

A comparative study on sexual self-care of women with and without genital human papillomavirus infection: A cross-sectional analytical study

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Abstract

Background

Given the high prevalence of human papillomavirus (HPV), the importance of sexual self-care in promoting women's health, the present study aimed to compare the status of sexual self-care of two groups of women with and without HPV genital infection.

Methods

This analytical cross-sectional study was conducted on 350 women aged 18–49 years, in two groups with and without HPV genital infection diagnosis. Setting of the study was eight women's healthcare centers affiliated with Alborz University of Medical Sciences. The participants were recruited using a multi stage sampling methods. Data were collected using two questionnaires including a demographic/reproductive information questionnaire and a standard sexual self-care questionnaire. Data were analyzed using independent t-test and Mann–Whitney U test, Pearson or Spearman correlation tests and by using SPSS-26.

Results

The mean age of participant were 34.72 ± 7.16 and 33.81 ± 7.26 years in two groups of women with and without HPV genital infection, respectively. There were significant differences between groups respecting the participants' education ($p < 0.05$) and previous history of marriage ($p < 0.05$). The total sexual self-care score was significantly lower in women HPV-infected women compared to the other group ($P < 0.001$; 144.58 ± 29.27 vs. 159.33 ± 21.70). In all four dimensions of sexual self-care, the HPV-infected group also obtained significantly lower scores compared to the other group ($P < 0.001$).

Conclusion

Women with HPV genital infection demonstrate lower levels of sexual self-care. This behavioral deficit appears to be multidimensional and highlights the need for integrated educational and supportive interventions focused on improving self-care across all domains, providing psychosocial counseling after diagnosis, and addressing cultural and structural barriers.

Introduction

The World Health Organization (WHO) considers self-care one of the most promising approaches to improving health [1]. Women are regarded as a vulnerable group in the field of health and sexual self-care due to physiological and social factors. Sexually transmitted infections (STIs), as well as sexual and reproductive healthcare in general, are often stigmatized in various contexts and populations, including

women. This stigma leads to limited access to sexual and reproductive health information and services [2, 3].

Studies indicate that self-care interventions can contribute to cost savings within healthcare systems. Self-care encompasses several domains, including self-awareness, self-testing, and self-management. Self-awareness refers to an individual's ability to monitor the internal thoughts and emotions. Self-testing involves the process of sample collection, performing tests, and interpreting results independently to gain insight into one's health status. Self-management is defined as an active or preventive approach aimed at maintaining a healthy lifestyle, preventing the onset of symptoms, assessing physical and psychological changes, monitoring symptoms, and effectively coping with the effects of diseases [4–6].

Research has shown that women's level of awareness and knowledge regarding sexual self-care remains low. Many women worldwide are unaware of the importance and benefits of optimal genital self-care or that unhealthy genital care practices may cause or exacerbate vulvovaginal problems [7, 8].

Human papillomavirus (HPV), as one of the most common sexually transmitted infections worldwide, represents a major concern in women's health. According to global statistics, approximately 80% of women acquire at least one type of HPV during their lifetime [9]. HPV infection has a considerable global prevalence, particularly among women, in whom it is recognized as a leading cause of cancer [10]. In addition to physical complications, women infected with HPV face psychological and social challenges such as feelings of shame, anxiety, depression, and fear of social judgment [11]. Individuals with HPV are at risk of anxiety, loss of self-confidence, pain and discomfort, reduced opportunities for sexual partnership, lesion progression, spread of infection, and an increased risk of cancer [12].

Sexual self-care in women with HPV not only affects individual health but also plays a significant role in reducing the economic burden on healthcare systems. The costs associated with the treatment of cervical cancer and other HPV-related diseases impose a substantial financial burden on national health systems. Prevention of these conditions through effective self-care practices can lead to economic savings and improvement in public health indicators [13, 14]. Midwives' awareness of the sexual self-care status of women with HPV can contribute to improving the quality of care provided, promoting women's health, and reducing the burden of HPV infection and cervical cancer. Therefore, considering the high prevalence of HPV, the importance of sexual self-care, the role of midwives in promoting women's health, and the lack of comparative studies, the present study was conducted in 2025 to assess and compare the status of sexual self-care in women with and without genital HPV infection who attended healthcare centers affiliated with Alborz University of Medical Sciences.

Methods

Study Design

This was an analytical cross-sectional study conducted to compare sexual self-care among women with and without HPV genital infection.

Participants

The study was carried out on 350 women in two groups including women with HPV-positive genital infection and 175 women with HPV-negative test. The study population consisted of women diagnosed with HPV-positive co-test results had been recorded in gynecology clinics affiliated with Alborz University of Medical Sciences in 2025.

Inclusion criteria were: age 18–49 years; clinical diagnosis of genital HPV-infection or warts by a gynecologist, dermatologist, or infectious disease specialist; Iranian nationality; sexual activity within the past six months; ability to read and write; and absence of underlying physical or psychological conditions affecting sexual function in the participant or her spouse. Participants were excluded if questionnaires were completed incompletely.

Sampling Method

Sampling was performed using a multistage approach. First, all eight women's gynecologic clinics affiliated with Alborz University of Medical Sciences were selected. Then, quota sampling was applied. Finally, eligible participants from each center were recruited through convenience sampling method.

Sample Size: The sample size in each group was calculated using the standard formula for comparing two means. In this formula:

$$n \geq 2 \frac{(z_{\alpha/2} + z_{\beta})^2 \sigma^2}{(\mu_1 - \mu_2)^2}$$

α represented the probability of type I error, $\alpha = 0.05 \Rightarrow z_{\alpha/2} = 1.96$

β represented the probability of type II error, $\beta = 0.10 \Rightarrow z_{\beta} = 1.28$

power = $1 - \beta = 0.80$

Observed effect size: $(\mu_1 - \mu_2)/\sigma = 0.30$

$$n = 2(1.96 + 1.28)^2 \left(\frac{1}{0.30} \right)^2 = 175$$

The effect size was defined as the difference between the mean sexual self-care scores divided by the standard deviation. Due to the lack of similar prior studies, the minimum effect size was considered 0.3 based on Munro's reference.

A minimum of 175 participants was required in each group; therefore, the total sample size was 350 women.

Tools of the study

Data were collected using a demographic–reproductive information questionnaire and the standard Female Sexual Health Self-Care Scale (FSHS) that was adopted from a previously published and validated instrument [15].

The demographic and reproductive questionnaire consisted of 29 items, including 13 questions on personal characteristics and 16 questions on reproductive history.

The FSHS consists of 40 items across four domains: prevention of sexually transmitted infections and genital tract infections, prevention of women's cancers, prevention of unintended pregnancy, and promotion of sexual health. Items are scored using a 5-point Likert scale: never (1), rarely (2), sometimes (3), often (4), and always (5). The total score of the instrument (40 items) ranges from 40 to 200. For better interpretability and comparability, scores for each domain were converted to a 0–100 scale; consequently, the overall scale score was also expressed on a 0–100 scale [15].

Regarding psychometric properties, the FSHS questionnaire was evaluated by Yazdani et al. for qualitative and quantitative face validity and qualitative and quantitative content validity. The overall Content Validity Index (CVI) was reported as 0.93, and the Content Validity Ratio (CVR) was 0.96. In the final analysis, Cronbach's alpha coefficient was 0.94, indicating excellent internal consistency [15].

Procedure for data collection: The questionnaires were administered using two methods: paper-based forms distributed at the clinics and an online Google Form link for women who were able to complete the survey remotely. In both formats, the questionnaires were completed through self-report. The researcher was available to provide clarification if participants required further explanation regarding any items.

Data Analysis

After completion and collection of the questionnaires, the data were reviewed, checked, and entered into SPSS software version 26. Data were coded and categorized. Descriptive statistics, including mean, standard deviation, frequency, and percentage, were used to describe demographic characteristics and study variables. The normality of data distribution was assessed using the Kolmogorov–Smirnov test. If the data were normally distributed, an independent t-test was used to compare the mean sexual self-care scores between the two groups; otherwise, the Mann–Whitney U test was applied. Pearson or Spearman correlation tests were used, depending on data type and distribution, to assess the relationship between demographic variables and sexual self-care scores. The level of statistical significance was set at $P < 0.05$ for all tests.

Ethics

This study was approved by the Ethics Committee of the Schools of Pharmacy, Nursing, and Midwifery at Shahid Beheshti University of Medical Sciences (Ethics code: IR.SBMU.PHARMACY.REC.1403.352). We adhered to the Declaration of Helsinki in the study. Necessary permissions were obtained from Shahid

Beheshti University of Medical Sciences and Alborz University of Medical Sciences. All eligible participants who were willing to take part in the study received an explanation of the research process and were assured about the confidentiality of their information and their right to withdraw from the study at any stage. Written informed consent was obtained from all participants.

Results

Three hundred and fifty women participated in this study in two groups, 175 in each group infected with and not infected with human papillomavirus. The finding of the study demonstrated that mean age ($\pm$ standard deviation) was 33.81 ($\pm$ 7.26) years in the HPV-negative (healthy) group and 34.72 ($\pm$ 7.16) years in the HPV-infected group. Regarding demographic features, the education level of the participants ($P = 0.020$) and their spouses ($P = 0.013$) showed a significant difference between the healthy and HPV-infected groups; the education levels of both, the participants and their spouses were significantly higher than the healthy group. Other variables, including having education related to medical sciences ($P = 0.412$), employment status of the individuals ($P = 0.075$), employment status of the spouses ($P = 0.107$), and family income ($P = 0.526$), did not show significant differences. Additionally, history of previous marriage for the individuals ($P = 0.001$) and their spouses ($P = 0.002$) was higher in the HPV-infected group (Table 1).

Table 1

Comparison of Demographic Variables Between The HPV-Negative (Healthy) and HPV-Positive Groups

Variables		Healthy (N = 175)	Affected (N = 175)	P-value
		Mean (SD)	Mean (SD)	
Age (years)		33.81 (7.26)	34.72 (7.16)	0.242
Duration of marriage (years)		8.31 (7.27)	8.65 (7.64)	0.673
Age at first Pap smear (years)		29.54 (6.32)	30.45 (6.85)	0.195
		N(%)	N(%)	P-value
Education level	Literacy (reading & writing)	4 (2.3%)	6 (3.4%)	0.020*
	High school to diploma	24 (13.7%)	47 (26.9%)	
	Associate & Bachelor’s	109 (62.3%)	87 (49.7%)	
	Master’s degree	27 (15.4%)	29 (16.5%)	
	PhD	11 (6.3%)	6 (3.4%)	
Spouse’s Education Level	Illiterate	3 (1.7%)	4 (2.3%)	0.013*
	Literacy (reading & writing)	2 (1.1%)	0 (0%)	
	High school to diploma	22 (12.5%)	31 (17.7%)	
	Associate & Bachelor’s	57 (32.5%)	70 (40%)	
	Master’s degree	69 (39.4%)	62 (35.4%)	
	PhD	22 (12.5%)	8 (4.5%)	
Medical Sciences Education	Yes	36 (20.6%)	30 (17.1%)	0.412*
	No	139 (79.4%)	145 (82.9%)	
Occupation	Housewife	45 (25.7%)	59 (33.7%)	0.075*
	Employee	90 (51.4%)	69 (39.4%)	
	Self-employed	17 (9.7%)	25 (14.3%)	
* Pearson Chi-Square test				

Variables		Healthy (N = 175)	Affected (N = 175)	P- value
		Mean (SD)	Mean (SD)	
	Worker	0 (0%)	4 (2.3%)	
	Home-based income job	4 (2.3%)	5 (2.9%)	
	Student	14 (8.0%)	10 (5.7%)	
	Job seeker	5 (2.9%)	3 (1.7%)	
Spouse’s Occupation	Employee	88 (50.3%)	74 (42.3%)	0.107*
	Self-employed	74 (42.3%)	80 (45.7%)	
	Worker	12 (6.9%)	14 (8.0%)	
	Farmer	1 (0.6%)	1 (0.6%)	
	Job seeker	0 (0%)	6 (3.4%)	
Income level	Less than sufficient	34 (19.4%)	34 (19.4%)	0.526
	Sufficient	89 (50.9%)	98 (56.0%)	
	Savings possible	52 (29.7%)	43 (24.6%)	
History of Previous Marriage	Yes	3 (1.7%)	18 (10.3%)	0.001*
	No	172 (98.3%)	157 (89.7%)	
Spouse’s Previous Marriage History	Yes	8 (4.6%)	25 (14.3%)	0.002*
	No	167 (95.4%)	150 (85.7%)	
* Pearson Chi-Square test				

There was a statistically significant difference in the history of miscarriage between the healthy and HPV-infected groups, with a higher frequency in the infected group. No significant differences were observed in other variables, including the number of pregnancies, number of live children, and number of stillbirths, between the two groups. Other characteristics related to pregnancy status, miscarriage, and pregnancy outcomes in the HPV-negative (healthy) and HPV-positive groups are presented in Table 2.

Table 2

Comparison of the Frequency of Pregnancy Status, Miscarriage, and Birth Outcomes between the HPV-Negative (Healthy) and HPV-Positive Groups

Variables		Healthy (N = 175)	Affected (N = 175)	Significance Level (P-value)
		Number (%)	Number (%)	
Number of Pregnancies	0	72 (41.6%)	68 (38.9%)	0.680*
	1	45 (26.0%)	46 (26.3%)	
	2	36 (20.8%)	31 (17.7%)	
	3	16 (9.1%)	18 (10.3%)	
	4	5 (2.9%)	9 (5.1%)	
	5	1 (0.6%)	3 (1.7%)	
Number of Abortions (Miscarriages)	0	148 (84.6%)	127 (72.6%)	0.018*
	1	22 (12.6%)	32 (18.3%)	
	2	5 (2.9%)	13 (7.4%)	
	3	0 (0%)	3 (1.7%)	
Number of Living Children	0	81 (46.3%)	81 (46.3%)	0.989*
	1	51 (29.1%)	52 (29.7%)	
	2	33 (18.9%)	34 (19.4%)	
	3	8 (4.6%)	6 (3.4%)	
	4	2 (1.1%)	2 (1.1%)	
Number of Stillbirths	No history	169 (96.5%)	166 (94.8%)	0.192*
	1	3 (1.7%)	8 (4.6%)	
	2	3 (1.7%)	1 (0.6%)	
* Pearson Chi-Square test				

The results of the assessment of vaginal health and vaginal care showed that when symptoms of vaginal infection were present, the most common action taken was to visit a doctor or midwife. However, the use of previous medications was higher in the HPV-infected group compared to the healthy group, and this difference was statistically significant ($P = 0.032$). The results indicated that 23.4% of healthy women and 34.9% of women infected with HPV had experienced symptoms of vaginal infection in the

past month. When symptoms were present, the most frequent action was visiting a doctor or midwife; nevertheless, the HPV-infected group had a significantly higher use of prior medications compared to the healthy group ($P = 0.032$) (Table 3).

Regarding the times of Pap smear test that was performed, the highest frequency in both groups was for having undergone the test once, and no significant difference was observed between the two groups ($P = 0.987$). The number of breast examinations by healthcare personnel was most frequently one to three times in the healthy group, while in the infected group, the highest frequency was among those who had never been examined. This difference was statistically significant ($P = 0.010$). The results also showed no statistically significant difference between the two groups in terms of undergoing an HIV test ($P = 0.162$) (Table 3).

Table 3

Comparison of Vaginal Health Status, Pap Smear Examinations, Breast Examinations, and HIV Testing in HPV-Negative (Healthy) and HPV-Positive Women

Variables		Healthy (N = 175)	Affected (N = 175)	P- value
		N (%)	N (%)	
Vaginal Infection Symptoms in the Past Month	Yes	41 (23.4%)	61 (34.9%)	0.019
	No	134 (76.6%)	114 (65.1%)	
Action Taken in Case of Vaginal Infection Symptoms	Use of previous medications	19 (10.9%)	35 (20.0%)	0.032
	Visit to physician or midwife	137 (78.3%)	115 (65.7%)	
	Online consultation with specialist	6 (3.4%)	2 (1.1%)	
	Use of herbal medicines	1 (0.6%)	4 (2.3%)	
	Self-medication	3 (1.7%)	6 (3.4%)	
	No treatment	9 (5.1%)	13 (7.4%)	
Number of Pap Smear Tests	1	87 (49.7%)	85 (48.6%)	0.987
	2	50 (28.6%)	54 (30.9%)	
	3	27 (15.4%)	26 (14.9%)	
	4	7 (4.0%)	7 (4.0%)	
	5	4 (2.3%)	3 (1.7%)	
Number of Breast Examinations by Health Personnel	Never examined	48 (27.4%)	77 (44.0%)	0.01
	Once	56 (32.0%)	40 (22.9%)	
	2–3 times	50 (28.6%)	37 (21.1%)	
	More than 4 times	21 (12.0%)	21 (12.0%)	
* Pearson Chi-Square test				

Age at First Breast Examination by Health Personnel	18–25 years	42 (24.0%)	34 (19.4%)	0.014*
	26–30 years	56 (32.0%)	37 (21.1%)	
	36–39 years	20 (11.4%)	18 (10.3%)	
	Over 40 years	8 (4.6%)	6 (3.4%)	
	Never examined	49 (28.0%)	80 (45.7%)	
HIV Testing	Yes	104 (59.4%)	91 (52.0%)	0.162
	No	71 (40.6%)	84 (48.0%)	
HIV Risk Factors	History of blood transfusion	1 (0.6%)	6 (3.4%)	0.001
	Spouse's history of injecting drug use	0 (0%)	2 (1.1%)	
	Use of shared instruments	1 (0.6%)	1 (0.6%)	
	Personal history of imprisonment	0 (0%)	0 (0%)	
	Spouse's history of imprisonment	0 (0%)	4 (2.3%)	
	History of high-risk sexual behavior	2 (1.1%)	14 (8.0%)	
	None	171 (97.7%)	148 (84.6%)	
History of Sexually Transmitted Diseases (STDs)	No history	171 (97.7%)	89 (50.9%)	0.00
	Genital warts	2 (1.1%)	85 (48.6%)	
	Genital herpes	2 (1.1%)	1 (0.6%)	
Spouse Diagnosed with Genital Warts	Yes	9 (5.1%)	40 (22.9%)	0.00
	No	166 (94.9%)	135 (77.1%)	
History of Gynecological Cancers	No history of cancer	165 (94.3%)	170 (97.1%)	0.251
* Pearson Chi-Square test				

	Breast cancer	8 (4.6%)	5 (2.9%)	
	Ovarian cancer	2 (1.1%)	0 (0%)	
HPV Vaccination Status	Yes	66 (37.7%)	12 (6.8%)	0.74
	No	109 (62.3%)	163 (93.1%)	
Sources of Information About Sexual Relationships	Newspapers and magazines	2 (1.1%)	4 (2.3%)	0.122
	Books	25 (14.3%)	17 (9.7%)	
	Movies	11 (6.3%)	13 (7.4%)	
	Websites	34 (19.4%)	51 (29.1%)	
	Friends	10 (5.7%)	17 (9.7%)	
	Parents	0 (0%)	1 (0.6%)	
	Social media	57 (32.6%)	42 (24.0%)	
	Health care centers	36 (20.6%)	30 (17.1%)	
* Pearson Chi-Square test				

Multivariate analysis results indicated that the mean scores in healthy individuals were significantly higher than those in affected individuals by 4.8, 3.11, 1.57, 5.26, and 14.75 units, respectively ($p < 0.001$). Effect size reflects the magnitude or strength of the relationship between two variables or the difference between two groups in a study. In all dimensions of self-care behavior, except for the third dimension, effect size values exceeded 0.5, indicating that, except for the prevention of unintended pregnancy, the difference in self-care behavior between HPV-infected and non-infected groups was substantially large (Table 4).

Table 4
Comparison of The Mean Sexual Self-Care Scores Between the HPV-Negative (Healthy) and HPV-Positive Groups

Sexual self-care Dimensions	Healthy (N = 175)	Affected (N = 175)	P-value	B**	Std. Error*	Effect size***
	Mean (SD)	Mean (SD)				
Prevention of sexually transmitted diseases and genital tract infections	58.02(8.74)	53.22 (10.04)	< .001	4.8	1.007	0.51
Prevention of female cancers	26.63(5.93)	23.52(7.24)	< .001	3.11	0.708	0.47
Prevention of Unwanted Pregnancy	23.52(3.58)	21.94(4.63)	< .001	1.57	0.443	0.38
Sexual Health promotion	51.14(9.02)	45.88(11.68)	< .001	5.26	1.116	0.51
Total Sexual Self-Care Score	159.33(21.70)	144.58(29.27)	< .001	14.75	. 2.755	0.58
* Independent t-test; ** Coefficient Estimate; *** Effect Size						

Discussion

The present study aimed to compare sexual self-care in healthy women and those infected with human papillomavirus (HPV). In this study, the two groups were homogeneous in terms of demographic characteristics such as mean age, duration of marital life, and age at first Pap smear.

However, lower educational levels (both in participants and their spouses) were observed in the HPV-infected group. This finding is consistent with the results of a previous study which reported that lower education is an independent risk factor for HPV infection as well as insufficient utilization of preventive services [16]. Higher education is often associated with better sexual health literacy, greater access to reliable information, and increased ability to make informed decisions [17].

Additionally, a history of previous marriage (in both the participant and her spouse) and a history of abortion were significantly more common in the HPV-infected group. These factors may indicate a higher number of sexual partners over the lifespan and increased exposure to risk. Significant association between multiple marriages and an elevated risk of sexually transmitted infections has been reported [18]. This finding is consistent with the previous study, which indicated that a history of multiple marriages and a higher number of sexual partners are independent risk factors for HPV infection [19]. Another important consideration is the spouse's history of previous marriage, which may increase a woman's risk of exposure to a partner who could be a carrier of the virus [20]. This underscores the

importance of screening and educating sexual partners as a one of the strategy in the prevention and control of sexually transmitted infections

The study findings indicated that, although there was no statistically significant difference in the distribution of contraceptive methods between the two groups, the pattern of method selection is noteworthy. In the healthy group, protective methods such as condoms were more commonly used, whereas in the infected group, lower-efficacy methods, such as withdrawal and oral contraceptives, were more prevalent. This finding aligns with the previous study, which reported no significant association between HPV status and the choice of contraceptive method [21].

However, the significantly lower score of the infected group in the sexually transmitted disease prevention subscale in our study suggests that the quality of use and consistency of protective methods (e.g., correct and consistent condom use) may be lower in this group. This aspect of the findings is consistent previous study, who reported that women with HPV often use protective methods incorrectly [22].

According to the results, the prevalence of vaginal infection symptoms was significantly higher in the HPV-infected group. Although the most common action in both groups was seeking care from a physician or midwife, the proportion of individuals pursuing professional care was lower in the infected group, who more often relied on previously used medications. This pattern aligns with the findings of previous study, which identified multiple barriers such as fear of judgment, cost, and underestimation of symptoms that hindered healthcare seeking in developing communities [23]. These barriers have also been recognized by the World Health Organization as key challenges in accessing health services in low- and middle-income countries [24].

Consistent with these results, previous study categorized a broader range of barriers into four levels: individual (e.g., shame, fear of pain, and diagnosis), service-related (e.g., cost, accessibility, and shortage of female healthcare staff), socio-cultural (e.g., stigma, gender-based restrictions), and policy-level (e.g., lack of national programs) [25]. These findings highlight that future interventions to improve self-care should extend beyond individual education and address these multilayered barriers at both the service delivery and community levels.

The present study showed that, while there was no significant difference between the two groups in the frequency of Pap smear tests, participation in breast examinations by healthcare personnel was significantly lower in the HPV-infected group. This finding is consistent with the previous study, which reported that women with a history of HPV infection in Iran were less likely to undergo regular breast examinations, as their attention and concern were primarily focused on cervical cancer [26]. Similarly, these results align with previous study, emphasizing the need for comprehensive and integrated education for women to cover all common female cancers, including breast and cervical cancers [27].

On the other hand, our results appear inconsistent with previous study, who reported that some women increase their health awareness and care following a positive HPV diagnosis [28]. This discrepancy may

be attributed to differences in the psychosocial support received or the quality of post-diagnosis counseling. In the absence of adequate supportive counseling, a diagnosis may lead to avoidance and reduced motivation rather than increased self-care.

The data also indicate that the infected group exhibits high-risk behaviors for sexually transmitted infections (e.g., history of risky sexual relationships, genital warts, and partner diagnosis). This alone may partly explain the observed differences in self-care scores. However, the lower self-care observed in areas not directly related to sexual behavior (e.g., breast examination) suggests that additional factors are involved. This finding is consistent with previous study who described the negative psychosocial impact of an HPV diagnosis (e.g., anxiety, stigma) on an individual's motivation and self-efficacy in maintaining personal health [29]. Furthermore, found that lower educational levels and high-risk sexual behaviors were associated with a higher prevalence of high-risk HPV [30].

According to the results, there was no significant difference between the two groups regarding sources of information about sexual relationships. However, self-care scores were significantly lower in the HPV-infected group. This finding suggests that access to information alone is not sufficient to change behavior. The Health Belief Model, which emphasizes the role of perceived barriers and benefits in adopting preventive behaviors, supports this observation [31].

The findings of this study indicate that women with HPV differ from healthy women not only in the prevalence of behavioral risk factors but also in performance across various domains of sexual self-care, both directly and indirectly related to infection. Consistent with our results, previous study reported that access to digital sexual health information has become relatively similar across different groups of women [32]. Moreover, these findings align with previous study who showed that young people worldwide primarily rely on the Internet and social media as their main sources of sexual health information [33].

However, despite similar access to information, sexual self-care scores were significantly lower in the HPV-infected group. This discrepancy suggests the assumption that "equal access to information automatically leads to equal health behaviors" and highlights the need for more in-depth research. A diagnosis of a chronic infection can undermine an individual's belief in their ability to control their own health (self-efficacy). Bandura's study emphasizes the central role of self-efficacy in overcoming barriers and maintaining preventive health behaviors, noting that information alone does not generate self-efficacy [34]. Moreover, although information sources may be similar, the quality, accuracy, and reliability of the information received can differ. Websites provide content ranging from credible to non-scientific previous study reported that online misinformation about HPV is prevalent and can lead to confusion and unhealthy behaviors [35]. Therefore, health media literacy is as important as access to information

The findings of the present study showed that the performance of women with HPV in STI-prevention was significantly lower than that of healthy women. This result aligns with the previous study which reported that women with HPV often use protective methods incorrectly [11]. Researchers have suggested that there is a relationship between health literacy and self-care behaviors in sexually

transmitted infections, and that insufficient awareness and risky attitudes are key determinants of weak self-care behaviors in STI prevention [36, 37].

However, these findings appear inconsistent with the previous study which reported a significant reduction in high-risk behaviors among women after being informed of their HPV status [38]. This discrepancy may be attributable to differences in the socio-cultural context of the study populations. In our study population, stigma associated with sexually transmitted infections and limited access to comprehensive sexual education may hinder protective behavior changes even after diagnosis. In support of this interpretation, previous study reported that fear of judgment by both the community and healthcare personnel is a major barrier to honest reporting of sexual behaviors and receiving appropriate counseling [39]. previous study emphasized that effective psychosocial counseling after diagnosis is essential for reducing anxiety and improving behavioral outcomes [40].

The significant difference observed in the cancer prevention between healthy and HPV-infected groups, despite no difference in the frequency of Pap smear tests, indicates that preventive self-care extends beyond merely undergoing a screening test. This finding is consistent with the study by Andersen et al., which suggested that women with a history of HPV infection may underestimate the risk of other female cancers [41]. However, it is inconsistent with the previous study which reported increased attention to health and preventive care among individuals with a history of chronic disease [42]. One possible explanation is that, given individuals' HPV infection, educational programs tend to focus on cervical cancer as the primary threat, while relatively neglecting education regarding other female cancers, such as breast cancer

The results of our study showed that, in the dimension prevention of unintended pregnancy, HPV-infected women scored lower than healthy women. previous study suggested that chronic stress can reduce accuracy in contraceptive method use [43]. However, previous study found no association between HPV status and the choice of contraceptive method [44]. A systematic review reported that an HPV diagnosis may be accompanied by psychological outcomes, including anxiety, but its impact on health behaviors such as the prevention of unintended pregnancy has not been consistently or conclusively reported across studies. They also noted that the psychological impact of diagnosis may be influenced by key mediating factors, such as social support, access to counseling, and prevailing cultural norms. Therefore, differences in these contextual factors across study populations may contribute to inconsistent findings regarding health behaviors [45]. The lower self-care score in the domain of unintended pregnancy prevention among HPV-infected women, despite the possibility of selecting the same contraceptive methods as the general population, primarily reflects adherence and effective use of the chosen method. This underscores the importance of addressing psychological factors and the quality of post-diagnosis care in addition to initial education

The results of our study showed that, in the dimension of self-care for sexual health promotion, HPV-infected women scored lower than healthy women. previous study described feelings of isolation, reduced self-confidence, and body image disturbances in women with HPV, which may contribute to

decreased self-care in sexual health promotion [29]. Similarly previous study on female cancer survivors, demonstrated that anxiety and disease-related concerns can have long-term negative effects on sexual function and satisfaction—a mechanism that may also apply to chronic HPV infection [46]. previous study reported that stress and body image disturbances, common consequences of an HPV diagnosis, directly impact the individual's sexual health quality [47]. However, these findings are inconsistent with the study by Wu et al., which reported improvements in sexual satisfaction among some women following successful treatment of HPV-related precancerous lesions [48]. This discrepancy highlights the importance of treatment outcomes and the distinction between active infection and post-treatment status. Therefore, based on current literature, the difference in self-care scores in the sexual health promotion dimension between the two groups in the present study may reflect the psychological burden experienced during the course of infection.

The present study showed that the overall sexual self-care score, as well as all of its dimension's prevention of sexually transmitted infections, prevention of female cancers, prevention of unintended pregnancy, and sexual health promotion were significantly lower in HPV-infected women compared to healthy women. This finding aligns with the Integrated Sexual Health Model, which emphasizes the interconnectedness of biological, psychological, and social dimensions [49]. HPV infection can may affect an individual's attitude toward their body and sexual health. However, studies indicate that impaired self-care extends beyond the mere presence of infection. Low health literacy has been identified as a strong predictor of poor self-care behaviors in patients with sexually transmitted infections [50, 51]. This may explain why, despite similar access to information in the present study, self-care scores were lower in the infected group, as the ability to understand, evaluate, and act upon information may be diminished.

previous studies that women with HPV experience multiple psychosocial challenges, including shame, isolation, anxiety, and reduced self-esteem [11, 52]. Furthermore, socio-cultural factors play a critical role. Stigma associated with sexually transmitted infections, highlighted in studies across various communities, can hinder timely healthcare-seeking, honest disclosure of health issues, and access to appropriate education [3, 53, 54]. Gender-based restrictions in certain cultural contexts may also limit women's autonomy in making decisions regarding their bodies and sexual health, negatively affecting self-care [55].

However, some studies have noted that certain women increase their vigilance and self-care behaviors following diagnosis [56]. This discrepancy underscores the importance of mediating factors, such as the quality of post-diagnosis counseling, social support, and individual self-efficacy. In the absence of these supportive factors, a diagnosis alone may not lead to adaptive responses, such as increased self-care, and may even result in adverse effects, including anxiety and reduced self-care.

Study Limitations

Among the limitations of this study was the sensitivity of the topic of sexual health and sexual self-care, due to the cultural taboo surrounding sexual issues in Iranian society. This could have affected women's willingness to participate and respond honestly. To mitigate this, participants were assured of confidentiality, were not required to provide their names or contact information, and completed the questionnaire in a calm and private environment, thereby creating a safe space for honest responses. Participants were also informed that participation was entirely voluntary, and withdrawal at any stage would have no impact on their access to healthcare services.

Another limitation was the potential for response bias due to the self-reported nature of the instrument. To address this, the researcher was present during questionnaire completion while maintaining an appropriate distance to clarify any ambiguities and ensure participants' correct understanding of the questions.

Conclusion

The present study indicates that women with HPV are in a more vulnerable position regarding sexual self-care compared to healthy women. These findings, consistent with the studies discussed, emphasize that HPV is not merely a viral infection but a complex health and social condition that may influence individual health behaviors. Focusing solely on medical treatment without addressing these behavioral challenges would be may insufficient.

Therefore, it is recommended that care for women with HPV be approached comprehensively, integrating sexual counseling, self-care skill training, mental health screening, and couples counseling as essential components of the treatment protocol. Investment in structured educational programs for this population could not only reduce the burden of HPV-related conditions but also represent a critical step toward enhancing overall sexual self-care and promoting community health.

Abbreviations

WHO

World Health Organization

HPV

Human papillomavirus

STIs

Sexually transmitted infections

FSHS

Female Sexual Health Self-Care Scale

CVI

Content Validity Index

CVR

Content Validity Ratio

Declarations

Ethics approval and consent to participate

The study was approved by the ethics committee of Shahid Beheshti University (Ethics code :IR.SBMU.PHARMACY.REC.1403.352). Written informed consent was obtained from all participants.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

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Author Contribution

ZM designed the study, performed data collection, and drafted the manuscript. MS provided guidance throughout all stages of the study. PP assisted in data collection. MN contributed to all statistical analyses. All authors read and approved the final manuscript.

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Data Availability

The datasets generated and analyzed during the current study are not publicly available due to privacy restrictions but are available from the corresponding author on reasonable request.

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