), oral contraceptive usage ($p = 0.040$), inadequate hygiene practices ($p = 0.001$), not having had a Pap smear prior to the present exam ($p < 0.001$), low level of awareness of HPV ($p < 0.001$), and living in a rural area ($p = 0.009$). Statistical significance at the $p < 0.05$ level is indicated for all listed variables by an asterisk (*).

Discussion

A cross-sectional research project located at Al-Sadr Teaching Hospital in Najaf, Iraq has illustrated a very concerning epidemiological profile due to the following: large percentage of multiple HPV-associated risk factors present in the study population, cervical cancer screening uptake is nearly zero, very little HPV vaccination coverage, lack of knowledge of HPV and HPV-associated risks among the study participants. These results not only confirm but expand upon existing literature; however, unlike the previously mentioned literature the results provide unique data to aid in local, regional and national public health policies and guidelines.

In terms of sociodemographic characteristics, the study sample is similar to the overall population of Iraqi female patients accessing public gynecologic services. The characteristics of being primarily within the 26–45 age group, being married and residing in both urban and rural locations reflect the patient catchment area for an established governorate-level teaching hospital. The study population consisted of a relatively large number of women with a primary or secondary education (48.4%) and a high percentage of illiterate women (14.0%); therefore, having a diverse population necessitates that health education initiatives will need to address differing levels of literacy.

A very significant predictor of whether the participant exhibited HPV High Risk Profile was related to the age of first marriage; this was found in 23.2% of study participants ($p = 0.001$). Numerous studies have established that early sexual debut, in MENA countries, is often synonymous with early marriage resulting in an increased lifetime cumulative exposure to HPV and decreased capacity for sexually active individuals to negotiate sexual health practices in an informed manner (Vaccarella et al., 2013). In Iraq, while legal protection exists early marriage continues to happen for example in rural and tribal communities. Socioeconomic factors such as poverty, and lack of educational opportunities for girls contribute to this problem (Al-Alwan et al., 2021). Therefore the association between early marriage and HPV risk that was found in this study has implications for both health and the larger social determinants of health equity.

High parity (defined as having 6 or more pregnancies), was found to be significantly associated with having a HPV high-risk profile in 22.0% of the participants who reported having high parity ($p = 0.003$). The association between high parity and increased risk of HPV has been well established in the literature and is thought to be due to several different mechanisms including: 1) the immunosuppressive affects of having multiple pregnancies, 2) hormonal changes that occur at time of delivery and after childbirth. These changes can facilitate HPV persistence in the female cervix, 3) the potential for cervical trauma to occur which would make the cells of the cervix more susceptible to becoming oncogenically transformed (Schiffman et al., 2016). In the context of Iraq where access to family planning services is poor and cultural

norms favour larger families; high parity is a modifiable risk factor that can be addressed by providing holistic reproductive health counselling.

Seventeen point two percent (17.2%) of the participants reported a history of STIs; this was found to be significantly associated with increased HPV risk ($p = 0.008$). Co-infection with STIs such as Chlamydia trachomatis, herpes simplex virus type 2 and Trichomonas vaginalis have been shown to increase duration with the female cervix infected with HPV due to chronic inflammation, disruption of the mucosal barrier, and changes in immunological status (Clifford et al., 2015). The prevalence of STI history reported in this scientific article underestimates the true prevalence of STIs, especially in light of the cultural stigma surrounding disclosing STI status as well as the limitations of public health's ability to provide STI diagnostic services. Thus, an important additional strategy for reducing the risk of HPV transmission would be to strengthen STI screening and treatment services within gynecological clinics.

Oral contraceptive use occurred in 38.8% of study participants and was found to be significantly associated with HPV risk ($p=0.040$). The link between long-term use of oral contraceptives and cervical cancer has been previously established by the International Agency for Research on Cancer (IARC), with the consensus that hormonal effects as a result from oral contraceptive use may contribute to hormone-mediated integration of HPV into host cell DNA as well as potentially affecting local immunity in the cervix (Arbyn et al., 2020). Importantly, this association does not detract from the benefits of contraceptive use and maternal health, but instead reinforces the need for integrated counseling regarding cervical cancer risk and screening services for women taking oral contraceptives.

Inadequate hygiene for the genitals (43.6% of participants met this criterion) was found to be significantly associated with HPV risk ($p=0.001$). As good hygiene of the external genital area removes pathogenic microorganisms, some studies suggest this may result in decreased risk of acquiring HPV or other sexually-transmitted infections, although direct protection from HPV transmission will not occur without using barrier methods (Brianti et al., 2020). Research findings suggest that the high levels of poor hygiene in this population may be due to a lack of health education and a limited access to sanitation facilities (especially in rural areas) in addition to cultural traditions such as douching, which destroys the beneficial vaginal microorganisms.

Evidence-based hygiene practices could provide a low-cost cultural intervention to share with the community via public health messages.

Another finding that stands out in this study is the extremely low percentage of women who have ever had a Pap smear to screen for cervical cancer. Seventy percent of women in this study had never had a Pap smear and not having had one has a significant relationship with HPV risk ($p < 0.001$). The same results have been seen across the MENA region and LMICs, where systemic barriers (e.g., no national cervical cancer program, limited laboratory availability, financial restraints, male primary healthcare providers, cultural barriers, and lack of education) inhibit women from obtaining cervical screening (Gargouri et al. 2019; Al-Dubai et al. 2021; Mugo et al., 2023). Evidence from European randomized controlled trials has demonstrated that HPV-based screening is significantly more effective than cytology alone in preventing invasive cervical cancer (Ronco et al., 2014); however, such evidence-based screening infrastructure remains largely absent in Iraq.

Cervical cancer screening is non-existent in the public health care system of Iraq and because of the lack of systematic outreach to women attending gynecology clinics for other reasons, even women who frequently attend the gynecology clinic will likely not be screened as part of their visit. The cervical cancer burden in Iraq must also be viewed within the global context; cervical cancer caused by high-risk HPV types—predominantly HPV 16 and 18—remains among the most preventable yet most deadly cancers in women in LMICs (de Sanjose et al., 2010; Ferlay et al., 2019). The above-mentioned systemic problem requires a systemic change in policy and individual education.

The absence of HPV education is seen in 72.8% of participants and the lack of HPV education was significantly associated with having one of the high-risk HPV types ($p < 0.001$). Studies have demonstrated consistent findings concerning female HPV knowledge rates of 20-40% in Jordan, Egypt, Saudi Arabia, and Iran. In rural and less educated sub-groups, the findings reveal even lower HPV knowledge rates (Almobarak et al., 2022; Drolet et al., 2019). While there are multiple factors that mediate the relationship between knowledge and health behaviours, awareness is still necessary (although insufficient) before an individual will seek vaccination, screening, and/or risk reduction.

This limited evidence of awareness of HPV highlights a pressing need for structured community-based health education through primary care, schools, places of worship, and multiple forms of media that are culturally relevant. The HPV vaccination coverage of 3.6% in this study indicates that there is little to no primary prevention of HPV among this population, as there is no HPV vaccination programme in Iraq, and the vaccine is only available through the private sector at a cost that most families cannot afford. The large difference between this situation and the other global vaccinations of 100-plus countries where HPV vaccination programmes have been introduced and many countries have an HPV vaccination coverage rate of over 70% for the age group targeted (World Health Organization, 2023; Moscicki et al., 2012). It is not surprising that fewer than 5% of the women surveyed had received the HPV vaccine in this study due to the lack of a policy supporting this inclusion in Iraq's national immunization schedule. Renewed advocacy efforts are warranted to integrate HPV vaccination into the national immunization program and prioritize girls 9-14 years prior to their sexual debut. The 9-valent HPV vaccine, which has demonstrated high efficacy against HPV types responsible for the vast majority of cervical cancers, represents the optimal choice for new national immunization programs (Joura et al., 2015).

Rural residence was found to be a significant risk factor for HPV (bivariate analysis $p = 0.009$) and indicates that rural women in Iraq are at a multi-dimensional disadvantage in relation to access to and receipt of (a) health-related information; (b) health services; and (c) socio-economic determinants of health. Rural women are significantly less likely than urban women to have completed formal education; to be married at a later age; to have a lower number of children; and to have received health education, all of which adds to their vulnerability across multiple risk factors. Therefore, development of geographically-relevant outreach strategies, such as mobile health units and community health worker programmes, may be particularly important for rural communities.

Several limitations should be recognized when considering the findings from this study. First, the cross-sectional nature of the study does not allow for conclusions regarding a temporal or causal relationship between the identified risk factors and HPV outcomes. Given the single site where the study was done (tertiary care centre), findings may not be generalizable to other care settings (i.e., primary care and community).

Additionally, the study's reliance on self-reported data may result in social desirability bias whereby sensitive information (e.g., STI history; sexual behaviours) may be under-reported, and the HPV risk assessment was based on a risk factor profile only; therefore, clinical confirmation of HPV infection status was not possible (i.e., laboratory test). Future studies should collect serology and/or molecular HPV testing (e.g., using PCR) to validate the risk factor-based approach to HPV risk assessment.

Despite these limitations, this study provides a critical contribution to the body of evidence regarding risk factors for HPV in women in Iraq. These findings are consistent with earlier Iraqi studies that documented high-risk HPV prevalence in Basra and Duhok governorates (Hassan et al., 2020; Hussein et al., 2021), further confirming that HPV-related risk is distributed across multiple regions of Iraq and not confined to a single geographic area. Together, these findings warrant a coordinated public health response that addresses the interrelated determinants of the risk of HPV, with consideration of the unique cultural, social, and healthcare context of Iraq. Coordinated action across health, education, and social policy will be critical in ensuring the burden of preventable HPV-related disease is reduced among women in Iraq in the future through the provision of robust local-level epidemiologic surveillance.

Conclusion

There is a high prevalence of HPV risk factors among women who attend the gynecological clinics at Al-Sadr Teaching Hospital in Najaf, Iraq, and evidence of very low rates of HPV awareness, vaccination, and cervical cancer screening. There were statistically significant associations between early marriage, high parity, STI history, oral contraceptive use, inadequate genital hygiene, and living in rural areas with high-risk profiles for HPV. The study revealed a dire need for policy interventions that are based on the research and evidence to improve preventive health infrastructure and health literacy. The highest priorities for this vulnerable population are integrating HPV vaccinations into Iraq's national immunization program, creating a standardized cervical cancer screening program within the public health system, and conducting ongoing culturally appropriate education and prevention programs focused on cervical cancer prevention.

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