



Predicting Human Papillomavirus Infection in Women Based on Sexual Assertiveness, Body Image Shame, and Impulsiveness

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Abstract

Background: Human papillomavirus (HPV) is among the most prevalent sexually transmitted infections worldwide. Understanding the psychological contributors to HPV infection is crucial for informing preventive strategies. We examined whether sexual assertiveness, body image shame, and impulsiveness predict HPV infection in women.

Methods: In this cross-sectional, predictive correlational study, 119 women aged 18 to 45 who underwent HPV testing in gynecology and oncology clinics in early 2024 were recruited via convenience sampling. Data were gathered using a demographic questionnaire and three standardized instruments: the Hurlbert Index of Sexual Assertiveness (HISA), the Body Image Shame Scale (BISS), and the Barratt Impulsiveness Scale (BIS). Logistic regression analysis was conducted using SPSS version 27.

Results: The participants had a mean age of 33.98 years, with 47.89% being single and 52.1% married. Among all participants, 40.3% tested positive for HPV. Body image shame and impulsiveness emerged as significant predictors of HPV infection risk ($P < 0.001$). External body image shame was identified as the most impactful subscale of body image shame, while cognitive impulsivity showed the strongest influence among the components of impulsiveness. However, the findings revealed no significant association between low sexual assertiveness and the risk of HPV infection ($P > 0.05$).

Conclusion: These findings highlight the role of psychological factors, especially body image shame and impulsiveness, in HPV risk. Integrating related interventions into public health measures like vaccination and screening may improve their effectiveness and enhance women's sexual health outcomes.

Keywords: Human papillomavirus; Sexual assertiveness; Body image shame; Impulsiveness



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Introduction

Human papillomavirus (HPV) is one of the most prevalent sexually transmitted infections (STIs) worldwide, with over 200 identified strains. It is estimated that approximately 75–80% of sexually active individuals will contract HPV at least once in their lifetime (1). While many types are benign, high-risk strains, particularly HPV types 16 and 18, are strongly associated with cervical cancer and several other malignancies, including anal, oropharyngeal, vaginal, vulvar, and penile cancers (2,3). Known risk factors for HPV infection include both behavioral and biological elements, such as early sexual initiation, multiple sexual partners, tobacco and alcohol use, co-infection with other STIs, genetic predisposition, and the specific viral genotype involved (4,5).

Although condom use and vaccination remain essential tools in HPV prevention, their effectiveness is limited. HPV can be transmitted through skin-to-skin contact in areas not covered by condoms, and current vaccines do not provide protection against all HPV types (6). Therefore, additional psychosocial and behavioral factors may play a significant role in HPV transmission and prevention. Previous research has shown that psychological variables such as anxiety, low body appreciation, and impulsivity are associated with risky sexual behaviors (7,8). Moreover, difficulties in negotiating condom use and making informed sexual decisions may further increase vulnerability to infection. Given these findings, exploring psychological predictors of HPV infection may provide valuable insights for public health strategies. This study focused on three specific psychological constructs: sexual assertiveness, body image shame, and impulsiveness. Sexual assertiveness refers to an individual's ability to communicate sexual boundaries, preferences, and needs. Higher levels of assertiveness are associated with healthier sexual relationships and consistent condom use, whereas lower assertiveness is often linked to anxiety, reduced self-efficacy, and engagement in risky sexual behaviors (9). Body image shame, charac-

terized by dissatisfaction with one's physical appearance, stems from the discrepancy between perceived and ideal body image. It is associated with low self-esteem, depressive symptoms, and impaired sexual communication. Individuals experiencing body image shame may be less likely to refuse unwanted sexual advances or to initiate discussions about protection and sexual health, which can increase their risk of STIs, including HPV (10-12).

Impulsivity, defined as a tendency to act quickly without adequate forethought, is another key factor influencing risky sexual behaviors. Impulsive individuals may prioritize short-term gratification over long-term safety, leading to earlier sexual debut, multiple partners, and inconsistent use of preventive measures (13-15). Moreover, impulsivity often interacts with situational factors like alcohol or drug use, further exacerbating high-risk behaviors (16). Understanding how these psychological variables contribute to HPV infection risk can inform more targeted, culturally sensitive prevention strategies.

The present study aimed to investigate whether sexual assertiveness, body image shame, and impulsiveness can predict HPV infection in women.

Materials and Methods

Study Design

This cross-sectional predictive correlational design, conducted from April 2024 to September 2024, aimed to examine the predictive factors for HPV infection in women, with a focus on psychological variables such as sexual assertiveness, body image shame, and impulsiveness. A convenience sampling method was used. The study population consisted of women seeking HPV testing at selected gynecology and oncology clinics. Eligibility criteria included providing informed consent, no prior awareness of HPV infection, and no history of a confirmed diagnosis. Participants were excluded if they failed to complete the questionnaires in full or did not undergo HPV testing.

Participants and Data Collection

The study involved women who provided informed consent following a detailed explanation of the research objectives. Of the participants, 140 completed self-reported questionnaires, capturing both demographic and psychological data. HPV test samples were processed at a certified pathology laboratory and the results were delivered to the clinics within two weeks.

General Characteristics of the Participants

Participants' general characteristics were assessed through a self-reported questionnaire, gathering information on age, marital status, education level, and the specific site of HPV testing, categorized as oral, anal, or vaginal.

Sexual Assertiveness

Sexual assertiveness was measured using the Hurlbert Index of Sexual Assertiveness (HISA) (17). This tool consists of 25 items designed to assess sexual assertiveness. Responses are recorded on a five-point Likert scale ranging from 0 ("Always") to 4 ("Never"), with 11 items reverse-scored. Total scores range from 0 to 100, where higher scores indicate greater sexual assertiveness. The reliability of this instrument has been validated in previous studies. Sarabi et al. reported a reliability coefficient of 0.79 (18). In the current study, Cronbach's α was found to be 0.81.

Body Image Shame

Body image shame was assessed using the Body Image Shame Scale (BISS) developed by Duarte et al. (19). The scale consists of 14 items rated on a five-point Likert scale ranging from 0 ("Never") to 4 ("Almost always"). It includes two subscales: external shame (7 items), which reflects the perception that others view one's body negatively, and internal shame (7 items), which involves self-critical thoughts and negative evaluations of one's own body. The total score ranges from 0 to 56, with higher scores indicating greater levels of body image shame. In Iran, Sadeghzadeh and Shamli reported reliability coefficients of 0.89 for the total scale, 0.91 for the external shame subscale, and 0.87 for the internal shame subscale (20). In the

current study, Cronbach's α for the total scale was 0.83.

Impulsiveness

Impulsiveness was measured using the Barratt Impulsiveness Scale (BIS), developed by Barratt (21). The scale comprises 30 items, divided into three subscales: cognitive impulsivity (10 items), which reflects quick decision-making and attention lapses; motor impulsivity (10 items), which captures acting without thinking; and non-planning impulsivity (10 items), which refers to a lack of forethought or future orientation. Each item is rated on a five-point Likert scale from 1 ("Rarely/Never") to 5 ("Almost Always/Always"). The total score ranges from 30 to 120, with higher scores indicating greater levels of impulsivity. Salehi et al. reported a Cronbach's α of 0.87 for the total scale (22). In the current study, Cronbach's α for the total scale was 0.79.

HPV Testing

Smear samples from oral, anal, or vaginal sites were collected by a gynecologist according to the participant's preference and sexual history. The samples were then sent to a certified laboratory for HPV testing, where detection and genotyping of HPV were performed using the INNO-LiPA HPV Genotyping assay, a PCR-based method capable of detecting and differentiating both high-risk and low-risk HPV genotypes.

Data Analysis

Data were analyzed in the following steps. First, participants' general characteristics and psychological variables, including sexual assertiveness, body image shame, and impulsiveness, were analyzed using frequencies, percentages, means, and standard deviations. Second, logistic regression was employed to examine the predictive relationships between psychological variables and HPV infection status. All statistical analyses were conducted using SPSS software (version 27.0) (IBM Corp., Armonk, NY, USA).

Ethical considerations

This study has been approved by the ethics Committee of Islamic Azad University, Ahvaz Branch, Iran with the code: IR.IAU.AH-VAZ.REC.1403.131, This research was based on Helsinki ethical standards that ensure respect for all human subjects and protect their rights to understand the objectives and procedures of the study, methods, confidentiality of their personal information and their right to withdraw at any stage of the research, and before starting the research, informed consent was obtained from all subjects involved in the study.

Results

This study aimed to examine whether sexual assertiveness, body image shame, and impulsiveness could predict the risk of HPV infection among women. Among the respondents, 140 individuals completed the questionnaires. However, 21 participants did not complete the laboratory procedures

required for HPV testing after completing the survey. According to the inclusion and exclusion criteria, these individuals were excluded from further analysis, leaving a final sample size of 119 participants.

Demographic Characteristics

A slight majority of the respondents were married, representing just over half of the study population. Single participants constituted the remainder, demonstrating a balanced representation of marital demographics. In terms of educational attainment, nearly half of the participants had earned at least a bachelor's degree, reflecting a relatively educated sample. A smaller portion held master's or doctorate degrees, while fewer individuals had completed only high school or an associate degree. This distribution indicates a diverse range of educational backgrounds, though the majority were well educated (Table 1).

Table 1: Demographic characteristics of participants

Variables	Groups	Frequency	Percentage
Marital Status	Single	57	47.8%
	Married	62	52.1%
	Total	119	100%
Education Level	High School Diploma	18	15.1%
	Associate Degree	10	8.4%
	Bachelor's Degree	59	49.6%
	Master's Degree	27	22.7%
	Doctorate	5	4.2%
	Total	119	100%
Test Area	Vagina	113	95%
	Vagina and Anus	3	2.5%
	Vagina and Mouth	3	2.5%
	Total	119	100%

The testing locations predominantly centered on the vaginal area, with almost all participants opting for this site. A very small minority of participants underwent additional testing involving the anus or

mouth, reflecting the primary focus on vaginal HPV detection. The types of HPV risk and strain distribution are detailed in Table 2.

Table 2: HPV distribution among participants

Variable	Groups	Frequency	Percentage
HPV Status	Positive	48	40.3%
	Negative	71	59.7%
	Total	119	100%
HPV Type	High risk	20	41.7%
	Low Risk	12	25%
	High/Low risk	16	33.3%
	Total	48	100%
Strains per Person	One strain	22	45.8%
	Two strains	11	22.9%
	Three strains	10	20.8%
	Four strains	2	4.2%
	Five strains	1	2.1%
	Six strains	2	4.2%
	Total	48	100%

Sexual Assertiveness and HPV Infection

Logistic regression analysis revealed no significant relationship between sexual assertiveness and HPV infection. The chi-square statistic for the overall model was 0.001 ($P = 0.97$), indicating no difference between the null model (constant only) and the full model. The Hosmer-Lemeshow goodness-of-fit statistic was 9.92 ($P = 0.27$), suggesting acceptable alignment between predicted and observed probabilities. However, the Nagelkerke R^2 value of 0 indicated that sexual assertiveness did not explain any variance in HPV infection risk. The regression coefficient for sexual assertiveness was $B = 0.000$ ($P = 0.97$), and the odds ratio was 1.00. These findings suggest that sexual assertiveness is not a predictor of HPV infection.

Body Image Shame and HPV Infection

Logistic regression showed that body image shame significantly predicted HPV infection (chi-square = 30.10, $P < 0.001$), with Nagelkerke R^2 indicating that body image shame explained 30% of the variance in HPV infection risk. The Hosmer-Lemeshow statistic was 10.73 ($P = 0.22$), confirming adequate alignment between predicted and observed probabilities. When analyzed as subdimensions,

external shame emerged as a significant predictor of HPV infection ($B = 0.242$, $P < 0.001$, OR = 1.27), while internal shame was not significant ($B = 0.031$, $P = 0.47$, OR = 1.03).

Impulsiveness and HPV Infection

Logistic regression for overall impulsiveness revealed a significant predictive relationship with HPV infection (chi-square = 56.53, $P < 0.001$), with Nagelkerke R^2 showing that impulsivity explained 51% of the variance in HPV infection risk (Table 3). The Hosmer-Lemeshow statistic was 6.84 ($P = 0.44$), confirming good model fit. A one-unit increase in overall impulsiveness raised the odds of HPV infection by 22% ($B = 0.20$, $P < 0.001$, OR = 1.22). Further analysis of impulsivity subdimensions revealed that non-planning and cognitive impulsivity were significant predictors of HPV infection, while motor impulsivity was not. Non-planning impulsivity increased the odds of HPV infection by 27% ($B = 0.240$, $P < 0.001$, OR = 1.27), and cognitive impulsivity increased the odds by 51% ($B = 0.416$, $P < 0.001$, OR = 1.51). Motor impulsivity was not statistically significant ($B = 0.053$, $P = 0.49$, OR = 1.05).

Table 3: Logistic Regression Results for Predicting the Risk of HPV Infection Based on Sexual Assertiveness, Body Image Shame, and Impulsivity

Variable	Beta (B)	SE	Wald (W)	P-value	Odds Ratio (Exp(B))	95% CI for Exp(B)
Sexual Assertiveness	0.000	0.010	0.001	0.97	1.00	0.97 – 1.02
Body Image Shame	0.113	0.025	20.13	<0.001	1.12	1.06 – 1.17
External Shame	0.242	0.066	13.49	<0.001	1.27	1.12 – 1.45
Internal Shame	0.031	0.044	0.51	0.47	1.03	0.94 – 1.12
Impulsivity	0.200	0.037	30.33	<0.001	1.22	1.14 – 1.31
Non-planning Impulsiveness	0.240	0.067	12.83	<0.001	1.27	1.11 – 1.45
Motor Impulsivity	0.053	0.079	0.46	0.49	1.05	0.60 – 1.23
Cognitive Impulsivity	0.416	0.094	19.40	<0.001	1.51	1.26 – 1.82

Discussion

This study examined whether psychological variables—specifically sexual assertiveness, body image shame, and impulsiveness—could predict HPV infection in women. The findings revealed that while sexual assertiveness was not significantly associated with HPV status, both body image shame and impulsivity emerged as significant predictors. The lack of association between sexual assertiveness and HPV infection contrasts with previous literature suggesting that assertiveness in sexual communication is linked to safer sexual practices and reduced risk of STIs (23). Several factors may account for this inconsistency. Cultural norms in many societies, particularly more conservative ones, may inhibit women from expressing their sexual needs, even when they possess assertive tendencies. In such contexts, assertiveness may not translate into effective behavioral change. Moreover, HPV transmission can occur via superficial skin contact, which may limit the protective role of assertiveness alone. Additionally, many participants, particularly single women, were unaware that non-penetrative contact could transmit HPV. This lack of knowledge may have been a more salient risk factor than assertiveness itself.

Methodological limitations, such as the cross-sectional design and modest sample size, may have also contributed to the

Future studies should consider incorporating culturally adapted measures and assessing knowledge levels related to HPV transmission. In contrast, body image shame—particularly external shame driven by societal judgment—was a significant predictor of HPV infection. This aligns with prior research indicating that negative body image can impair sexual self-efficacy and reduce engagement in protective behaviors (24). In a large tri-ethnic sample, Littleton et al. found that appearance-related shame predicted multiple high-risk sexual behaviors, including inconsistent condom use and higher numbers of sexual partners, both of which are recognized risk factors for HPV infection (10). These findings suggest that individuals with high external shame may avoid seeking preventive services such as vaccination and screening due to stigma or embarrassment, thereby increasing their susceptibility to infection. Interventions promoting positive body image and addressing societal pressures around physical appearance may therefore play a critical role in reducing risky sexual behaviors and enhancing sexual health outcomes. Impulsivity also significantly predicted HPV infection, with cognitive and non-planning impulsivity being the most influential subtypes. Cognitive impulsivity, which reflects poor decision-making and

reduced consideration of consequences, may lead individuals to engage in unprotected sex or delay preventive actions despite being aware of the risks. Non-planning impulsivity, characterized by lack of foresight, may contribute to neglecting long-term health behaviors, such as vaccination or regular screening. These findings are in line with prior research, including Kahn et al, who reported strong associations between impulsivity and engagement in sexual risk-taking among adolescent and young adult women (15), as well as Hayaki et al., who found that sexual risk-taking mediated the relationship between impulsivity and acquisition of STIs among incarcerated women (16). Interestingly, motor impulsivity, associated with spontaneous physical actions, did not show a significant relationship with HPV infection. This suggests that cognitive aspects of impulsivity, those involving judgment and planning, play a more critical role in sexual risk-taking than reactive behaviors. The high prevalence of high-risk or mixed high/low-risk HPV types among infected participants further underscores the need for comprehensive prevention strategies. Infections with multiple high-risk HPV types, in particular, have been associated with persistent low- and high-grade lesions, increasing the likelihood of disease progression (2). Therefore, these strategies should go beyond biological interventions and incorporate psychological and behavioral components. Specifically, public health programs may benefit from integrating educational initiatives that address impulsivity and body image concerns, along with increasing awareness about HPV transmission routes. Despite its valuable contributions, this study has several limitations. The sample included only women, limiting the generalizability of findings to men or gender-diverse individuals. Additionally, due to cultural sensitivities, detailed data on sexual history, such as number of partners, age at sexual debut, and partner characteristics, could not be collected.

These behavioral variables may interact with psychological factors in complex ways. This should be addressed in future research. Expanding partici-

pant diversity and incorporating broader psychosocial variables will help develop more effective, inclusive HPV prevention strategies.

Conclusion

These results underscore the importance of psychosocial factors in HPV infection risk. Sexual assertiveness was not associated with HPV infection, while body image shame and impulsivity (especially external shame, non-planning, and cognitive impulsivity) significantly predicted increased risk. Interventions addressing external shame and impulsivity may be effective in mitigating HPV infection risk, particularly for high-risk individuals.

Conflict of interest

The authors declare that they have no conflict of interest.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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